



Investing in Oil and Gas Transition Assets En Route to Net Zero

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Achieving the goal of net-zero greenhouse gas emissions by 2050 requires a substantial reduction in the share of high-emitting fossil fuels in primary energy consumption. A scenario from the International Energy Agency (IEA) for reaching the net-zero target envisions oil demand in 2050 dropping by 75 percent, natural gas by 55 percent, and coal by 90 percent.¹ Scaling down fossil fuels to this degree while scaling up clean energy technologies will require careful planning to avoid a disorderly transition.

The magnitude of this challenge underscores the difficult reality of having to operate, maintain, and even invest in oil and gas assets (designated as “transition assets” by Jason Bordoff and Meghan O’Sullivan²) before eventually phasing some of them out. To keep energy markets in balance while staying on the net-zero pathway, no investments in new oil and gas fields are required; however, given expected decline rates from current fields, the IEA estimates that continued investments of \$400–500 billion per year until 2030 are needed in existing sources of production—including in new fields already approved for development.³ Implicit in these assumptions is a significant deployment of renewable energy and energy demand efficiency, which are key to avoiding a mismatch between energy supply and demand.⁴ But neither oil demand nor clean energy deployment is trending toward what is needed to meet net-zero goals at the moment.

Investments in clean energy have increased and now represent a 1.5 to 1 ratio with fossil fuels, but these investments need to be scaled up dramatically, to a ratio of 9 to 1, by 2030 to be consistent with the net-zero path.⁵ Despite the record addition of 340 gigawatts of renewable energy capacity in 2022, the pace of investments needs to increase even more rapidly to meet the target

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of increasing the share of renewables in global electricity generation to 60 percent by 2030 from 29 percent in 2021.⁶

As such, phasing out transition assets too early may result in wild swings in oil and gas prices, raising energy security and affordability concerns, similar to what has transpired since Russia invaded Ukraine. Oil and gas price volatility can be an additional incentive to accelerate the energy transition, but in the short term it may move the world further away from the path to net zero. In 2022, for example, the world shifted to more carbon-intensive fuels, particularly coal, resulting in record-high emissions.⁷ Additionally, acute shortages of energy supply could result in social and economic pain—for example, what Sri Lanka is currently experiencing⁸—via a higher cost of living and lower economic growth, and may severely impair the ability of many emerging economies to invest in clean energy sources. Indeed, in response to a crisis, some of these countries may opt to build fossil fuel assets in excess of what is necessary—another undesired outcome.

This commentary focuses on the investments needed in oil and gas assets—without setting aside decarbonization goals—to act as a bridge until renewable energy and other clean energy technologies are deployed at an adequate scale.⁹ An assessment in this commentary of investment trends taking place in the oil and gas industry leads to the following findings:

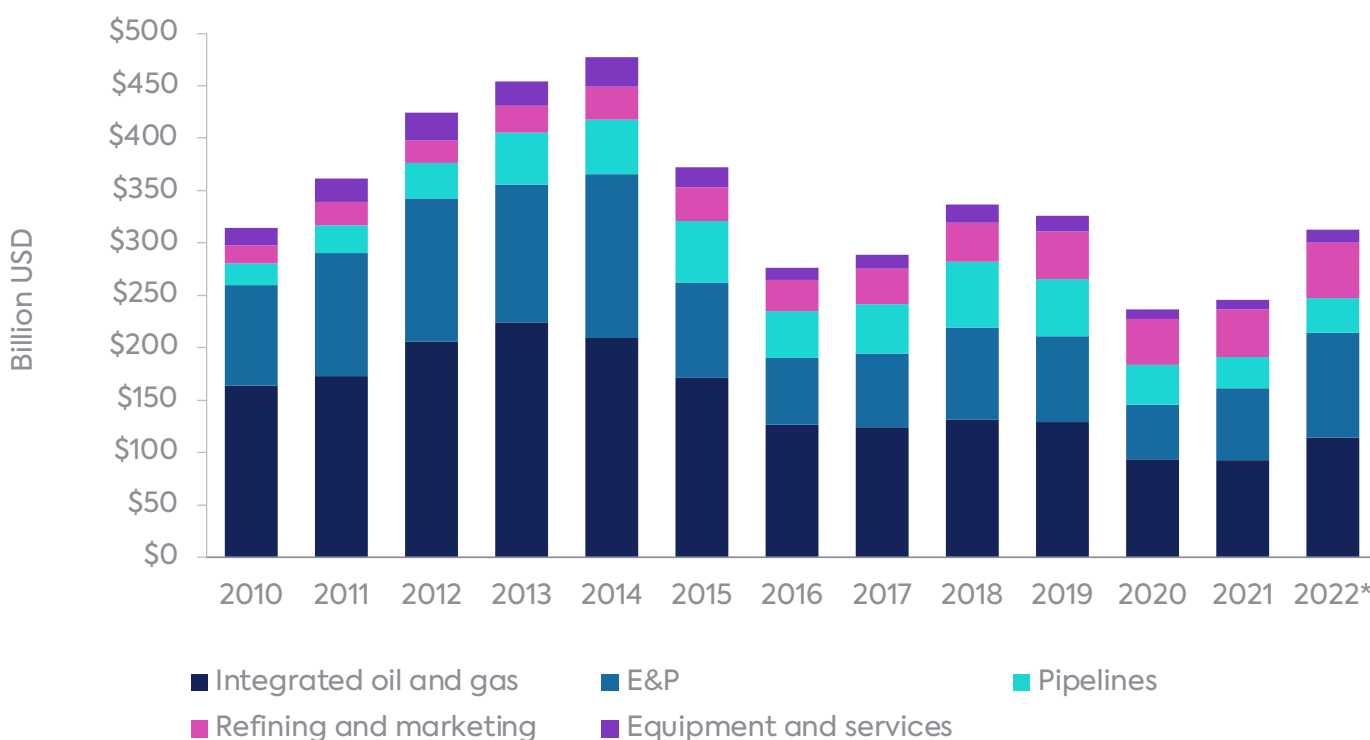
- Despite current record profits, private oil and gas companies' focus on capital discipline (i.e., reducing leverage and increasing dividend payments) seems to go beyond compensating for the lackluster returns of the past few years, and instead reflect adjustments to policy signaling about phasing down oil and gas production. The oil and gas industry is investing less than what is required to meet current demand trends but more than what is needed in the net-zero scenario.
- Given that oil and gas demand trends are not yet falling in line with decarbonization commitments, the void in investments by private companies is being filled by national oil companies (NOCs), especially those based in the Middle East, which adds geopolitical risk to future supply.
- While financial institutions' environmental, social, and governance (ESG) considerations have not yet meaningfully impacted access to financing for the oil and gas sector, these institutions' net-zero commitments may do so in the coming years.

After exploring these issues, the authors suggest options for policymakers and financial institutions to help ensure adequate financing of existing, new, and retiring oil and gas assets to engineer an orderly transition without disregarding climate goals.

Investment Shifts in the Oil and Gas Sector

The Covid-19 pandemic and resulting demand destruction led to oil and gas investments falling to the decade's lowest levels in 2020 across private companies involved in upstream, midstream, and downstream activities (see Figure 1). The 2021–22 period of high oil and gas prices did not lead to a significant increase in capital spending by private companies despite record profits.¹⁰ One exception has been upstream exploration and production (E&P) companies, whose capital spending in 2022 was the highest since 2014. Nevertheless, not only is the total capital expenditure below the 2019 pre-pandemic level, but a large part of the increase in 2022 may be attributable to inflationary pressures, as upstream costs alone are estimated to have risen by 25 percent since 2020.¹¹

Figure 1: Annual capital expenditures by private oil and gas companies globally

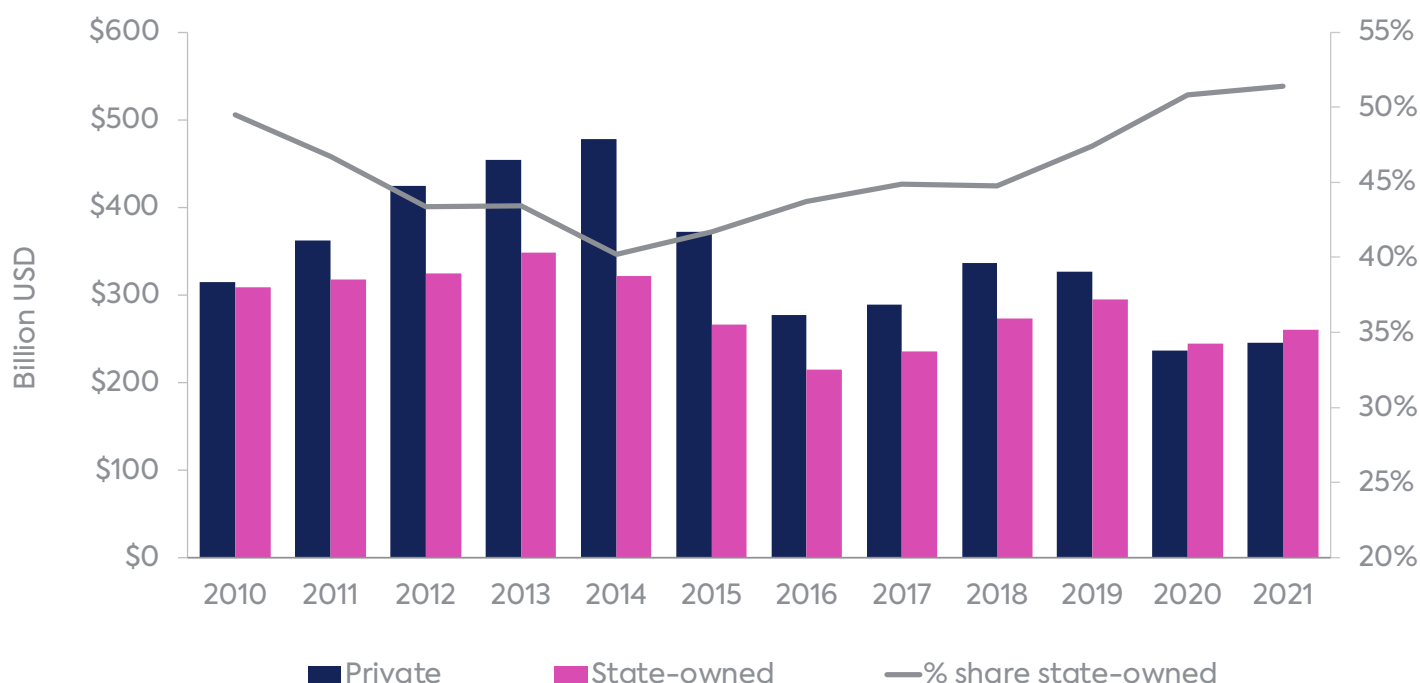


*Note: Private companies with a market capitalization greater than \$500 million in November 2022 were included; *Q4 2022 spending was assumed to be the same as Q3 2022 for companies with data not available by January 31, 2023.*

Source: Bloomberg data, authors' calculations.

Why did record profits not translate to a commensurate increase in capital expenditures by private companies in 2022? Oil and gas companies have been under pressure to maintain profitability and capital discipline after years of poor returns for equity investors. As a result, the cash windfall has been directed toward paying down debt, paying dividends, and buying back stocks. The total debt of private oil and gas companies¹² has dropped by \$100 billion since 2021 and \$180 billion since 2020 (see Appendix 1, Figure A-1). Cash dividends, meanwhile, totaled \$170 billion in 2022, substantially higher than the decade's average of just over \$100 billion (see Appendix 1, Figure A-2), with stock buybacks reaching \$140 billion in 2022 versus the decade's average of \$35 billion (see Appendix 1, Figure A-3). Adding the debt reduction to the dividend payments and stocks buybacks above their respective 10-year averages shows that if those funds had instead been reinvested, total 2022 capital spending by private oil and gas companies would have been \$580 billion instead of \$310 billion—higher even than the 2014 peak. These decisions underscore a strict adherence to capital discipline, built upon years of flagging returns and a structural shift in some shareholders' perceptions of the longer-term value of oil and gas assets.

Compared with the relatively slow recovery of capital expenditures by private companies, NOCs have been investing more heavily in recent years, particularly those based in the Middle East. Their share of total oil and gas investments rose to an average of 48 percent in the five years ending in 2021, versus 43 percent over the previous five years (see Figure 2). In almost every year from 2015 to 2021, the annual capital spending by state-owned oil and gas companies, most of which are based in emerging market and developing economies,¹³ has outpaced that of private companies, which are largely based in advanced economies.

Figure 2: Annual capital expenditures by global oil and gas companies based on ownership

Note: Companies with a market capitalization over \$500 million in November 2022 were included; for state-owned companies that don't have any equity listings, the criteria used for inclusion was oil and gas production of at least 500,000 barrels of oil equivalent per day. Where necessary, data in local currencies were converted to US dollars using the average exchange rate for the year; capital expenditures by ADNOC were estimated using announced five-year plans; capital expenditures for years with missing data for state-owned companies were obtained using interpolation; no data was available for Basra Oil Company (Iraq), the National Oil Corporation (Libya), the National Iranian Oil Company, QatarEnergy, and Petróleos de Venezuela. Source: Bloomberg data; Refinitiv; annual reports of KazMunayGas, Kuwait Petroleum Corporation, NNPC, Saudi Aramco, Sonangol, and Sonatrach; authors' calculations.

Given the greater lag in reporting by many state-owned companies compared with private companies, there is not yet sufficient data for 2022 to ascertain if the trend continued last year. Nevertheless, conservatively assuming that capital expenditures for state-owned companies with missing data in 2022 were the same as in 2021, total investments by both private and state-owned oil and gas companies can be estimated to be close to \$600 billion in 2022. Considering that this estimate is only for companies with market capitalizations greater than \$500 million, and notwithstanding that a small portion of the capital expenditures are toward renewable projects,¹⁴ the current level of total investments in the oil and gas sector is consistent with expected

investments for the sector assumed by countries' climate pledges. The IEA, for example, estimates average annual oil and gas investments of around \$700 billion from 2022 to 2030 in its announced pledges scenario,¹⁵ which models energy supply and demand assuming that current climate pledges by all countries are achieved on time and in full. Unlike net-zero scenarios, this scenario is not consistent with limiting temperature rise to 1.5°C by 2050, but rather for a temperature rise of 1.8°C, reaching 2.1°C by 2100.¹⁶

Drivers of Lackluster Private Sector Investments

What is driving the relatively muted recovery of investments by private oil and gas companies, and is it likely to pick up? Past performance and future outlook are the major determinants of the capital discipline taking place in the sector. Part of the future outlook incorporates policy signaling of diversification away from fossil fuels in energy transition scenarios. Despite the recent backlash,¹⁷ ESG considerations of banks and asset managers do not seem to have been a major obstacle to oil and gas investments. However, the net-zero commitments of financial institutions could impact oil and gas investments and financing over the coming years.

Past Performance and Future Outlook

Poor performance in recent years: Although publicly traded oil and gas companies performed well last year, computing returns on a longer horizon—such as rolling five years—shows that they have underperformed against the S&P 500 index since 2017 across upstream, midstream, and downstream sectors (see Appendix 2, Figure A-4). The low company-level returns of publicly listed oil and gas stocks are in line with the low internal rates of return (IRRs) of hydrocarbon projects, which declined from around 20 percent during 2011–15 to 15 percent in 2019–20.¹⁸

Performance is worse when adjusted for risk: The lag of oil and gas stocks looks even worse on a risk-adjusted basis due to the elevated volatility—especially when computed over a long investment horizon—of oil and gas prices in recent years. On a five-year rolling basis, the volatilities of both oil and gas prices—based on the nearest futures contract—are close to the high end of their respective historical ranges.¹⁹ Consequently, the underperformance of oil and gas stocks since 2017 is even more extreme when measured as the ratio of five-year returns to five-year volatility (see Appendix 2, Figure A-5). In contrast, renewable energy companies have outperformed fossil fuel companies on a risk-adjusted basis over the past decade.²⁰

Expectations of low risk-adjusted returns in the coming years: In addition to low returns in the recent past, expectations of future returns from the oil and gas sector are not rosy, either in absolute terms or on a risk-adjusted basis, for several reasons:

- *Expected drop in oil and gas prices in the medium term:* Backwardation (spot prices being higher than those in the futures market) of the oil futures curve²¹ points to expectations that high prices are not going to last.²² Indeed, oil and gas prices have already dropped considerably from their peak following Russia's invasion of Ukraine. Low oil prices over the past decade were mostly due to excessive supply, but going forward the inverted curve likely reflects expectations of sagging demand given the ongoing shift away from fossil fuels to renewables.²³
- *Short life cycles of projects and early retirement of assets:* With demand uncertain and current high prices unlikely to last, the dominant factor in new investments is the perception of shortened life cycles for hydrocarbon projects going forward, which implies low IRRs. Adding the potential cost of early retirement or dealing with a stranded asset worsens the return expectations.
- *Expectations of continued high oil and gas price volatility:* Implied volatilities from options on oil and gas futures contracts show expectations of these volatilities remaining elevated relative to history. The combination of high expected volatility stemming from swings in commodity prices with expectations of unattractive returns implies poor risk-adjusted returns.
- *Higher cost of capital:* Interest rate increases over the past year by central banks globally to address inflationary pressures are weighing on all investments, including renewables and fossil fuels. With capital becoming expensive and scarce, investors are likely to become more selective, and therefore hesitant, toward investments in fossil fuel projects and companies due to demand uncertainty.

Policy signaling: The current level of oil and gas investments is consistent with announced climate pledges by countries, indicating that companies are rationally adjusting to the progression of policy developments. Policy signaling about the declining role of oil and gas in the energy transition, as well as the expected fall in oil prices in the long term, is likely influencing capital allocation decisions by private companies and investors, especially given the long horizons of these investments.

Financial Institutions' Net-Zero Commitments

While some blame ESG considerations for the current spate of low investments in the sector, third-party surveys suggest that the financing of oil and gas projects by the largest global banks dropped less than 10 percent in 2021 from 2018's level.²⁴ Moreover, this decline was likely the result of lower demand for financing—partly due to the pandemic and partly due to oil and gas companies making rational capital allocation decisions due to uncertainty about the future outlook for the sector—rather than reduced access to financing. It is noteworthy that investments by E&P companies—which are more heavily dependent on bank lending—jumped by almost 50 percent

in 2022 versus the previous year, while integrated oil and gas companies have seen an increase of just over 20 percent (see previous Figure 1). Nevertheless, going forward, net-zero pledges by banks could play a much more meaningful role in the availability of financing for oil and gas companies.²⁵

Major global banks, like other large companies, have committed to aligning their lending and investment portfolios to meet net-zero emissions by 2050. More importantly, a significant number of banks have also committed to meeting intermediate targets as part of the Glasgow Financial Alliance for Net Zero (GFANZ),²⁶ which could imply a reduction of their financed emissions in the oil and gas sector by 2030 (see Appendix 3, Table A-1). But some execution risks exist, as evidenced by recent headlines related to several banks threatening to leave the GFANZ.²⁷

These targets don't prohibit financial institutions from lending and investing activities related to the oil and gas industry. Instead, they imply increased selectivity and scrutiny of the fossil fuel sector's commitments and progress on emission reduction.²⁸ Rather than a complete divestment from the industry, these pledges could lead to greater differentiation among oil and gas companies in terms of access and costs of financing—penalizing companies whose operations have relatively high carbon intensity, that are not making investments to reduce emissions, and that are lagging in setting emission targets and decarbonization plans.²⁹

How financial institutions go about meeting their net-zero targets is also important. Decarbonization goals that are met by divesting from fossil fuel assets instead of investing in technologies to mitigate emissions can have the unintended consequence of transferring these assets to operators with lower environmental commitments and scrutiny, which may stall or worsen the level of greenhouse gas emissions and slow the energy transition—the so-called transferred emissions problem.³⁰

A Policy Toolkit for Transition Assets

Although oil and gas investments are trending in line with climate pledges announced by countries, net-zero scenarios assume oil production will fall in response to the decline in oil demand.³¹ However, an energy transition in which the drop in oil and gas production outpaces the demand decline leads to high and volatile fuel prices, heightened energy security concerns, and geopolitical risks.³² Hence, there is a need to think more strategically about investments in oil and gas assets as a bridge on the path to an orderly energy transition.

Investment decisions need to be made for three broad classes of transition assets in the oil and gas space: existing assets, new assets, and retiring assets. Key players in these decisions are policymakers, financial institutions, and asset owners. This section focuses on the intersection between finance and policymaking for each of the three classes of transition assets to ensure energy security and affordability while meeting net-zero goals.³³

Existing Assets: Policies and Guidelines Mostly in Place

Premature retirement of existing fossil fuel infrastructure can lead to an energy deficit, but extending their lifetimes can hurt climate goals.³⁴ A better understanding of the role of oil and gas investments in net-zero scenarios is thus needed to lower the risk of a disorderly transition.

The *financial sector* has been making tangible commitments under their net-zero pledges to reduce financed emissions related to the companies they finance and invest in.³⁵ Specific guidelines outlined by the largest banks for access to their financing services (see Appendix 3, Table A-1) and by the largest asset managers for continued investment in these companies (see Appendix 3, Table A-2) indicate they will become more selective going forward. Instead of disengaging, an orderly transition could involve these institutions stressing enhanced reporting, external verification, and compliance requirements from both private and state-owned oil and gas companies.³⁶ To have the greatest impact on reducing emissions, a big focus of future financing could be conditional on unequivocal progress on flaring and venting of natural gas, resulting in an immediate and dramatic reduction in methane emissions, one of the most cost-effective ways for the industry to bring down greenhouse gas emissions.³⁷

Because NOCs represent roughly 50 percent of current oil production and hold around 80 percent of oil reserves, it is difficult for the sector's decarbonization efforts to have a material impact without engaging them. Bond investors have the potential to play an important role by pressuring NOCs to reduce emissions, given the need of NOCs and their shareholder governments to roll over debt.³⁸

For existing oil and gas assets, the role of *policymakers* is on the execution side, since the frameworks and policy decisions are already in place to a great extent. Examples include the Zero Routine Flaring by 2030 initiative, a sectoral pledge launched with the support of the World Bank in 2015;³⁹ the Global Methane Pledge,⁴⁰ launched at COP 26 in November 2021; and domestic policies, such as the US Inflation Reduction Act of 2022, that penalize methane emissions.⁴¹ More work is needed in emerging market and developing economies (EMDE) regarding financial, regulatory, and technical support for decarbonization solutions and engagement with state-owned companies to adopt them.⁴² Given the role of multilateral banks in development finance for EMDE, future financing could be contingent upon regulating methane emissions and restricting flaring and venting.

Another area for policy consideration is refineries. The 2 million barrels per day of refinery closures in Organisation for Economic Co-operation and Development (OECD) countries since the start of the pandemic⁴³ could pose energy security risks, as 60 percent of global refining capacity is in EMDE, with their share expected to increase.⁴⁴ In McKinsey's most bullish scenario, liquid oil demand (for transportation) is expected to peak in the next decade,⁴⁵ potentially posing a challenge for advanced economies to continue operating their refineries. Policymakers could consider providing

incentives for must-run refineries to delay closures, but with the obligation to close when no longer needed.⁴⁶ In areas most sensitive to product supply disruptions, incentives could be provided to accelerate oil demand displacements.

Investments in New Assets: Limited Policy Role

The idea of no investments in new oil and gas fields has gained traction and is supported by oil and gas companies appearing to align their capital spending with announced climate pledges. Nonetheless, there are instances where new oil and gas investments may make sense for *financial institutions* as they combine decarbonization goals with energy security.⁴⁷ Some examples include:

- Projects already approved or those that have reached a final investment decision, in line with the IEA's net-zero scenario.
- Projects with shorter lead times and quick payback periods—so-called short-cycle projects.⁴⁸
- Projects that are transition ready, as highlighted by Bordoff and O'Sullivan⁴⁹: those with low carbon emissions in their operation or investment plans (e.g., flaring controls, carbon capture and storage [CCS], and hydrogen-ready infrastructure) and with a viable plan for early retirement or retrofitting.⁵⁰

While the role of *policy* is limited here, one area where there may be space is in providing incentives for building resiliency in energy systems for energy security purposes. One example is facilitating the building of commercial and strategic product inventories close to demand centers.⁵¹ The approach could be to build inventories during periods of weak demand to be used during supply disruptions or when supply is not keeping up with demand for any other reason. The US successfully used this strategy in releasing crude oil from its Strategic Petroleum Reserve when supply was at risk during Russia's invasion of Ukraine, and has announced that it will begin purchasing it back at a lower price as these pressures have eased.⁵² Similarly, the EU's natural gas storage proved pivotal to dealing with supply disruptions from Russia last year.⁵³ Finally, policymakers could consider fast-tracking the permitting process for oil and gas infrastructures that are transition-ready.

Investing in the Retirement of Assets: Frameworks Needed

Oil and gas assets are expected to remain a part of the energy system for many years, and therefore not much attention has been paid to developing frameworks for their eventual retirement, decommissioning, or repurposing.⁵⁴ However, this is an area where policy could play a significant role for two reasons.

- There is an opportunity for a decommissioning framework to consider potential reuse and

repurposing of some of this infrastructure.⁵⁵

- If most oil investments in the coming decades are made in existing fields, as opposed to new ones, much more attention needs to be placed on aging fields and the risks they pose in terms of worsening energy intensity and carbon emissions per barrel.⁵⁶ This may lead oil and gas companies to optimize their portfolios by divesting from uneconomical assets with the highest emission intensities to less climate-friendly entities—the transferred emissions problem.

Since both decommissioning and repurposing are highly capital-intensive activities, the role of *financial institutions* is critical. However, net-zero pledges may constrain the ability of these actors to finance and invest in these activities due to their high emission intensities, even though they are critical to meeting climate goals. One solution could be to account for these assets differently in the financed emissions limits of financial institutions, to make it easier for them to be considered in financing and investment decisions.⁵⁷ Undoubtedly, such a step would be controversial and would need the involvement and buy-in of financial regulators and governments.

Any such special designation of retiring assets should come with clear guardrails and strict governance to avoid becoming a loophole. Nevertheless, if executed successfully, it could unlock private capital for assets that need to be phased out or retrofitted, facilitating the accelerated greening of brown assets in support of an orderly transition to net zero.

Policymakers also have a crucial role to play in both the responsible decommissioning and divestment of assets.

Decommissioning or repurposing assets: Some ideas include:

- Securing the early retirement of an asset in exchange for incentives such as carbon credits.⁵⁸
- Facilitating the creation of financial structures such as special purpose vehicles by a company to manage its decommissioned assets instead of divesting to entities with less stringent decarbonization goals.⁵⁹
- Helping to create a carbon retirement portfolio with a commitment to retire assets more quickly than business as usual and incentives to lower greenhouse gas emissions.⁶⁰

In many EMDE, governments are the owners of the reserves instead of oil and gas companies. Thus, responsible companies may not be able to make decisions about phasing out assets, and the only possible solution for them may be to divest. One approach that could be taken to address this problem is providing carbon credits for the decommissioning of assets or their retrofitting—with very strict timelines to phase them out. Such an approach could also incentivize EMDE governments

to phase out such assets if financial benefits offset at least part of the opportunity cost of foregone oil and gas revenues.

Addressing divestment of assets to less climate-friendly actors: To improve performance in terms of profitability and emissions, the incentive of companies is to build portfolios resilient to both low commodity prices and high carbon prices by divesting the least productive and highest emitting assets.⁶¹ However, this significantly increases the transferred emissions risk.⁶²

In addition to guidelines proposed by the Environmental Defense Fund and Ceres about responsible mergers and acquisitions transactions in the oil and gas industry,⁶³ policymakers could consider:

- Creating a global directory of oil and gas assets being purchased and sold to ensure transparency and raise awareness of the transferred emissions problem.
- Creating a decommissioning fund by imposing a fee on divestment transactions to be used for the eventual decommissioning of assets.
- Attaching to new assets going forward an explicit obligation to retire them responsibly, by not being able to transfer the liability of claims and expenses related to their closure.⁶⁴ In other words, the cost of retirement would need to be factored in when estimating the potential return from new projects.

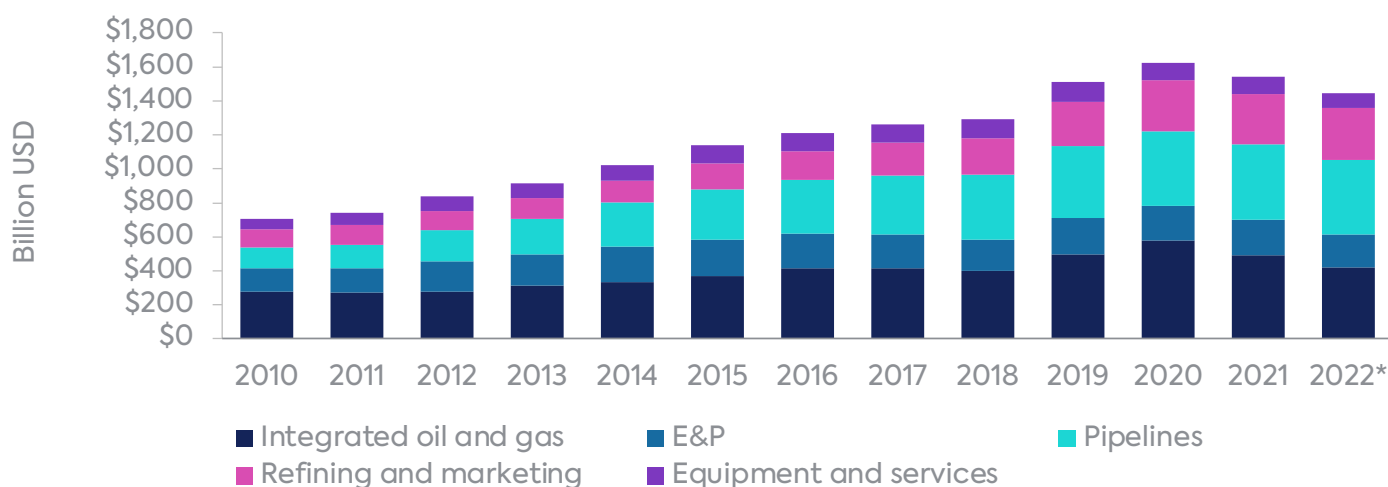
Conclusion

The current level of investments in the oil and gas sector is consistent with announced climate pledges by countries, but is above what is projected for net-zero scenarios and below near-term demand trends. This suggests that companies in the sector are adjusting to policy signals regarding the scaling down of assets and the implied outlook for oil and gas demand. Building on initiatives and frameworks already in place, this commentary laid out additional considerations for new and existing assets to meet energy security and geopolitical priorities within the confines of climate goals.

Where there is an imperative for a more thoughtful approach, both from financial actors and policymakers, is in the financing of responsible oil and gas asset decommissioning or retrofitting—both of which are highly capital-intensive activities. Absent a framework that creates the right incentives, some efforts by financial institutions and responsible companies to meet their net-zero goals could be lost if emissions are not curbed but transferred. Within the reality of the world's shrinking carbon budget to meet climate goals, there is a need to think about investments in new, existing, and retiring oil and gas assets holistically.

Appendix 1: Private Oil and Gas Companies' Debt Levels, Dividend Payments, and Stock Buybacks

Figure A-1: Total outstanding debt of private oil and gas companies globally

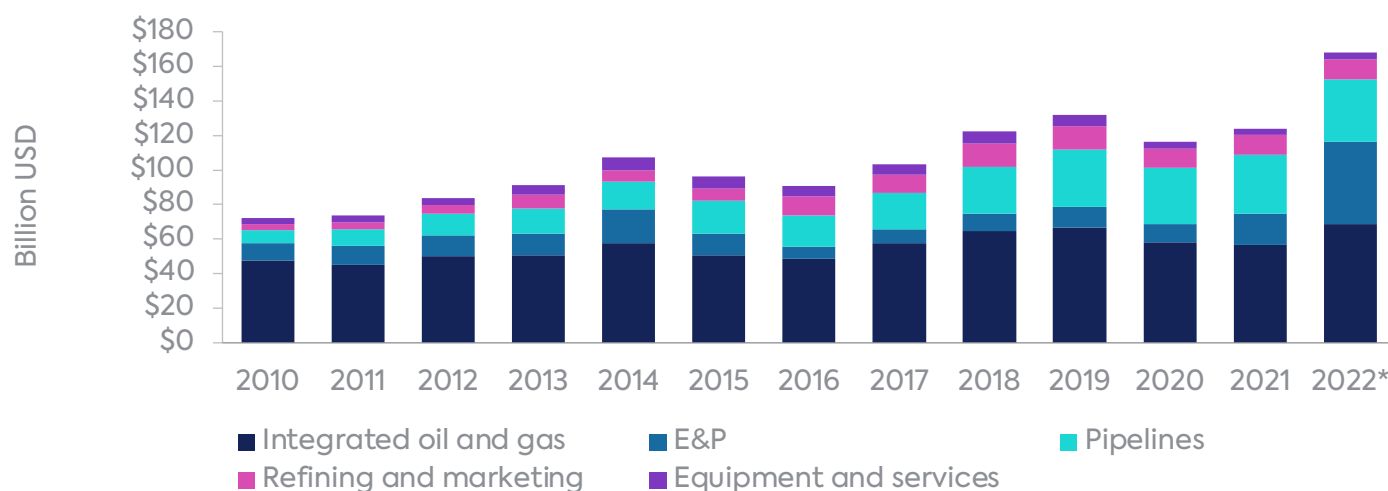


Note: Private companies with a market capitalization over \$500 million in November 2022 were included;

*as of Q3 22 for companies with Q4 22 data not available by January 31, 2023.

Source: Bloomberg data, authors' calculations.

Figure A-2: Annual dividend paid by private oil and gas companies globally



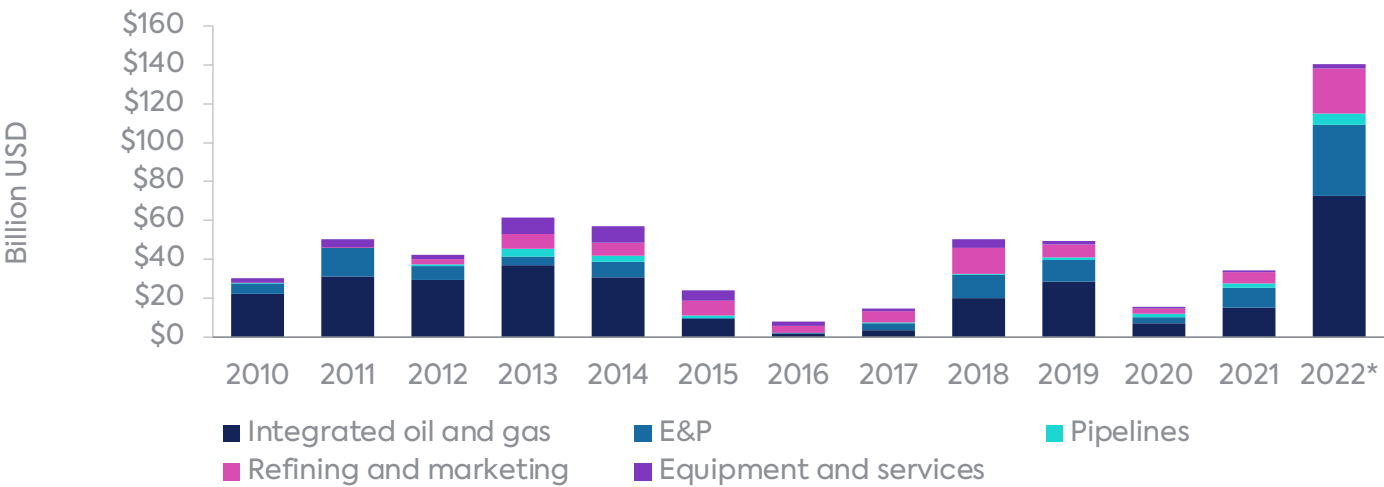
Note: Private companies with a market capitalization over \$500 million in November 2022 were included;

*Q4 22 dividend amount was assumed to be the same as Q3 22 for companies with Q4 data not available by January 31, 2023.

Source: Bloomberg data, authors' calculations.



Figure A-3: Annual stock buybacks by private oil and gas companies globally



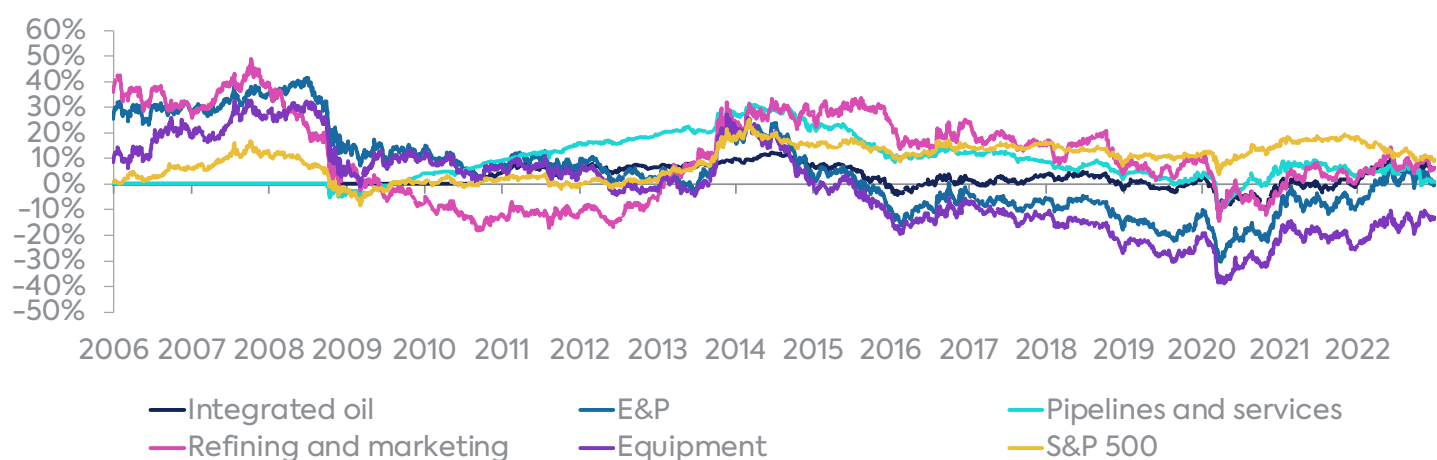
Note: Private companies with a market capitalization over \$500 million in November 2022 were included;
*Q4 2022 buyback amount was assumed to be the same as Q3 2022 for companies with Q4 data not available by January 31, 2023.

Source: Bloomberg data, authors' calculations.



Appendix 2: Performance of Oil and Gas Subsectors vis-à-vis the S&P 500 Index

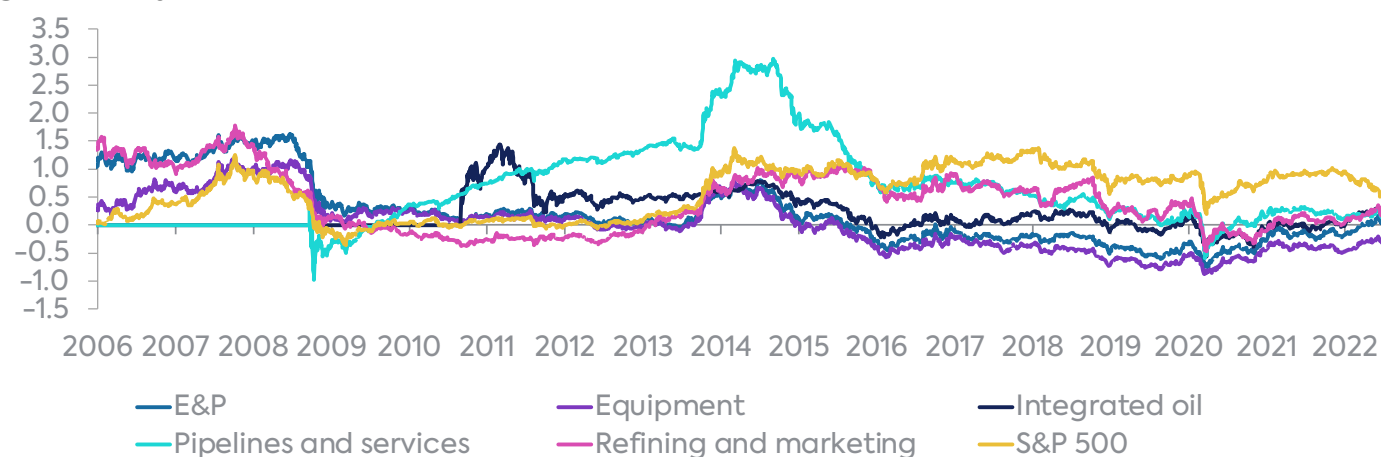
Figure A-4: Rolling five-year index returns for different sectors within the oil and gas industry



Note: For integrated oil, the total return index by MSCI was used; for pipelines and services, the total return index by Solactive, which is denominated in Canadian dollars, was used; for E&P, equipment, and refining and marketing, total return indices by S&P were used. Data as of December 2022.

Source: Bloomberg data, authors' calculations

Figure A-5: Rolling five-year index returns to volatility ratios for different sectors within the oil and gas industry



Note: For integrated oil, the total return index by MSCI was used; for pipelines and services, the total return index by Solactive, which is denominated in Canadian dollars, was used; for E&P, equipment, and refining and marketing, total return indices by S&P were used. Data as of December 2022.

Source: Bloomberg data, authors' calculations.

Appendix 3: Oil and Gas Sector Emission Reduction Targets for Banks and Asset Managers

Table A-1: Banks' targets for emission reductions in the oil and gas sector

Institution	Total assets at end of 2021* (USD billions)	Oil and gas reduction targets	Year of adoption	Baseline year for targets	Baseline emissions	Target year
JP Morgan	\$3,743.57	35% (Scopes 1 and 2) and 15% (Scope 3) in portfolio-weighted average carbon intensity of the bank's in-scope clients	2021	2019	Scopes 1 and 2: 6.10 grams of carbon dioxide equivalent per megajoule (CO ₂ e/MJ); Scope 3: 66.50 gCO ₂ e/MJ	2030
MUFG	\$3,176.84	15–28% in absolute GHG emissions	2022	2019	83 Mt CO ₂ e	2030
Bank of America	\$3,169.50	42% in emissions intensity in gCO ₂ e/MJ (Scopes 1 and 2) and 29% in emissions intensity in gCO ₂ e/MJ (Scope 3)	2021	2019	Baseline to be published	2030
HSBC	\$2,953.64	34% in absolute emissions (Scopes 1, 2, and 3)	2022	2019	35.8 Mt CO ₂ e	2030
BNP Paribas	\$2,905.83	At least 10% in financed emissions intensity in gCO ₂ e/MJ; 12% reduction in credit exposure for upstream oil and gas and 25% for upstream oil only	2022	2020	68 gCO ₂ e/MJ	2025
Citi	\$2,291.41	29% absolute emissions (Scopes 1, 2, and 3)	2021	2020	143.8 Mt CO ₂ e	2030
Mizuho	\$1,957.87	In process of setting midterm targets	N/A	N/A	N/A	2030
Wells Fargo	\$1,948.07	26% in financed emissions (Scopes 1, 2, and 3)	2022	2019	97.7 Mt CO ₂ e	2030
Barclays	\$1,874.40	40% in absolute emissions (Scopes 1, 2, and 3)	2022	2020	78.5 Mt CO ₂ e	2030
TD	\$1,486.40	29% in financed emissions lending intensity for the energy sector overall (Scopes 1, 2, and 3)	2022	2019	2,078 g CO ₂ e/CAD\$	2030
Goldman Sachs	\$1,463.99	17–22% reduction in emissions intensity in gCO ₂ e/MJ (Scopes 1, 2, and 3)	2021	2019	72 gCO ₂ e/MJ	2030
RBC	\$1,376.79	35% (Scopes 1 and 2) and 11–27% (Scope 3) in financed physical emissions intensity	2022	2019	Scopes 1 and 2: 7.6 gCO ₂ e/MJ; Scope 3: 68.60 gCO ₂ e/MJ	2030
Morgan Stanley	\$1,188.14	29% in financed emissions lending intensity (Scopes 1, 2, and 3)	2021	2019	N/A	2030
UBS	\$1,117.18	71% absolute emissions (Scopes 1, 2, and 3)	2022	2020	N/A	2030
Scotia Bank	\$978.48	30% (Scopes 1 and 2) and 15–25% (Scope 3) emissions intensity in tCO ₂ e/TJ	2022	2019	Scopes 1 and 2: 5.8 tCO ₂ e/TJ; Scope 3: 66 tCO ₂ e/TJ	2030

Note: "CO₂e" refers to carbon dioxide equivalent; "Mt" refers to million tons or million metric tons, depending on the region/country.

Source: Cited companies' ESG reports and websites. | *Source: S&P Global Market Intelligence, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/the-world-s-100-largest-banks-2022-69651785>.



Table A-2: Selected asset managers' targets for the oil and gas sector

Institution	Total assets under management (AUM) as of Q1 2022* (billion USD)	Investment targets/objectives	Year of target disclosure	Target year	Baseline year	Baseline figures
BlackRock	\$9,570	Anticipate that at least 75% of BlackRock corporate and sovereign assets managed on behalf of clients to be invested in issuers with science-based targets or equivalent (from 25% currently)	2022	2030	2021	N/A
Vanguard	\$8,100	Quit the Net Zero Asset Managers initiative on December 7, 2022	N/A	N/A	N/A	N/A
State Street	\$4,020	Reduce financed Scope 1 and 2 carbon emissions intensity by 50% relative to 2019 baseline by 2030	2022	2030	2019	To be completed
Amundi	\$2,251	18% of total AUM net zero aligned by 2025; 30% carbon intensity reduction target in 2025 vs. 2019, and 60% vs. 2030 (minimum targets that need to be exceeded) on Scopes 1, 2, and part of 3 for committed portfolios under Net Zero Investment Framework Implementation (NZIF)	2022	2025/ 2030	2019	254.2 t CO ₂ e/€M turnover
JP Morgan Asset Management	\$2,960	Approximately 55% of in-scope AUM to be in investments where the issuer has set science-based net zero targets or equivalent	N/A	2030	2021	N/A
Invesco	\$1,556	Reference target for decarbonization of portfolio: 50% lower carbon footprint as measured by t CO ₂ /\$ invested by 2030 vs. 2019 baseline	2022	2030	2019	73 t CO ₂ e/USD mn invested
Deutsche Bank – DWS	\$2,124	50% reduction in weighted average inflation-adjusted financial carbon intensity (WACI adj.) related to Scope 1 and 2 emissions, consistent with a fair share of the 50% global reduction in CO ₂ identified as a requirement in the IPCC special report on global warming of 1.5°C.	2021	2030	2019	170 tCO ₂ e/USD mn (referring to Scope 1 & 2 emissions of 286 bn USD AUM only, excluding 58 bn USD in companies without financial emission intensity data)
UBS Asset Management	\$1,615	Weighted average carbon intensity of funds to be 50% below the carbon intensity of the respective 2019 benchmark by 2030	2021	2030	2019	Each strategy will have a different baseline metric performance relative to their benchmark
LGIM (Legal and General Investment Mgmt.)	\$1,866	Funds are considered net zero aligned if they meet either: At least 50% reduction in GHG intensity from 2019 baseline or temperature alignment of 1.5°C by 2030	2021	2030	2019	Baseline performance may vary according to portfolio; for funds launched at later dates, the 50% reduction can be pro-rated over the remaining time to 2030

Note: Asset managers listed according to their ranking in oil and gas new financing by Reclaim Finance's Asset Manager Climate Score Card, https://reclaimfinance.org/site/wp-content/uploads/2022/04/Asset_Manager_Climate_Scorecard_2022.pdf.

Source: Cited companies' ESG reports and websites; Net Zero Asset Management Initiative, <https://www.netzeroassetmanagers.org>.

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Before her time at Citgo, Palacios was a Senior Managing Director and member of the management committee of Medley Global Advisors, a macro policy research firm. She headed Medley's Latin America's economic and energy practice and later the firm's emerging market research efforts. She previously worked at Barclays Capital as a Director in the emerging markets research department in New York, and as an economist in the risk department at Société Générale in Paris. She also worked as a senior economist at the Japan Bank for International Cooperation and was a consultant in the Office of the Chief Economist for Latin America at the World Bank in Washington, D.C.

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