Paris Maligned II

Climate alignment assessments reveal oil and gas company transition risk exposure

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Carbon Tracker Initiative

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About Carbon Tracker

The Carbon Tracker Initiative is a team of financial specialists making climate risk real in today's capital markets. Our research to date on unburnable carbon and stranded assets has started a new debate on how to align the financial system in the transition to a low carbon economy.

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Table of Contents

1 Key Findings

- **The world's largest oil and gas companies are still not aligned with the goals of the Paris Agreement,** despite corporate messaging on supporting a low-carbon future.
- **Key to achieving Paris alignment will be planning for production declines and sanctioning fewer new developments,** both of which will help to insulate companies from the demand substitution risk from the energy transition.
- **Investor appetite for climate alignment assessments is increasing,** whether as a proxy for transition risk exposure, to ensure climate targets/investment mandates are met, or from a universal ownership perspective.
- **We assess the compatibility of the Upstream portfolios of 25 of the world's largest oil and gas companies** against a moderate transition scenario (APS/1.7°C), as well as considering 1.5°C-alignment.
    - **Companies are still sanctioning new projects which are incompatible with Paris:** TotalEnergies and CNOOC's massive Uganda expansion has seen six new projects sanctioned, three of which are not compatible even with a slow transition/2.4°C future.
    - **Additional large projects inconsistent with a slow transition (/2.4°C scenario appear to be on course for development** including Chevron's Aphrodite gas field and TotalEnergies' offshore Cameia project.
- **We then combine these assessments alongside other key metrics to provide a holistic assessment of company climate alignment.** Companies are graded from A-H, based on the alignment of their investment options, production plans, emissions targets and executive remuneration policies.
    - **bp** ranks the highest, with a D grade.
    - **Repsol, Equinor, Eni, Shell, and TotalEnergies** each receive an E.
    - **ExxonMobil, Petrobras, Saudi Aramco, and ConocoPhillips** are among the worst performers.
- **Investors seeking improved alignment performance should engage companies on:**
    - The disclosure of long-term production plans alongside investment plans
    - Key project sanctions which are not aligned with Paris.
    - Emissions targets meet our hallmarks with credible methods to achieve.
    - Ensuring that executive remuneration policies do not reward CEOs for growing production (e.g. using say on pay votes)

2 Executive Summary

The energy transition is well underway. Driven by technology substitution and accelerated by policy action on climate and energy security, the transition will see the world increasingly shift towards an energy system based on clean technologies. Changing patterns of energy consumption and production will have significant consequences for the oil and gas industry, which is facing an irreversible decline in demand for its core products.

Growing public awareness of the urgent need to act on climate change is increasingly reflected in the investment preferences of asset owners. Some are seeking for their capital to be 'aligned' with a given climate/temperature warming outcome or wish to be a 'sustainable' investor, while others seek to assess climate-alignment of investments from a 'universal owner' investment perspective. A further group may seek to understand climate-alignment primarily from a desire to mitigate transition risk exposure. Irrespective of motivation, investors who set targets will need a means to evaluate an investment's compatibility with them.

Companies' potential project options reveal transition risk exposure...

Evaluating the portfolio of projects options available to an oil and gas company can illustrate both its transition risk exposure and its climate alignment. Declining demand for hydrocarbons will likely imply lower future prices, which producers should duly incorporate into their strategic decision-making. Near-term overinvestment could have a significant impact on a company's future cash flow generation - producers with lower-cost portfolios who adequately prepare for declining demand are likely to be more financially resilient should prices fall in the future.

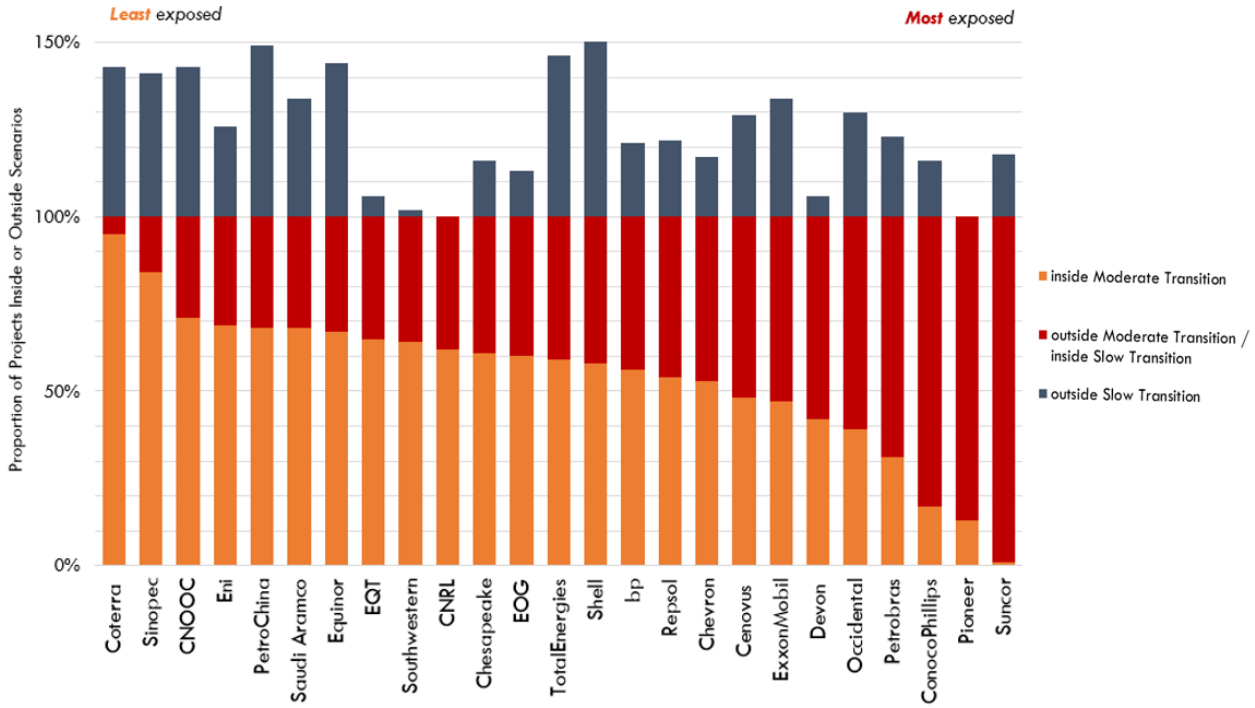
We analyse the cost-competitiveness of the portfolios of 25 of the world's largest oil and gas companies (the majors, several NOCs, and independents) to evaluate which are relatively more exposed low-demand futures (Figure 1). Among the majors, we find Eni and Equinor to have the least risky portfolios, whereas ConocoPhillips, Occidental, and ExxonMobil are relatively more exposed. NOCs perform better, reflecting their more cost-competitive portfolios comprised of largely conventional projects.

... and, alongside production plans, is crucial for assessing a company's alignment with Paris

Our analysis of project options can also be interpreted as the degree to which a company is aligned with a given temperature scenario: a company can hardly be considered aligned with a 1.7°C (APS) or even 2.4°C (STEPS) future if its business model depends on selling oil and gas which threaten the achievement of these goals.

Company production plans are also a key factor in assessing alignment. We find that many producers are still publishing guidance indicating that production will increase, at least in the near term but also in the longer term. Bp is the only producer to have stated that production will fall by 2030, though Equinor, Repsol and Shell have committed to keeping production volumes steady by then. Many other producers have not published guidance past the mid-2020s, though TotalEnergies, Saudi Aramco and ConocoPhillips have indicated that they expect production to increase significantly through to 2030.

FIGURE 1: COMPATIBILITY OF POTENTIAL NEW UPSTREAM PROJECTS WITH TRANSITION SCENARIOS



Sources: Rystad Energy, IEA, CTI Analysis Notes: Future capex (2024-2030) on unsanctioned projects compatible with different scenarios, as a % of business-as-usual plans (STEPs). Ordered by % capex compatible with APS.

We combine our assessments to assign each company a combined alignment grade...

Investment and production plans will ultimately determine a company's contribution to global emissions and are therefore instrumental in determining whether a company is operating in line with the goals of the Paris Agreement. However, Carbon Tracker also assesses alignment across other metrics, which investors can use for insight into, or indeed to influence, a company's alignment performance. These metrics include emissions targets (covered in our Absolute Impact series) and executive remuneration policies (in Crude Intentions). Here, we combine our assessments into a combined alignment grade to illustrate each company's standing vs peers (Figure 2).

.. and find that oil and gas companies are far from aligned with Paris goals

Across the board, our results show that the industry is lagging far behind in what is required to be aligned with the goals of the Paris Agreement. bp receives the highest grade of D, helped by its ambition to cut production by 2030. Six companies, including the European majors receive an 'E' grade, though we would note that several did not have any recent project sanctions and therefore scored favourably on that metric. Aramco, Petrobras, ExxonMobil, and Pioneer all fall towards the bottom of the ranking, due in part to their unambitious emission reduction targets but also due to their (at least) near-term plans to expand production.

Combined alignment grades, and scoring across alignment metrics, can direct investors to areas in which they can influence companies to improve their performance, e.g., by voting on remuneration plans during voting season. If a company fails to make progress over time, then investors will need to consider whether or not their investment is compatible with their own investment objectives.

FIGURE 2: COMBINED ALIGNMENT ASSESSMENT

Company	*Individual Unweighted Scores (all out of 4)*					Overall Grade
	Investment Options	Recent Sanctions	Production Plans	Emissions Targets	Remuneration	
bp	2	2	3	2	1	D
Chesapeake	2	4*	3	0	1	E
Equinor	2	3	2	1	2	E
Repsol	2	2	2	2	1	E
Eni	2	2	1	3	1	E
Shell	2	2	2	1	1	E
TotalEnergies	2	2	1	2	1	E
Chevron	2	3	1	1	1	F
EQT	2	4*	1	0	2	F
Occidental	1	4*	1	1	3	F
Southwestern	2	4*	1	0	2	F
Coterra	2	4*	1	0	1	F
EOG	2	3	1	0	1	F
PetroChina	2	3	1	0	1	F
CNRL	2	2	1	0	1	F
Cenovus	1	4*	1	0	1	F
CNOOC	2	2	1	0	0	F
Devon	1	4*	1	0	1	F
Sinopec	2	2	1	0	0	F
Suncor	0	4*	1	1	2	F
ExxonMobil	1	2	1	0	1	G
Petrobras	1	3	1	0	0	G
Saudi Aramco	2	3	0	0	0	G
Pioneer	0	4*	1	0	1	G
ConocoPhillips	0	3	0	0	1	H
Weight	*30%*	*10%*	*30%*	*20%*	*10%*	-

*Sources: company reporting, CTI analysis, IEA, Rystad Energy. Notes: we assess production targets as of 29 February 2024, emissions targets as of August 2023, and remuneration policies for 2022. Rystad data as of September 2023. Companies graded from 0 (worst) to 4 (best) on each metric. *denotes companies for which no recent sanctions were identified, so were scored a 4. Companies ordered by combined score; those with the same score are ordered alphabetically. We do not currently assess credibility of emissions re in our methodology and therefore top score is a 3. We note, however, significant shortcomings in the credibility of emissions reductions plans of those in our blue band (scores 3 and 2) related to the use of offsets, CCUS, and NBS and the commercial viability of these. See Appendix for full methodology.*

3 Introduction

The paradigm shift that is currently taking place in the global energy system is moving energy needs away from fossil fuels and towards clean technologies. This shift is being driven by technological substitution, as cheaper, cleaner, more secure sources of energy come to market, reducing global dependency on hydrocarbons. Policy action on climate is accelerating these developments, as governments worldwide ramp up efforts aimed at achieving the goals of the Paris Agreement.[1]

Technological substitution is displacing demand for fossil fuels...

Fossil fuels are being progressively undercut as the world's key sources of energy. The cost of power generation from renewables are falling rapidly,[2] and their deployment have consistently outpaced forecasts.[3] The global passenger vehicle fleet is rapidly electrifying, with battery electric vehicles (BEVs) adoption following the classic S-curve trajectory of technology disruption. [4] These developments, among others, have led the IEA to predict that demand for oil, gas, and coal will all peak before 2030.[5]

These changing patterns of energy production and consumption will have significant consequences for oil and gas producers, whose business is predicated upon selling a product which is facing an irreversible decline in demand. This is a critical juncture for fossil fuel companies: **investment decisions made in the near-term could have drastic implications for the financial health of the company over the next decades.**

… Putting future revenues from oil and gas investments at risk

Lower future commodity demand naturally implies lower future commodity prices. Carbon Tracker has long argued that prices therefore could fall below the level which some individual oil and gas investments require to generate an economic return. This is particularly the case for new projects, which could produce well into the 2030s and beyond, as commodity price risk accelerates. Existing projects, while less exposed, are not completely immune either. Future cash flows from producing facilities could also be at risk, impacting the NPV of assets, and thus negatively impacting company and financial instrument valuations, even for those with are heavily weighted towards already-producing assets.

Porfolio analysis reveals producers' transition risk exposure and climate alignment

In this report, we analyse producers' risk exposure to lower demand scenarios by evaluating the cost-competitiveness of their assets. Our findings can also illustrate a company's alignment with a given temperature warming scenario, and therefore its alignment (or lack thereof) with the goals of the Paris Agreement. Evaluating companies' climate alignment has become a part of investment decision-making for many investors, particularly those who have set decarbonisation or alignment targets for their portfolios.

[1] E.g., in the EU (Reuters, EU recommends ambitious 2040 climate target, goes light on farming (02/06/24) and in China (Carbon Brief, Why China is set to significantly overachieve its 2030 climate goals (19/05/22).
[2] International Renewable Energy Agency (IRENA), Renewable Power Generation Costs in 2022 (2023)
[3] IEA, Renewable power on course to shatter more records (01/06/23)
[4] See Carbon Tracker, Driving Change (2023) for more details.
[5] IEA, Oil 2023 (2023); IEA, World Energy Outlook (2022).

There are different motivations among asset owners, asset managers, banks and other financial institutions for assessing the climate alignment of investments:

- Assessing a company's alignment with a lower-carbon future scenario can be used as a proxy for the degree of **transition risk exposure** under that scenario. The CA100+, for example, provide such assessments (albeit framed as "climate" risk.)
- Large, long-term institutional investors are increasingly **adopting a 'universal owner'** investment perspective.[6]
- There is an increasingly large cohort of assets owners seeking for their **capital is managed 'sustainably'** due to e.g., beneficiary concerns around contributing to climate change).[7]
    - Asset managers are offering a growing range of 'aligned'/'sustainable'/'transition' products to cater to these investment preferences and attract capital, or at least prevent it from going elsewhere.
    - See for example the growing membership of initiatives under which investors pledge to decarbonise their portfolios in line with the goals of the Paris agreement, like the Net Zero Asset Managers Initiative ($57tn AUM)[8] and the Net Zero Asset Owners Alliance ($8tn AUM).[9]
- Banks and other financial institutions are operating under **alignment mandates** set for their lending (or other) portfolios, particularly those with large retail arms and who are the subject of heightening societal pressure to combat climate change.

Investments should be compatible with transition risk appetite and/or alignment mandates

Investors will ultimately need to determine whether an oil and gas investment is compatible with both their appetite for transition risk, and/or any portfolio climate alignment targets they may have. Such assessments are crucial to protect future returns and to ensure alignment mandates are met.

This report aims to assist investors in this evaluation by analysing the performance of 25 of the largest Upstream oil and gas companies against Carbon Tracker's indicators of transition risk and climate alignment.[10] For a more detailed account of each company, see our Oil and Gas Company Profiles.

We assess oil and gas company portfolios to determine their relative exposure to transition risk under, or alignment with, different demand scenarios. Our least cost modelling approach links the global supply of oil and gas at the individual asset level to demand pathways and their associated commodity prices, under different IEA transition scenarios (Box 1). We then use data on asset-level economics from Rystad Energy to determine which assets are either compatible or not with each scenario, based on their relative cost competitiveness. We then take the aggregate capex and production from assets that are compatible with each scenario, and determine the proportion a

[6] See e.g., Wiltshire Pension Fund (WPF) recently divested its fossil fuel investments as, "As a long-term investor, WPF's goal is protect the investments from climate change risk and safeguard the financial future of the fund." Net Zero Investor, Wiltshire Pension Fund to divest all fossil fuel assets by 2030 (11/12/23).
[7] See e.g., PFZW, a Dutch pension fund ($234bn AUM) recently divested its holdings in 310 upstream companies who were "not prepared to adapt their business models to 'Paris'". Net Zero Investor, Dutch pension fund divests €2.8bn from Shell, BP and other fossil fuel firms (08/02/24)
[8] Net Zero Asset Managers, About [accessed 20/02/22]
[9] Net Zero Asset Owners Alliance, Third progress report (2023)
[10] Universe includes the 25 largest publicly traded oil and gas companies, by Rystad 2022 production volumes, excluding fully state-owned NOCs and companies based in Russia. Future investment analysis for a further 39 producers is available in Appendix 6.3.

company's full portfolio (in terms of capex and production) that is compatible or not with each scenario.

BOX 1: SUMMARY OF IEA SCENARIOS[11]

Slow transition (2.4˚C) –The Stated Policies Scenario (STEPS): forecasts future demand where existing government pledges are met, but it does not take into account pledges which have been only as of yet, announced. In effect, it can be considered a continuation of the status quo - many oil and gas companies are effectively planning on this pathway.[12] Oil demand peaks before 2030, and it is associated with a temperature rise of 2.4˚C in 2100. STEPS is a forecast scenario, contingent on the level of policy action.

Moderate transition (1.7˚C) – The Announced Pledges Scenario (APS): forecasts a demand trajectory based on both existing and announced government pledges, regardless of whether pledges have been legislated. Under APS, renewables generate c. 50% of all electricity by 2030 and oil demand peaks within five years; the emissions trajectory leads to 1.7˚C of warming by 2100. APS is a forecast scenario, contingent on level of policy action. APS is a forecast scenario, contingent on the level of policy action.

Fast transition (1.5˚C) – The Net Zero Emissions by 2050 Scenario (NZE): sets out a normative pathway for policy action to achieve a 1.5 ˚C by 2100 warming outcome. Demand for oil and gas falls by c. 60% by 2040. NZE is a normative scenario, which describes policy action required to achieve a 1.5˚C temperature warming outcome.

Considering climate-alignment across multiple metrics gives a holistic view of companies' relative positioning on climate

The oil and gas industry is both carbon intensive and inherently vulnerable to changing patterns of energy consumption, and so it is crucial for investors who have climate or transition risk concerns to scrutinise companies' potential investments and production plans. There are additional indicators which can help inform investors of companies' relative performance, particularly for assessing climate alignment.

To provide investors with a holistic view of company performance, we present a combined alignment grade for each company in our universe. This grade considers investment and production plans, as well as two other key metrics for Paris alignment: emissions reduction targets and executive incentive policies.[13]

[11] IEA, World Energy Outlook 2023 (2023)
[12] See Carbon Tracker's Oil and Gas Company Profiles for details on producers' choices of demand scenario for investment decision-marking.
[13] Carbon Tracker's Absolute Impact series covers the alignment of company emissions targets; Crude Intentions II (2024) is most recent iteration of our series on executive remuneration.

4 Transition Risk in Investment & Production Plans

As peak demand for oil and gas draws ever closer, the decision to sanction new developments carries even more weight. New conventional oil and gas projects, particularly large, complex developments, can take years to come online and could have future cash flows extending into the 2040s; returns generated from such assets will be exposed to the market dynamics of the unfolding energy transition.

Near-term investment decisions will have long-term implications for upstream returns

Overinvestment by the industry could lead to the market being oversupplied with oil and gas in the coming decades: Carbon Tracker's recent Navigating Peak Demand found that, should the industry continue to invest in a business-as-usual manner out to 2030 oversupply could result even under a moderately paced transition.[14] Companies – and their investors – who invest in the near term without due consideration of the unfolding energy transition could bear the brunt of this potential oversupply, though some are better positioned than others to be among the last market players standing.

Falling future oil and gas demand would put downward pressure on long-term prices, the impact of which may include a fall in cash flows (and asset NPVs), as well as volumes profitably sold. These price dynamics will need to be factored into decisions on the appropriate production volume to maintain, and the level of investment into new assets. Allowing projects to deplete naturally, without replacement, would reduce exposure to future commodity price risk but could come at the expense of future revenues. Maintaining production would require investing in new assets, whose heightened risk companies and investors would need to accept. Another option is for companies to accept the write down of cancelled unsanctioned projects and pursue a (partial) depletion strategy, extracting value rather than re-investing cash flows. We explore the implications of these strategies in more detail in Navigating Peak Demand.

Producers with lower-cost portfolios who have adequately prepared for falling demand will likely weather the transition much easier than those with less diversified or higher-cost asset bases, particularly if they engaged in risky expansionary strategies in the 2020s.

4.1 Future Investment Options – Capital at Risk

A company's exposure to transition risk is related to both the competitiveness of existing projects (and duration risk of current productive assets) as well the economics of its potential projects. Our analysis focuses primarily on project options (which have yet to be sanctioned) as those are where companies and their investors have the greatest potential impact.

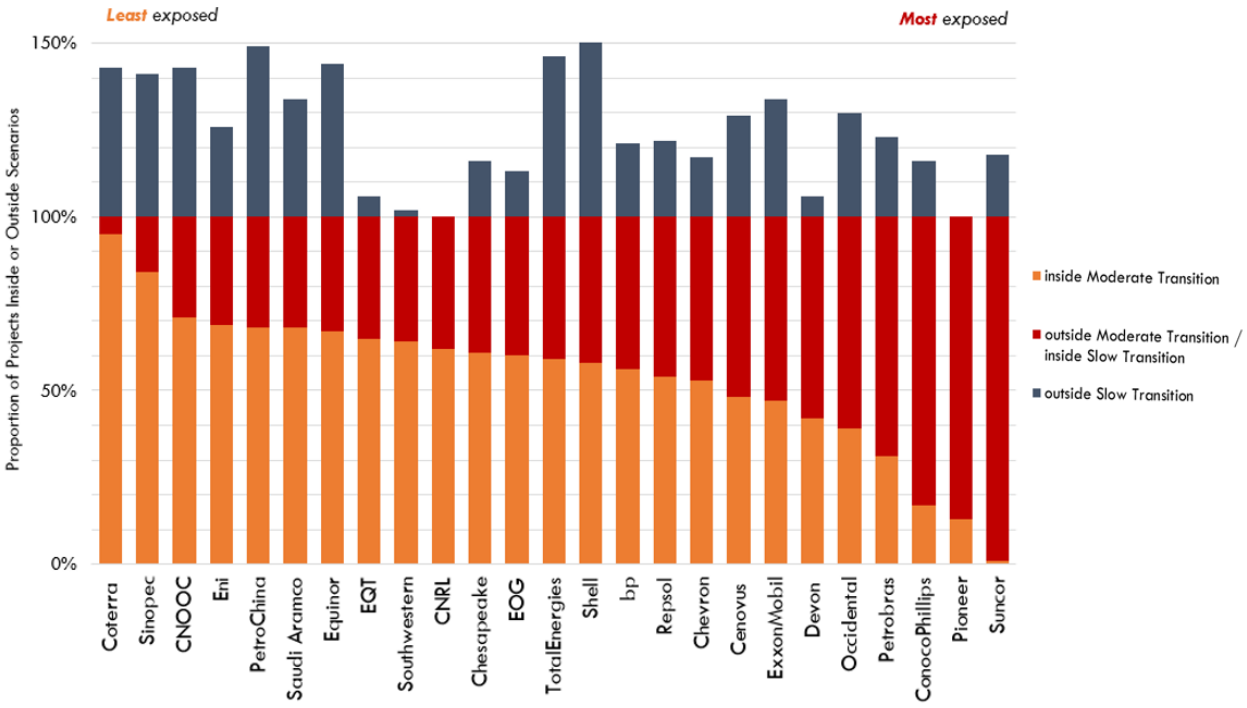
Figure 3 breaks down each producer's project options, showing what proportion may be at risk under a slow (STEPS) or moderate (APS) paced transition. These scenarios capture the demand

[14] Moderate transition based on the Forecast Policies Scenario (FPS) from the Inevitable Policy Response (IPR) programme.

pathway that the IEA forecasts, based on current (or, for APS, announced) government policies.[15] Companies with large red bars – i.e. with large portions of future investment falling outside of a moderate transition scenario – are most exposed to lower future demand.

We use STEPs as a proxy for companies' business-as-usual investment plans, and therefore focus primarily on projects that fall within that scenario. However, some companies will plan for a future in which oil demand is higher than a slow transition/STEPs scenario – Saudi Aramco (and OPEC more broadly) and ExxonMobil have dismissed the IEA's forecast that oil demand will peak this decade.[16] Such a view could well see companies sanction projects which fall outside STEPS (dark blue bars,Figure 1Figure 3) with the associated capital put at risk. Indeed, we find that companies have been sanctioning such high-cost projects in the recent past (Table 3).

FIGURE 3: COMPATIBILITY OF POTENTIAL NEW UPSTREAM PROJECTS WITH MODERATE AND SLOW TRANSITION SCENARIOS



Sources: Rystad Energy, IEA, CTI Analysis
Notes: Future capex (2024-2030) on unsanctioned projects compatible with different scenarios, as a % of business-as-usual plans (STEPs). Ordered by % capex compatible with APS. Rystad data as of September 2023. See Appendix 6.3 for results for a further 39 companies.

National oil companies (NOCs) are almost universally more aligned with a moderate transition scenario (APS/1.7°C), except for Petrobras. This reflects their more cost-competitive portfolios made up of largely conventional oil and gas projects, which carry lower breakeven prices than many of the majors or independents.

The majors are largely concentrated within the middle third of the cohort, reflecting the diverse nature of their portfolio options which are spread across many geographies and resource type. Eni,

[15] The NZE, on the other hand, is normative scenario which describes a potential pathway to achieve a 1.5°C temperature outcome.
[16] Reuters, Aramco, Exxon CEOs push back against forecasts of peak oil demand (18/09/23)

as in previous iterations of this analysis, appear to have the relatively least risky portfolio among the majors.

Results for oil sands producers are mixed: CNRL outperform many of the majors, whereas Cenovus appear to be more exposed to a moderate transition than most. Shale focused producers, like Pioneer, ConocoPhillips, Occidental, and Devon, on the right-hand side of the chart appear as the most exposed to a moderate transition, though shale producers' portfolio economics often positions them close to key demand levels on the cost curve, and therefore exhibit high sensitivity to changes in demand (see Figure 7, appendix). On the other hand, shale projects are more flexible in that they generally have shorter lead-times and productive lives, and so are less exposed to duration risk – shale companies are therefore more capable of moderating output levels to meet demand.

Companies should carefully consider the future profitability of new sanctions, especially for projects outside of STEPS.

New projects are at greatest risk from value erosion from falling demand, and we encourage investors to challenge companies who plan to invest in large, high-cost projects at this stage of the energy transition (

Table 1). The largest project falling outside of APS is bp's massive c.$15bn ultra-deepwater Kaskida project, which the company appears to be gearing up to sanction.[17]

Riskier still are projects which fall outside of a slow transition future (blue bars, Figure 3). Oil prices are currently still above the STEPS marginal breakeven price ($65/bbl), which could well entice companies to sanction projects: Chevron, for example, is moving to proceed with Aphrodite,[18] and TotalEnergies appear to be on track to sanction the Cameia offshore project in Angola.[19]

[17] Rystad Energy reports 2024-2030 as c.$9bn; bp has said that the project is likely to cost between $15-20bn. S&P Global, BP readies new Gulf of Mexico oil project Kaskida after Q1 output bounce (02/05/23)
[18] AP, Cyprus and Chevron reach a deal to develop an offshore natural gas field, ending years of delays (01/12/23)
[19] Upstream Online, Fresh FPSO front-runner emerges for challenging TotalEnergies Angola project (13/12/23)

TABLE 1: 15 LARGEST PROJECTS APPROACHING FID IN 2024-2026 OUTSIDE OF A MODERATE TRANSITION SCENARIO (APS/1.7˚C), WITH THOSE OUTSIDE A SLOW TRANSITION (STEPS/2.4˚C) HIGHLIGHTED IN BLUE

Asset	Country	Approval Date	2024-2030 Capex $bn	Production Start	Resource Theme	Ownership
Kaskida	US	2026	8.7	2029	Ultra deepwater, oil	BP* (100%)
Manifa phase 2	Saudi Arabia	2024	5.8	2028	Shelf, oil	Saudi Aramco* (100%)
Atapu (P-84)	Brazil	2024	5.0	2028	Ultra deepwater, oil	Petrobras* (66%); Shell (17%); TotalEnergies (15%); Galp (1.2%); PPSA (0.95%); Sinopec (0.51%)
Baleine Phase 3	Côte d'Ivoire	2025	4.7	2028	Deepwater, oil	Eni* (90%); Petroci (Côte d'Ivoire) (10%)
Sepia (P-85)	Brazil	2024	3.9	2028	Ultra deepwater, oil	Petrobras* (55%); TotalEnergies (17%); Petronas (13%); QatarEnergy (13%); Galp (1.7%); Sinopec (0.72%)
Aphrodite	Cyprus	2025	2.1	2029	Ultra deepwater, gas	Chevron* (35%); Shell (35%); Delek Group (30%)
Fangtooth	Guyana	2025	2.0	2029	Ultra deepwater, oil	ExxonMobil* (45%); Hess (30%); CNOOC (25%)
Cameia	Angola	2024	1.8	2027	Ultra deepwater, oil	TotalEnergies* (80%); Sonangol (20%)
Pedunculo	Brazil	2026	1.7	2030	Ultra deepwater, oil	Petrobras* (55%); TotalEnergies (17%); Petronas (13%); QatarEnergy (13%); Galp (1.7%); Sinopec (0.72%)
Verus (x-Evans Shoal)	Australia	2026	1.7	2030	Ultra deepwater, oil	Eni* (65%); Petronas (25%); Osaka Gas (10%)
Turbot	Guyana	2026	1.7	2030	Shelf, gas	ExxonMobil* (45%); Hess (30%); CNOOC (25%)
Tupi (x-Lula) Unitised Reservoir	Brazil	2026	1.7	2030	Ultra deepwater, oil	Petrobras* (67%); Shell (23%); Galp (6.5%); Sinopec (2.8%); PPSA (0.55%)
Leopard	US	2026	1.7	2028	Ultra deepwater, oil	Shell* (50%); Chevron (50%)
Fangtooth South East	Guyana	2025	1.6	2029	Ultra deepwater, oil	ExxonMobil* (45%); Hess (30%); CNOOC (25%)
Sagitario	Brazil	2026	1.6	2030	Ultra deepwater, oil	Petrobras* (60%); Shell (20%); Repsol (12%); Sinopec (8%)

*Sources: Rystad Energy, IEA, CTI Analysis. Notes: largest projects by capex (2024-2030) where a final investment decision (FID) is expected in 2024, 2025, or 2026, that are considered incompatible with a moderate transition scenario (APS). Projects incompatible with a slow transition scenario (STEPS) shown in blue. * Denotes Operator; Ownership stakes rounded to two significant figures. Chevron announced its acquisition of Hess in September 2023. Rystad data as of September 2023.*

4.2 Future Production Plans – Duration Risk

In the face of falling demand for their core products, oil and gas producers will need to decide on the appropriate level of production to maintain. Sanctioning new projects to eke out more volume In effect, the choice to be made is on how much it is worth to pursue future revenues that may not materialise.

Production guidance provides insight into a company's near-term strategic transition response

Investors can use production guidance as an indicator of a company's continued level of investment and its view on the pace of the transition (Table 2). Some independents and NOCs, however, have only published guidance over the relatively near term, which will be largely determined by production from existing projects. This can complement analysis of new project options (Section 4.1) to assess exposure to commodity price risk, investors should press companies on their longer-term plans for production.

Of those companies that have released longer-term guidance, bp is alone in targeting a reduction, while Equinor, Repsol and Shell are planning to hold production flat. These moves could be could a sign that companies are recognising that demand for their core products is unlikely to increase. Such views are in the minority across the industry however, evidenced by the many companies which targeting significant increases in total volumes.

TABLE 2: REPORTED PRODUCTION GUIDANCE (WITH % CHANGE VS 2022)

Company	Production Guidance / Target	Year for achieving target production	% change in production vs 2022 baseline
bp	Aiming for 2 mmboe/d in Upstream oil and gas production	2030	-13%
Cenovus	Aims to produce 770-810k boe/d	2024	+1%
Chesapeake	Production is expected to decline in 2024 compared to 2022	2024	-33%
Chevron	Expected production of c. 4 mmboe/d	2027	+33%
CNOOC	Target full year production 810-830 mmboe	2026	+31%
CNRL	Targeted production growth of ~4-5%	2025	+10%
ConocoPhillips	Aim to produce >2.5 mmboe/d on average over period	2029-32	+47%
Coterra Energy	Aim to produce 655-688k boe/d on average over period, driven by oil production growth	2024-26	+6%
Devon Energy	Aims to produce 650 kboe/d	2024	+7%
Eni	Expected production growth of 3-4% CAGR vs 2022	2026	+15%
EOG Resources	Aiming for 1015-1097 mmboe/d (total volume) and 486-492 mmbbl/d (oil)	2024	+16% (total) +3% (oil)
EQT Corporation	Aim to produce 2200-2300 bcfe	2024	+16%
Equinor	Aiming to hold oil and gas production constant at 2 mmboe/d	2030	0%
ExxonMobil	Targeted production volume of 4.2 mmboe/d	2027	+12%
Occidental	Aim to produce 1,220-1,280 kboe/d	2024	+8%
Petrobras	Aim to produce 3.2 mmboe/d	2028	+19%
PetroChina	Planned total output 1,273 mmboe	2023	+3%
Pioneer	Aim to produce 750-766 kboe/d	2024	+17%
Repsol	Aim to produce 550k boe/d on average	2024-27	0%
Saudi Aramco	Maintain crude oil maximum sustainable capacity (MSC) at 12 mmboe/d Target >50% increase in gas production	- (oil) 2030 (gas)	0% (oil) +43% (gas)
Shell	Stable liquids and growth in gas	2030	0% or slight reduction
Sinopec	Target full year production 496 mmboe (actual: 501 mmboe / +3%)	2023	+1%
Southwestern Energy	Aiming for 4.6 bcfe/d (actual: 4.6 bcfe/d / +0%)	2023	+1%
Suncor	Aim to produce 770-810k mmboe/d	2024	+6%
TotalEnergies	Grow oil and gas production by 2-3% a year over next five ye	2028	+2%

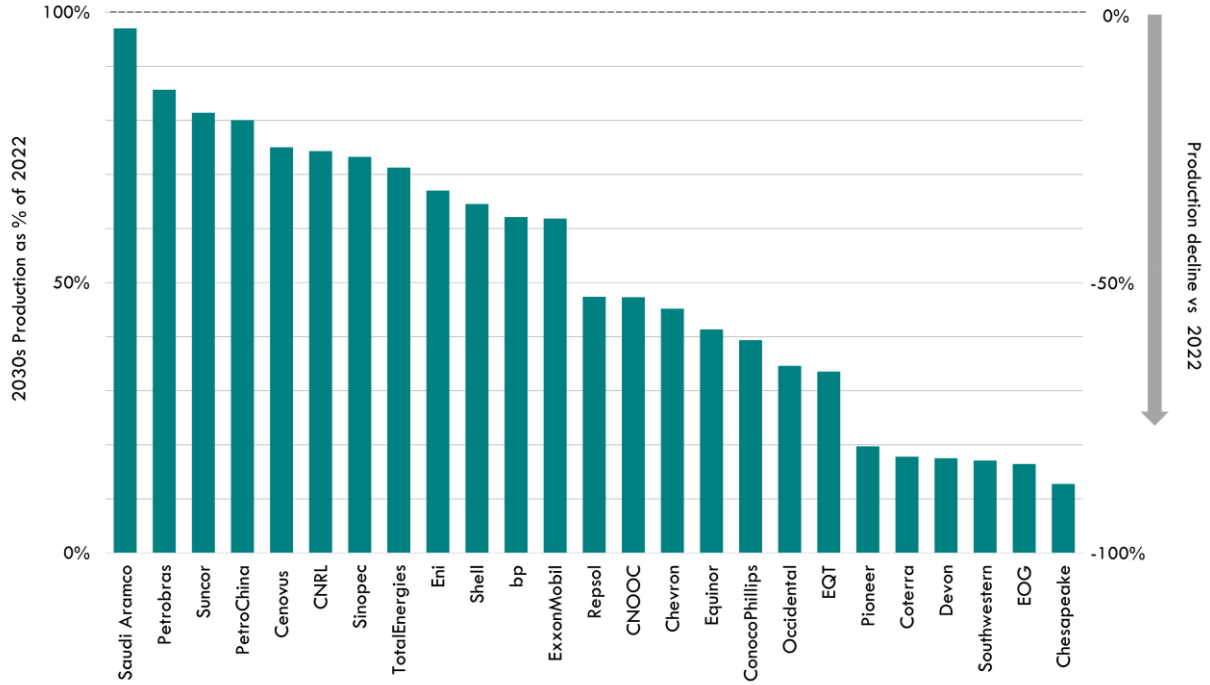
Sources: see Appendix 6.2
Notes: Production increases/declines calculated by CTI using the company's reported 2022 production figures and production guidance as of 29/02/24. Where a company expresses a target as a range, the midpoint has been used. bp's 2022 production and 2030 target excludes its stake in Rosneft; ExxonMobil's 2022 production and target excludes Pioneer. Sinopec and Southwestern Energy have not announced production guidance for 2024 – targets shown are for 2023 vs actual 2023 production. Targets as of 29 February 2023.

Production declines from existing assets offer a view of duration risk

The amount of replacement investment a company will require to maintain output levels will vary based on their portfolio economics; shale producers will see production volumes deplete at a far faster rate than those companies focussed on long-cycle, conventional resources. Figure 3Figure 4 demonstrates the variance in production duration across company portfolios, with the teal bars showing a company's production in the 2030s should no new projects be sanctioned.

Investors can use this as an indicator of duration risk in a company's portfolio: those facing significant falls in volumes from existing projects will require substantial investment in new projects to maintain production. Those new projects will carry significant exposure to lower future demand and commodity prices.

FIGURE 4: DURATION RISK - AVERAGE PRODUCTION FROM EXISTING ASSETS IN 2030S AS A % OF 2022 PRODUCTION



Sources: Rystad Energy, IEA, CTI Analysis. Notes: 2031-2040 average production from already sanctioned projects as a % of 2022 production. Rystad data as of September 2023.

Saudi Aramco, Petrobras, PetroChina and Sinopec see small declines in production, however that is not to say that they are immune from transition risks. The fiscal health of petrostate economies is heavily dependent on oil prices and would face serious challenges in even a moderate transition scenario, as we have shown in reports including Petrostates of Decline.[20]

Shale projects have relatively short productive lives, which means that shale producers are clustered to the right of the chart with the biggest declines in production from existing assets – and therefore require the most replacement investment if companies wish to maintain production volumes. However,

[20] Petrostates of Decline (2023) and its precursor, Beyond Petrostates (2021), analyses the shortfalls in future revenues which petrostates could face under different paced transition scenarios.

diversified companies with large shale operations like Chevron, Equinor, and Repsol, will also need to contend with the implications of fast depleting short cycle projects.

That said, recent M&A activity in the upstream industry suggests that companies are starting to view expanding production via short-cycle projects as a hedge against duration risk and long-term demand destruction (Box 2).

BOX 2: MAJORS TARGET SHALE IN M&A ACTIVITY

The past year has seen a flurry of M&A activity in the upstream industry, with companies in particular choosing targets in order to expand their shale capacity. ExxonMobil's $60bn acquisition of Pioneer, announced in October 2023, will see Exxon's Permian shale production volumes double.[21] In mid-2023, Chevron announced a takeover of shale producer PDF Energy, [22] and it intends to takeover Hess Corporation, which – if successful[23] - would further increase Chevron's presence in the Permian. Occidental has also revealed plans to expand shale production via its acquisition of CrownRock.[24]

These moves indicate that companies could be realising that short-cycle plays offer more favourable risk/reward profiles (via the reduction in duration risk) than long-cycle conventional projects at this stage of the transition. However, that is not to say that the acquisitions are without risk: Chevron's Hess acquisition in particular carries with it exposure to large, long lead time projects in Guyana, the economics of which are exposed to falling future commodity demand.

Investors should ensure that M&A activity by portfolio companies is aligned with their view on future demand trajectories: capital spent on acquiring suboptimal targets at this stage of the transition could be better off spent elsewhere or returned to shareholders.

[21] ExxonMobil, ExxonMobil announces merger with Pioneer Natural Resources in an all-stock transaction (11/11/23)
[22] Chevron, Chevron announces agreement to acquire PDC energy (22/12/23)
[23] At time of writing, ExxonMobil is challenging the acquisition over a stake in the Stabroek oil field. Reuters, Exxon's curveball move in Guyana alters Chevron-Hess deal prospects (28/02/24)
[24] Occidental, Occidental to Acquire CrownRock, Strengthening its U.S. Onshore Portfolio with Premier Permian Basin Assets (11/12/23)

4.3 Considerations for Stakeholders

While here we focus on future production and investment as measures of transition risk exposure, we note that there are other factors which investors can use to for insights into a company's assumptions about the transition, and the viability of a company's strategic response its challenges (Box 3).

BOX 3: OTHER INDICATORS OF TRANSITION RISK EXPOSURE

Beyond production and investment plans, investors should expect to see demand substitution and commodity price risk duly reflected in a company's:

- **Corporate strategy:** companies have a range of strategic options in response to demand substitution risk, from depleting production (whether at a natural or accelerated rate) to replacing or indeed growing production. In Navigating Peak Demand, we outline the investor implications for these strategic options.
- **Commodity price assumptions:** the long-term commodity price forecasts that a company uses within business planning, if they are disclosed, can give an insight into the company's view on future demand and the pace of the transition. The CA100+ Indicator 4, for example, provides an assessment of how compatible a company's oil price forecast is with different transition scenarios.[25]
- **Remuneration targets:** the structure of executive remuneration packages reveal what corporate strategy management are incentivised to pursue. Direct growth metrics imply that CEO is remunerated based on increasing production, potentially exposing shareholders to greater risk.
- **Emissions targets:** if framed appropriately, targets can be viewed as a proxy for company production plans and preparedness for the energy transition.
- **Climate related disclosures:** to ensure than a company's financial statements and audit risk reflect considerations of transition risk.[26] We assess corporate climate disclosures in Flying Blind: In a Holding Patten.

Key questions for investors to ask:

- What pace of transition is the company using in its investment and production planning?
- If sanctioning a high-cost project, has the company performed a sensitivity analysis on its exposure to a faster-than-expected transition scenario?
- What amount of new exploration and development is required to meet a company's production guidance?
- Has the company has not released long-term production guidance (beyond 2030)? If not, why?
- Has the company considered that a strategy of (partial) depletion may be more beneficial to shareholders?

[25] Carbon Tracker carries out this assessment for the CA100+ Benchmark - see Carbon Tracker, Oil & Gas Assessments for the Climate Action 100+ (2023).
[26] Carbon Tracker carries out Climate Accounting and Audit assessments for the CA100+ Benchmark – see Carbon Tracker Methodologies (2023).

5 Assessing Paris-Alignment

Having reviewed the transition risk implications for these companies, we now turn to assessing whether these companies can be "climate-aligned" to support a range of financial market participants in their investment decisions. Alignment is often measured in terms of compatibility with the goals of the Paris Agreement (usually 1.5˚C/NZE or the looser 1.7˚C/APS). Having alignment goals requires investors to the compatibility of potential investments: investors seeking Paris-aligned portfolios cannot credibly invest in companies which are not themselves Paris-aligned.

Assessing Paris Alignment requires a multifaceted approach

Chief among the factors relevant to assessing whether an oil and gas company is aligned with the goals of the Paris agreement are investment and production plans. Ultimately, achieving the targets set by the Paris Agreement will depend on reducing global emissions to net zero – to do this, oil and gas producers would need to reduce the volume of fuels that they produce and sell.

However, production and investment decisions are not alone sufficient to render a producer aligned with goals of the Paris agreement. Two additional key alignment metrics we assess here are:

- **Emissions targets:** indicate the extent to which a producer is committed to reducing the emissions for which it is responsible.
- **Executive remuneration incentives:** are an important corporate governance lever for Paris alignment: management should not be incentivised – either directly or indirectly – to expand production if the company is aiming to be Paris aligned.

We first summarise our assessments under the individual metrics before combining them to give a combined overall assessment of company climate alignment.

5.1 Investment and Future Production

The investment and production analysis of the previous chapter can also be used to measure company alignment with various climate scenarios. Given the significant contribution of oil and gas production to climate change, there is the potential for companies (and their investors) to be perceived as being complicit in taking warming to a specific outcome, should they continue to sanction and produce fossil fuels could lead the world to breach its carbon budget.

Diversification efforts will not necessarily make a company more Paris-aligned

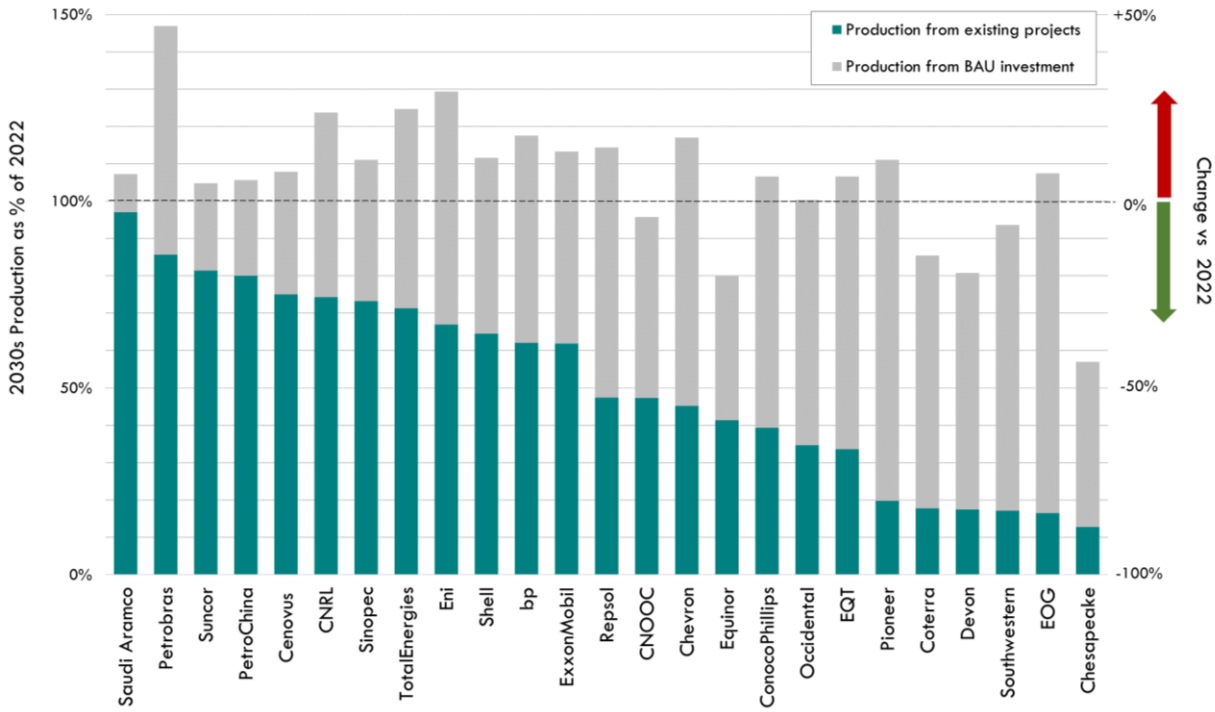
Many oil and gas companies have reported their intentions to be become "integrated energy companies", pointing to the development of renewables and other clean technologies as evidence of their commitment towards becoming energy companies fit for a lower-carbon future. It is important for investors to recognise, however, that expanding the range of energies produced does not necessarily mean that a company will produce fewer emissions. Chief among the factors that determine Paris-alignment is that oil and gas production fall on an absolute basis, which a shift in the fossil-renewable mix of a company's portfolio does not necessarily guarantee.

Alignment with 1.5˚C would see production fall significantly into the 2030s

An oil and gas producer cannot be considered aligned with the goals of the Paris Agreement if it continues to sanction projects which would breach the world's carbon budget for a Paris-aligned temperature outcome. This has even stricter implications for those companies and investors aiming to be aligned with 1.5˚C, as the IEA have stipulated that no new long-lead time, conventional projects are required if we are to achieve 1.5˚C. As such, producers that are serious about complying with 1.5˚C need to be prepared for declining production, and investors need to prepare for the implications.

The teal bars in Figure 5 indicate companies' production volumes in the 2030s should no new projects be sanctioned (as in Figure 4) while the grey bars represent each company's future production should they continue with investing in a business-as-usual manner. The ratio of the two bars therefore can be considered a measure of how far companies are from achieving 1.5˚C alignment. Those to the right of the chart, largely shale producers, could be considered less aligned given the amount of investment in new projects required to maintain production. Chevron and Repsol also have significant amounts of potential investment options which, if sanctioned, could result in future production output far beyond what is aligned with 1.5˚C.

FIGURE 5: AVERAGE PRODUCTION IN 2030S FOLLOWING A STRATEGY OF NATURAL DEPLETION VS BUSINESS-AS-USUAL INVESTMENT



Sources: Rystad Energy, IEA, CTI Analysis.
Notes: Teal bars show 2031-2040 average production from sanctioned projects as a % of 2022 production. Grey bars show future production from unsanctioned projects, modelled under the IEA's STEPs scenario, which we use as a proxy for companies' business-as-usual plans. Rystad data as of September 2023.

Comparing reported production guidance with project options can illustrate a company's alignment trajectory

Investors can compare stated production plans (Table 2) with the unsanctioned project options in Figure 5 for insights into the potential trajectory of a company's alignment. For a company to be considered 1.5˚C-aligned, it should be forecasting declines in line with natural depletion from existing projects. Production guidance targeting growth which is in line with the grey bars in Figure 5, on the other hand, indicates that a producer is more aligned to a slow transition/2.4˚C scenario.

Recent project sanctions indicate the alignment of companies' strategic decision-making

Scrutinising recently sanctioned projects can illustrate which climate scenario a company's strategy is currently aligned with. Table 3 lists 15 of the largest projects sanctioned in the last two years.[27] TotalEnergies features prominently with new projects in Norway, Brazil, and six in Uganda (three of which fall outside of a STEPS/2.4˚C scenario). Investors in Total, as well as the other companies listed – particularly those with stakes in projects which are not aligned with even 2.4˚C – will have to question whether this corporate behaviour is compatible with portfolio alignment targets.

[27] From January 2022 – September 2023.

TABLE 3: 15 LARGEST PROJECTS SANCTIONED IN 2022/3 THAT ARE OUTSIDE OF A MODERATE TRANSITION (APS/1.7°C), OR SLOW TRANSITION (STEPS/2.4°C) SCENARIO HIGHLIGHTED IN BLUE

Asset	Country	Approval Date	2022-2030 Capex ($bn)	Production Start	Resource Theme	Ownership
Munin (Krafla)	Norway	2023	2.4	2027	Shelf, oil	Aker BP* (50%); Equinor (50%)
Jobi-Rii	Uganda	2022	1.9	2026	Onshore, oil	TotalEnergies* (56.67%); CNOOC (28.33%); Government of Uganda (15%)
Baleine Phase 2	Côte d'Ivoire	2022	1.8	2025	Deepwater, oil	Eni* (90%); Petroci (Ivory Coast) (10%)
Ngiri	Uganda	2022	1.3	2026	Onshore, oil	TotalEnergies* (56.67%); CNOOC (28.33%); Government of Uganda (15%)
Kingfisher South	Uganda	2022	1.2	2026	Onshore, oil	CNOOC* (28.33%); TotalEnergies (56.67%); Government of Uganda (15%)
Gunya	Uganda	2022	0.8	2026	Onshore, oil	TotalEnergies* (56.67%); CNOOC (28.33%); Government of Uganda (15%)
Irpa (Asterix)	Norway	2023	0.7	2026	Deepwater (Arctic), gas condensate	Equinor* (51%); Petoro (20%); Wintershall Dea (19%); Shell (10%)
Lapa Southwest (BM-S-9)	Brazil	2023	0.6	2025	Ultra deepwater, oil	TotalEnergies* (45%); Shell (30%); Repsol (15%); Sinopec (10%)
Nsoga	Uganda	2022	0.5	2026	Onshore, oil	TotalEnergies* (56.67%); CNOOC (28.33%); Government of Uganda (15%)
Kigogole	Uganda	2022	0.4	2027	Onshore, oil	TotalEnergies* (56.67%); CNOOC (28.33%); Government of Uganda (15%)
Snohvit Future	Norway	2023	0.4	2028	Deepwater (Arctic), gas	Equinor* (36.79%); Petoro (30%); TotalEnergies (18.4%); Neptune Energy (12%); Wintershall Dea (2.81%)
Fulla	Norway	2023	0.4	2027	Shelf, gas condensate	Aker BP* (50%); Equinor (40%); ORLEN S.A. (10%)
Berling (Hades-Iris)	Norway	2023	0.3	2028	Deepwater, gas condensate	OMV* (30%); Equinor (40%); DNO (30%)
Kasamene	Uganda	2022	0.3	2026	Onshore, oil	TotalEnergies* (56.67%); CNOOC (28.33%); Government of Uganda (15%)
Leviathan Phase 1B (pipeline expansion)	Israel	2023	0.3	2025	Ultra deepwater, gas condensate	Chevron* (39.66%); Delek Group (45.34%); Ratio Energies (15%)

Sources: Rystad Energy, IEA, CTI analysis

*Notes: largest projects by capex (2022-2030) where a final investment decision (FID) was made in 2022 or before September 2023, that are considered incompatible with a moderate transition scenario (APS). Projects incompatible with a slow transition scenario (STEPS) shown in blue. A $10/boe margin of error has been applied above the APS marginal breakeven price for oil fields, and a $1.5/kcf for gas. * denotes Operator. Rystad data as of September 2023. Chevron has announced that it will acquire Hess in October 2023. Ownership stakes rounded to two significant figures.*

5.2 Emissions Targets

Reducing emissions to net zero by 2050has become the cornerstone of many corporate climate targets. Over a series of reports, we have argued that emissions reduction targets must be of sufficient scope and ambition if they are to be considered potentially Paris aligned. Carbon Tracker's Hallmarks of Paris-Aligned Emissions Targets (Box 4) provide a framework against which investors can assess company targets.

While we consider meeting the Hallmarks as a pre-requisite for a company's target to be considered Paris aligned, there are other factors which should also be considered, including the scale/magnitude of reductions and the credibility of methods with which they are to be achieved. [28]

BOX 4: HALLMARKS OF PARIS-ALIGNED EMISSIONS TARGETS

For a company's emissions target to be considered potentially Paris-aligned we believe that, at a minimum, it should satisfy these three pre-conditions:

1. Include full lifecycle emissions, including scopes 1, 2, and 3 emissions.
2. Target net-zero by 2050 on a full lifecycle basis, with absolute interim milestones.
3. Cover emissions from the company's own production and global product sales on a full-equity share basis, including downstream product sales from third-party crude.

Our most recent assessment of company emissions targets found that 16 of the 25 fail to meet even one of our Hallmarks, as planned reductions do not cover scope 3 emissions (which comprise c. 85% of a producer's total). Eni is found to have the most ambitious target, with the potential to be considered Paris-aligned if the company outlines a credible strategy for its achievement. TotalEnergies, Repsol, and bp rank behind Eni, respectively, but their targets still fail to cover their full suite of emissions (see Appendix, Figure 9 for detailed results).

5.3 Executive Remuneration

Executive remuneration policies are an important tool which shareholders can use to influence the strategic priorities of company management. For investors concerned with an oil and gas company's alignment, we would encourage them to scrutinise the targets which management are incentivised to achieve to ensure that they could not compromise a company's alignment.

Executives in a Paris-aligned company must not be incentivised to grow production

Direct growth incentives reward management for exploration and production work and can indicate the extent to which a company intends to grow, likely through new developments. This is particularly true in the case of targets which are tied to project completion milestones. Management can also be incentivised to grow production indirectly, through measures which implicitly encourage increasing oil and gas production (e.g., by targeting free cashflows or net income).

If a company has ambitions to grow their less carbon-intensive business segments, then remuneration incentives should be set appropriately to align behaviours being incentivised for management. Remuneration metrics which are tied to the achievement of emissions reduction targets should be of the same scope and ambition as the company's corporate-wide target. Incentives which reward 'easy wins' from an emissions standpoint year on year could be less impactful than those which align management's targets with the company's wider and longer-term goals.[29]

[28] See Absolute Impact 2023 (2023) for a full discussion of the Hallmarks, and emissions reduction methods. To be credible, a goal should not unduly rely on i) asset divestments to make space for new projects; ii) unproven emissions mitigation technologies; or iii) third-party offsets.

[29] See Crude Intentions II (2024) for more details on mis-matches between corporate emissions targets and executive remuneration policies.

Our most recent assessment of executive remuneration policies finds that almost all continue to incentivise production growth, either directly or indirectly. Of the majors, Eni has the greatest proportion of remuneration based on growth targets, though ExxonMobil, Shell, bp, and Repsol are not far behind. Results for the independents are mixed, though CNRL has by far the largest proportion determined by direct growth metrics. Four of the five NOCs in the universe produce sufficiently unclear disclosures that we could not assess the metrics used (see Appendix, Figure 10 for detailed results).

5.4 Combined Paris Alignment Ranking

Recognising that many different components need to be considered when evaluating Paris alignment, and to enable investors to compare producers against peers, we have combined our assessments of company performance across different alignment metrics to assign each company a combined alignment score.

Combined Alignment Ranking Methodology

Our combined score aggregates each company's performance against five metrics, scored from 0-4, that we see as a necessary, though not complete, basis for a producer to be consider Paris aligned. Metrics are weighted according to their importance of achieving the Paris goals (Table 4 – see Appendix 6.3 for full methodology).

TABLE 4: METRICS FOR COMBINED ALIGNMENT RANKING

Category	Metric	Weight
Investment	Alignment of investment options Alignment of recent investments	30% 10%
Production	Alignment of production plans	30%
Emissions Targets	Alignment of emissions targets	20%
Remuneration Incentives	Prevalence of growth incentives	10%

We then grade companies from A to H based on their aggregate alignment score.

Oil and gas companies are still far from aligned with the goals of the Paris Agreement

Our combined alignment assessment reveals that the world's largest oil and gas producers have yet to take the requisite steps to be considered Paris aligned (Figure 6). None of the 25 companies receive a grade of A-C; bp tops our ranking as the only producer to be graded a D, due in part to its commitment to cut production by 13% by 2030 (Table 2). The rest of the European majors, as well as Chesapeake, receive an E. Chesapeake's alignment score benefitted from its near-term guidance that production will fall by 33%, but we would encourage investors to seek longer-term production plans from the company.

FIGURE 6: COMBINED ALIGNMENT ASSESSMENT

Company	*Individual Unweighted Scores (all out of 4)*					Overall Grade
	Investment Options	Recent Sanctions	Production Plans	Emissions Targets	Remuneration	
bp	2	2	3	2	1	D
Chesapeake	2	4*	3	0	1	E
Equinor	2	3	2	1	2	E
Repsol	2	2	2	2	1	E
Eni	2	2	1	3	1	E
Shell	2	2	2	1	1	E
TotalEnergies	2	2	1	2	1	E
Chevron	2	3	1	1	1	F
EQT	2	4*	1	0	2	F
Occidental	1	4*	1	1	3	F
Southwestern	2	4*	1	0	2	F
Coterra	2	4*	1	0	1	F
EOG	2	3	1	0	1	F
PetroChina	2	3	1	0	1	F
CNRL	2	2	1	0	1	F
Cenovus	1	4*	1	0	1	F
CNOOC	2	2	1	0	0	F
Devon	1	4*	1	0	1	F
Sinopec	2	2	1	0	0	F
Suncor	0	4*	1	1	2	F
ExxonMobil	1	2	1	0	1	G
Petrobras	1	3	1	0	0	G
Saudi Aramco	2	3	0	0	0	G
Pioneer	0	4*	1	0	1	G
ConocoPhillips	0	3	0	0	1	H
Weight	*30%*	*10%*	*30%*	*20%*	*10%*	-

*Sources: company reporting, CTI analysis, IEA, Rystad Energy. Notes: we assess production targets as of 29 February 2024, emissions targets as of August 2023, and remuneration policies for 2022. Rystad data as of September 2023. Companies graded from 0 (worst) to 4 (best) on each metric. *denotes companies for which no recent sanctions were identified, so were scored a 4. Companies ordered by combined score; those with the same score are ordered alphabetically. We do not currently assess credibility of emissions re in our methodology and therefore top score is a 3. We note, however, significant shortcomings in the credibility of emissions reductions plans of those in our blue band (scores 3 and 2) related to the use of offsets, CCUS, and NBS and the commercial viability of these. See Appendix for full methodology.*

Most of the shale and oil sands producers, and the Chinese NOCs, are graded an, due in part to their lacklustre emissions reduction targets which do exclude scope 3 emissions and their stated intention to increase production in the near-term. Saudi Aramco, ConocoPhillips, and Pioneer are among the worst performers, scoring poorly across all metrics except for recent project sanctions. We note that our recent sanctions analysis covers a period of under two years, and so these companies may be benefitting recent sanctions falling outside of the window of our analysis. Pioneer is in the process of being acquired by ExxonMobil, which was ranked equally poorly – the acquisition is unlikely to benefit Exxon's performance.

Companies perform almost universally poorly on remuneration incentives: only Occidental scored a 3/4, as their executives are not incentivised to increase production either directly or indirectly.

5.5 Considerations for stakeholders

We have covered the key metrics for assessing the Paris alignment of oil and gas companies. However, there are other indicators which investors can consider, particularly those which could jeopardise the achievement of Paris goals by both the company and wider society (e.g. lobbying efforts) (Box 5).

BOX 5: OTHER RELEVANT FOR ASSESSING PARIS ALIGNMENT

- **Methane emissions targets:** methane is important from a climate standpoint, as methane gas is 25 times more potent than CO_2 as a greenhouse gas and curbing methane emissions will play a key role in achieving the goals of the Paris agreement. Companies should target zero routine flaring and eliminating methane emissions.
- **Exploration plans:** Given the IEA's stipulation that virtually no new oil and gas fields are required in a 1.5˚C scenario, investors seeking 1.5˚C alignment should scrutinise company plans to continue frontier exploration[30] which could be viewed as an indication that a company intends to expand production.
- **Capex on existing vs new projects:** the ratio of investment between investment on new and existing projects can give insight into a company's production and development strategy, and the extent to which it intends to pursue new projects.
- **Lobbying:** lobbying efforts by companies and their industry alliances and associates could undermine climate-related regulations and policies. Investors should engage companies on how it justifies lobbying activities that could hinder the achievement of Paris goals.[31]

Key Engagement Questions

- Why has the company not set scope 3 emissions targets?
- What strategy will the company use to achieve its emission reduction targets? Is it credible?
- How does the company reconcile continued use of growth metrics in their executive remuneration policies?
- Why do emission reductions metrics fail to match the framing of wider corporate emissions targets?

[30] Frontier exploration generally refers to exploration plays in areas in which there are few or no existing productive facilities. These regions are often remote and present operational challenges; a significant proportion of current frontier exploration is being done in Africa.

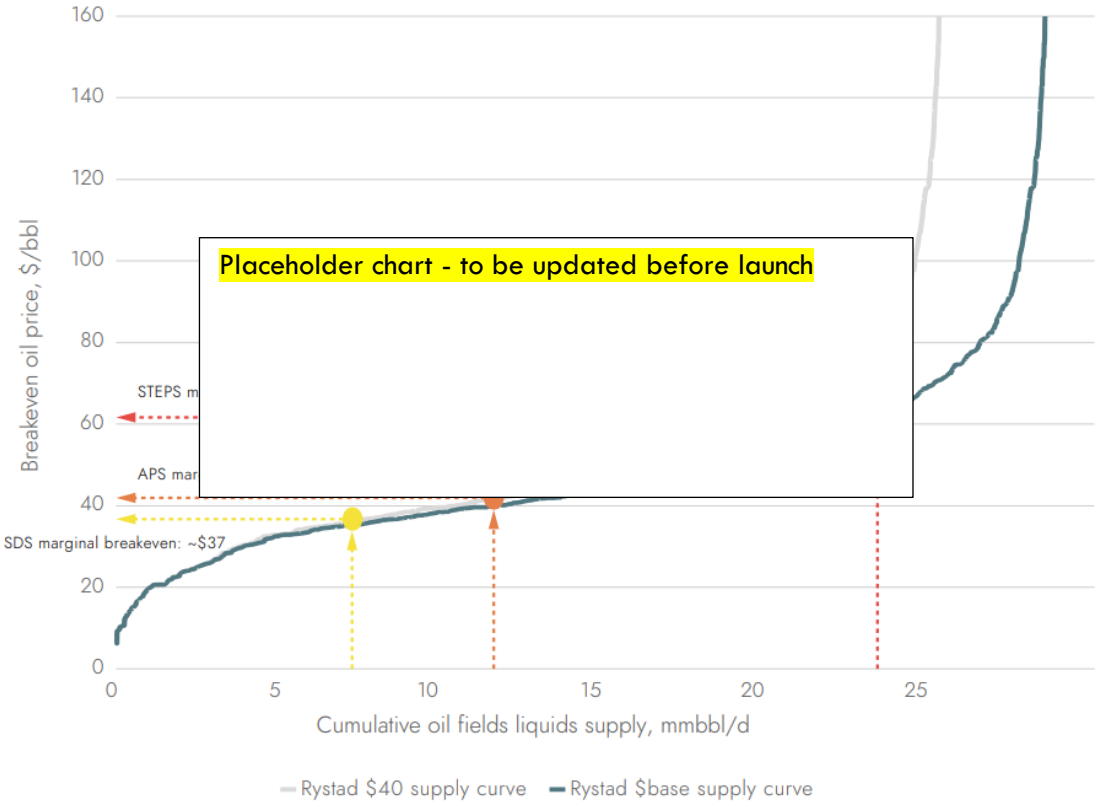
[31] The lobbying practices of the companies' analysed in this report are available in Carbon Tracker's company profiles.

6 Appendix

6.1 Least Cost Methodology

Analysis builds on our existing Two Degrees of Separation series: Breaking the Habit (2019), Fault Lines (2020), Adapt to Survive (2021) and Paris Maligned (2022).

FIGURE 7: CUMULATIVE POTENTIAL OIL SUPPLY (2022 - 2040) FROM UNSANCTIONED OIL FIELDS



Sources: IEA, Rystad Energy, CTI Analysis. Notes: Breakeven prices assume a 15% IRR

6.2 Data Sources

Asset Data:

Asset-level portfolio data is sourced from Rystad Energy's Cube datasets from September 2023.

Company Universe:

Our universe of 25 companies mirror that used in Absolute Impact 2023 and Crude Intentions 2 and includes the world's largest publicly traded companies by Rystad's production volumes in 2022, excluding fully state-owned NOCs and companies based in Russia. Supplementary data is given in the appendix for an extended universe which includes all companies from the E&P and Integrated segments of the S&P Global Oil Index as of 15 January 2024, except for California Resources Collective for which there was no data available from Rystad Energy.

Demand Scenarios:

Oil and gas demand scenarios used are from the IEA's World Energy Outlook 2023 extended dataset.

Emissions Targets:

Company emissions targets are sourced from companies' own reporting. See Absolute Impact 2023 for a complete list of sources.

Remuneration Policies:

Data on company remuneration policies are sourced from companies' own reporting. See Crude Intentions II for a complete list of sources.

Production Guidance:

Company	2022 Production Figure Source	Production Guidance Source
bp	bp Annual Report 2022	bp Strategy Update Feb 2023
Cenovus	Cenovus FY/23 Earnings Statement	Cenovus Press Release 2023
Chesapeake	Chesapeake Press Release 2023	Chesapeake Press Release 2023
Chevron	Chevron Annual Report 2022	Chevron Investor Presentation March 2023
CNOOC	CNOOC Annual Report 2022	CNOOC 2024 Strategy Preview
CNRL	CNRL Press Release 2023	CNRL Press Release 2024
ConocoPhillips	ConocoPhillips Annual Report 2022	ConocoPhillips Analyst and Investor Meeting 2023
Coterra Energy	Coterra Annual Report 2022	Coterra Earnings Presentation Q3 2022
Devon	Devon Press Release 2024	Devon Press Release 2024
Eni	Eni Fact Book 2022	Eni Capital Markets Update 2023
EOG Resources	EOG Press Release 2024	EOG Press Release 2024
EQT Corporation	EQT Press Release 2024	EQT Press Release 2024
Equinor	Equinor Annual Report 2022	Equinor Annual Report 2022
ExxonMobil	ExxonMobil Annual Report 2022	ExxonMobil Corporate Plan 2023
Occidental	Occidental Annual Report 2022	Occidental 2023 4th Quarter Earnings Presentation
Petrobras	Petrobras Press Release 2022	Petrobras Strategic Plan 2024-2028
PetroChina	PetroChina Annual Report 2022	PetroChina Annual Report 2022
Pioneer	Pioneer Annual Report 2022	Pioneer Press Release 2024
Repsol	Repsol Strategic Update 2024-27 Summary	Repsol Q423 Results and Strategic Update
Saudi Aramco	Saudi Aramco Annual Report 2022	Oil: Saudi Aramco Press Release 2024 Gas: Saudi Aramco 2022 Results Presentation
Shell	Shell Annual Report 2022	Shell Capital Markets Day Presentation 2023
Sinopec	Sinopec Operational Statistics 2023	Sinopec Annual Report 2022 Sinopec Operational Statistics 2023
Southwestern	Southwestern Energy Press Release 2023	Southwestern Energy Press Release 2023
Suncor	Suncor Annual Report 2022	Suncor Q3 Investor Presentation
TotalEnergies	TotalEnergies Press Release 2023	TotalEnergies Sustainability & Climate Progress Report 2023

6.3 Investment Options: Supplementary Results

FIGURE 8: COMPATIBILITY OF POTENTIAL NEW UPSTREAM PROJECTS WITH MODERATE AND SLOW TRANSITION SCENARIOS – EXTENDED COMPANY UNIVERSE

APS Quartile	Company	Unsanctioned Capex inside of a Moderate Transition (APS/1.7°C)	Unsanctioned Capex outside of a Moderate Transition (APS/1.7°C) / Inside of a Slow Transition (STEPS/2.4°C)	Unsanctioned Capex outside of a Slow Transition (STEPS/2.4°C)
1	Baytex Energy	0-10%	90-100%	10-20%
1	Chord Energy	0-10%	90-100%	10-20%
1	Civitas Resources	0-10%	90-100%	10-20%
1	ConocoPhillips	10-20%	80-90%	10-20%
1	Ecopetrol	30-40%	60-70%	40-50%
1	Enerplus Corporation	10-20%	80-90%	40-50%
1	Marathon Oil	20-30%	70-80%	20-30%
1	Matador Resources	30-40%	60-70%	0-10%
1	Murphy Oil	30-40%	60-70%	>100%
1	Northern Oil & Gas	0-10%	90-100%	30-40%
1	Ovintiv	10-20%	80-90%	30-40%
1	Parex Resources	0-10%	90-100%	>100%
1	Permian Resources	0-10%	90-100%	0-10%
1	Petrobras	30-40%	60-70%	20-30%
1	Pioneer	10-20%	80-90%	0-10%
1	Suncor	0-10%	90-100%	10-20%
2	APA Corporation	30-40%	60-70%	50-60%
2	Antero Resources	40-50%	50-60%	0-10%
2	bp	50-60%	40-50%	20-30%
2	Cenovus Energy	40-50%	50-60%	20-30%
2	Chevron	50-60%	40-50%	10-20%
2	Crescent Point Energy	40-50%	50-60%	10-20%
2	Devon	40-50%	50-60%	0-10%
2	ExxonMobil	40-50%	50-60%	30-40%
2	Hess	30-40%	60-70%	10-20%
2	Magnolia Oil & Gas	50-60%	40-50%	0-10%
2	Occidental	30-40%	60-70%	20-30%
2	Range Resources	50-60%	40-50%	70-80%
2	Repsol	50-60%	40-50%	20-30%
2	Santos	40-50%	50-60%	60-70%
2	SM Energy	40-50%	50-60%	20-30%
2	Vermilion Energy	30-40%	60-70%	50-60%
3	Aker BP	60-70%	30-40%	40-50%
3	Beach Energy Limited	50-60%	40-50%	>100%
3	CNRL	60-70%	30-40%	0-10%
3	Chesapeake	60-70%	30-40%	10-20%
3	Comstock Resources	60-70%	30-40%	0-10%
3	EOG	50-60%	30-40%	10-20%
3	EQT	60-70%	30-40%	0-10%
3	Equinor	60-70%	30-40%	40-50%
3	Paramount Resources	60-70%	30-40%	0-10%
3	PetroChina	60-70%	30-40%	40-50%
3	Saudi Aramco	60-70%	30-40%	30-40%
3	Shell	50-60%	40-50%	50-60%
3	Southwestern	60-70%	30-40%	0-10%
3	TotalEnergies	50-60%	40-50%	40-50%
3	Tourmaline Oil	50-60%	40-50%	0-10%
3	Whitecap Resources	50-60%	30-40%	10-20%
4	Arc Resources	70-80%	20-30%	0-10%
4	CNOOC	70-80%	20-30%	40-50%
4	CNX Resources Corporation	70-80%	20-30%	0-10%
4	Coterra Energy	90-100%	0-10%	40-50%
4	Diamondback Energy	70-80%	20-30%	0-10%
4	Eni	60-70%	30-40%	20-30%
4	Galp	70-80%	20-30%	10-20%
4	Harbour Energy plc	90-100%	0-10%	30-40%
4	Imperial Oil	60-70%	20-30%	0-10%
4	Inpex	80-90%	10-20%	0-10%
4	Kosmos Energy	90-100%	0-10%	0-10%
4	MEG Energy	90-100%	0-10%	0-10%
4	OMV	80-90%	10-20%	80-90%
4	Sinopec	80-90%	10-20%	40-50%
4	Vår Energi	80-90%	0-10%	50-60%
4	Woodside	90-100%	0-10%	40-50%

Sources: IEA, Rystad Energy, CTI analysis. Notes: Future capex (2024-2030) on unsanctioned projects compatible with different scenarios, as a % of business-as-usual plans (STEPs). Companies ranked alphabetically within APS quartile. Rystad data as of September 2023. Includes all companies listed on the S&P Global Oil Index on 15/01/24, excluding California Resources Collective (no Rystad data available)

6.4 Alignment Assessment: Scoring Methodologies

6.4.1 Investment Options

	Alignment of Investment Options	Weight 30%
	Compatibility of the company's potential future investment on new upstream oil and gas projects with a Paris-aligned pathway.	
Score		
4	100% of potential future upstream capex is assessed to be not incompatible with the NZE (1.5°C)	
3	100% of potential future upstream capex is assessed to be not incompatible with the APS (1.7°C)	
2	More than 50% of potential future upstream capex is assessed to be not incompatible with the APS (1.7°C)	
1	More than 25% of potential future upstream capex is assessed to be not incompatible with the APS (1.7°C)	
0	Less than 25% of potential future upstream capex is assessed to be not incompatible with the APS (1.7°C)	
Notes		
	This metric is in line with **Indicator 2** of the CA100+ O&G Alignment assessments. 'Future investment' refers to unsanctioned investments (in terms of capital expenditure) in the 2030s	

	Alignment of Recent Project Sanctions	Weight 10%
	Compatibility of the company's recent upstream oil and gas investments (capex) with a Paris-aligned pathway.	
Score		
4	Recent upstream oil and gas investment (capex) is not incompatible with NZE (1.5°C).	
3	Recent upstream oil and gas investment (capex) is not incompatible with APS (1.7°C).	
2	More than 50% of recent upstream oil and gas investment (capex) is not incompatible with APS (1.7°C)	
1	More than 25% of recent upstream oil and gas investment (capex) is not incompatible with APS (1.7°C)	
0	Less than 25% of recent upstream oil and gas investment (capex) is not incompatible with APS (1.7°C)	
Notes		
	This metric is in line with **Indicator 1** of the CA100+ O&G Alignment assessments. 'Recent' refers to projects sanctioned in 2022 or before September 2023. If no recent investments were identified, companies were scored a 4.	

6.4.2 Production Plans

	Alignment of Production Plans	Weight	30%
	Compatibility of the company's production plans		
Score			
4	Targeting a significant decline in the long term and decline in the short term.		
3	Long term target not disclosed but targeting reduction in short term OR Targeting flat production in the short term and a long-term reduction.		
2	Targeting flat production long-term and short-term growth.		
1	Long term targets are not disclosed and targeting short term growth OR no forward guidance disclosed.		
0	Company is targeting long-term growth.		
Notes			
	"Long-term" refers to targets for 2030 or later. Targets evaluated based on the change in volumes vs 2022 level.		

6.4.3 Emissions Targets

	Alignment of Emissions Targets	Weight	20%
	Alignment of a company's primary emissions target with the Hallmarks of Paris Aligned Emissions Targets (Box 4)		
Score			
4	Target meets all three Hallmarks, and the company has outlined a credible plan to deliver reductions.		
3	Target meets Hallmarks 1 and 2		
2	Target meets Hallmark 1 and targets net zero by 2050		
1	Target meets Hallmark 1		
0	Target meets no Hallmarks		
Notes			
	Details of which company targets are evaluated are available in Absolute Impact 2023 We do not currently assess credibility in our methodology and therefore the top score is a 3. We note, however, significant shortcomings in the credibility of emissions reductions plans of those who have scored a 3 related to the use of offsets, CCUS, and NBS and the commercial viability of these technologies.		

Emissions Targets Hallmarks Assessments: Methodology and Results

To assess company emissions targets, we reviewed all company goals and chose the choose the target which most fulfils our Hallmarks. We then classified targets by band, based on whether they include scope 3 emissions, target net-zero lifecycle emissions, and are set on an absolute basis. Targets are then ranked within the bands based on the extent to which Hallmark 3 is met and the pace of reduction. See Absolute Impact 2023 for more details.

FIGURE 9: COMPARISON OF COMPANY CLIMATE GOALS, SELECTED PER CTI METHODOLOGY

Rank	Company	Metric	Hallmark 1	Hallmark 2		Hallmark 3		Scale		Potentially Paris-aligned
			Scope 3 emissions	Scope 1,2,3 net-zero	2030 absolute goal	Full equity share	3rd party crude	2030 absolute reduction	Scope 1 & 2 net zero year	
1	Eni	Lifecycle emissions	Yes	Yes	Yes	Yes	Yes	35%	2050	Yes
2	Total[1]	Lifecycle emissions	Yes	Yes	Yes	Partial[2]	Yes	~6.2%	2050	-
3	Repsol	Lifecycle emissions	Yes	Yes	Yes	Partial[2]	-	30%	2050	-
4	bp[1]	Lifecycle emissions	Yes	Yes	Yes	Partial[2]	-	~23.9%-32.6%	2050	-
5	Shell	Lifecycle intensity	Yes	Yes	-	Yes	Yes	-	2050	-
6	Equinor	Lifecycle intensity	Yes	Yes	-	Partial[2]	-	-	2050	-
7	Oxy	Lifecycle intensity	Yes	Yes	-	-	n/a	-	2050	-
8	Suncor	Lifecycle emissions	Yes	-	Yes	Yes	-	10 $MtCO_2e/y$[3]	-	-
9	Chevron	Lifecycle intensity	Yes	-	-	-	Yes	-	-	-
10	Conoco	Operational intensity	-	n/a	n/a	Yes	n/a	-	2050	-
11	Cenovus	Operational emissions	-	n/a	n/a	Yes	-	-	2050	-
12	EQT	Operational emissions	-	n/a	n/a	-	n/a	-	2025	-
13	Chesapeake	Operational emissions	-	n/a	n/a	-	n/a	-	2035	-
14	EOG	Operational emissions	-	n/a	n/a	-	n/a	-	2040	-
15	CNRL	Operational emissions	-	n/a	n/a	-	n/a	-	2050	-
=16	Devon	Operational intensity	-	n/a	n/a	-	n/a	-	2050	-
=16	Pioneer	Operational intensity	-	n/a	n/a	-	n/a	-	2050	-
18	SWN	Operational emissions	-	n/a	n/a	-	n/a	-	-	-
19	Coterra	Operational intensity	-	n/a	n/a	-	n/a	-	-	-
20	CNOOC	Operational intensity[4]	-	n/a	n/a	-	n/a	-	-	-
21	Petrobras	Operational emissions	-	n/a	n/a	-	-	-	2050	-
22	Exxon	Operational intensity	-	n/a	n/a	-	-	-	2050	-
23	PetroChina	Operational intensity	-	n/a	n/a	-	-	-	2050	-
24	Sinopec	Operational emissions	-	n/a	n/a	-	-	-	-	-
25	Aramco	Operational intensity[4]	-	n/a	n/a	-[5]	-	-	2050	-

Source: Company disclosures, CTI Analysis; chart originally published in Absolute Impact 2023

Notes: [1] TotalEnergies' and bp's operational and scope 3 goals have been merged to allow for a fair comparison with peers. [2] Partial equity-share basis means operational emissions on an operated-asset basis and scope 3 emissions on a full equity-share basis. [3] Suncor's targets cannot be expressed in percentage terms because the company has not publicly disclosed the scope 3 emissions for its baseline. [4] CNOOC's and Saudi Aramco's targets are measured against business-as-usual scenarios, which makes these 'intensity reduction' goals. [5] Saudi Aramco's goal is on a wholly-owned operated-asset basis.

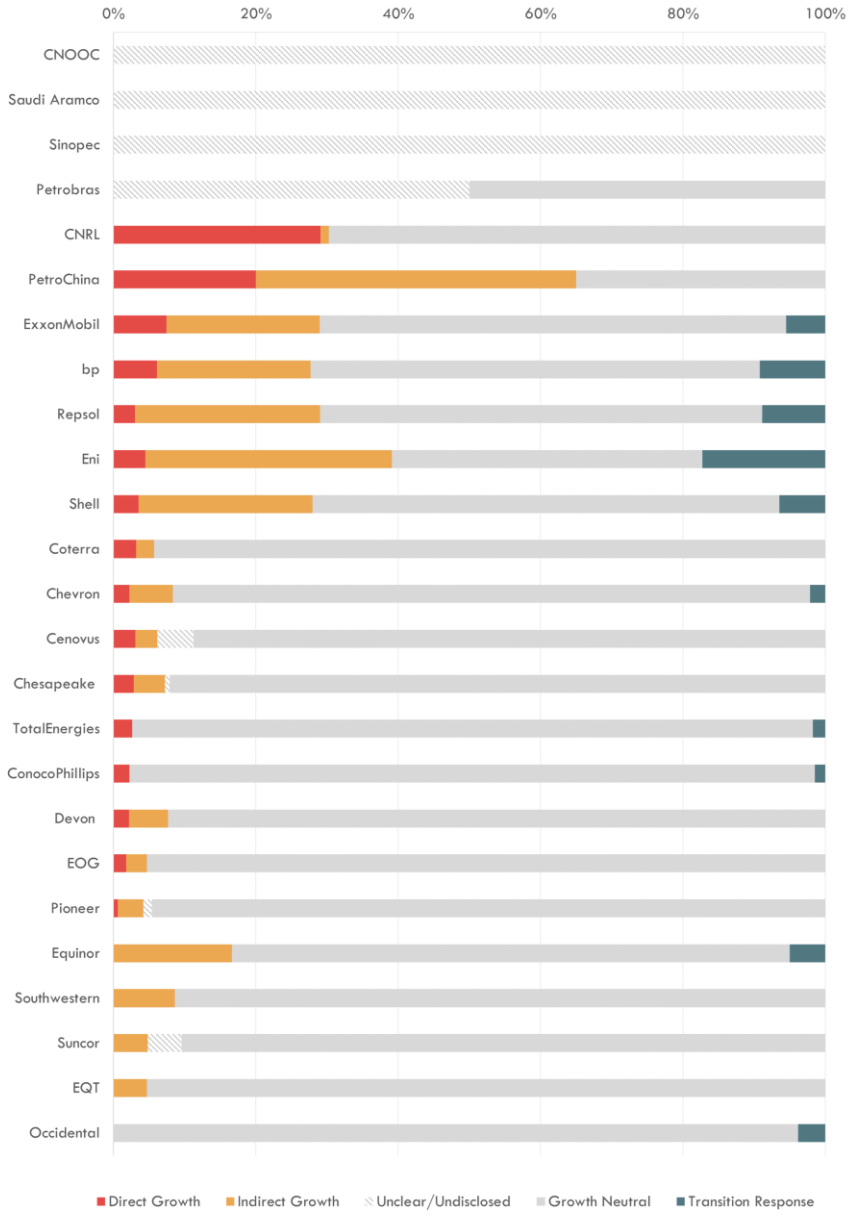
6.4.4 Remuneration

	Remuneration Incentives	Weight	10%
	Alignment based on the prevalence of production growth targets in executive remuneration policies.		
Score			
4	Incentive plans do not contain direct or indirect growth metrics and if they include emissions reduction targets, they are of the same scale and ambition as the company's wider emission targets.		
3	Incentive plans do not contain direct or indirect growth metrics and if they include emissions reduction targets, they are not of the same scale and ambition as the company's wider emission targets.		
2	Incentive plans do not contain direct growth metrics, but include indirect growth metrics		
1	Incentive plans contain direct growth metrics		
0	Metrics are insufficiently disclosed to evaluate (≥50% undisclosed)		
Notes			
	Details of which company targets are evaluated are available in Crude Intentions II		

Remuneration assessment: Methodology & Results

Our analysis focuses on the variable component of executive remuneration policies (short- and long-term incentive plans). We analyse the targets set for executives to determining their compensation, weight them, and group them into one of four categories: i) Direct growth metrics; ii) Indirect growth metrics; iii) Growth neutral metrics; iv) Transition response metrics. See Crude Intentions II for a full discussion of assessment methodology and detailed description of the categories.

FIGURE 10: EXECUTIVE TARGET VARIABLE PAY (WITH CONDITIONS) BY METRIC TYPE (2022)



Source: Corporate disclosures, CTI analysis. Chart originally published in Crude Intentions II.
Notes: Companies sorted by the relative share of direct growth metrics and then by the share of indirect growth metrics. Companies where unclear/undisclosed metrics made up 50% or more of the total are placed at the top of the chart.

6.4.5 Grade assignments

Combined Alignment Score	Grade
≤40	A
≤35	B
≤30	C
≤25	D
≤20	E
≤15	F
≤10	G
≤5	H

7 References

To be added before launch – please refer to page footnotes until mapped across.

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