

Horizons

The cost of capital discipline:

Big Oil's longevity challenge

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INTRODUCTION



Sustaining hydrocarbon production through the 2030s has become a strategic priority for the world's largest oil and gas companies. A slowing energy transition and challenges in building out low-carbon businesses have prompted a recalibration back towards oil and gas to maintain cash flows (and dividends) through the next decade.

After five years of reduced upstream activity, however, many companies have been left with production – and cash-flow – outlooks that are more aligned with net-zero pathways, than the higher-for-longer demand scenario that appears to be playing out. Wood Mackenzie expects production from current commercial projects, for a peer group of 30 of the world's largest exploration and production (E&P) companies, to fall by nearly 40% between 2025 and 2040, on average. The decline is most acute for companies without US tight oil exposure.

We forecast global oil and gas demand to grow by 6% to 2040, providing a solid macro backdrop that can sustain or even grow the upstream cash engine. However, pressure to return cash to shareholders and near-term price uncertainty are putting a ceiling on the investment needed to address the upstream longevity challenge.

The key question is: can oil and gas companies satisfy shareholder desire for payouts while ensuring cash-flow sustainability through the next decade?



The 22 mmboe/d shortfall

Oil and gas companies are recalibrating back towards upstream activity. The slowing energy transition, downgrades to low-carbon ambitions and investor pressure for distributions have reinforced upstream as Big Oil's cash-flow engine well into the future. For most companies, however, the challenge of sustaining production has increased dramatically over the last decade.

We think the industry can deliver the supply needed to meet peak demand and beyond. Less certain is which companies are best placed to deliver it and how they can maintain their share of the world's supply.

The challenge of sustaining production has increased dramatically over the last decade

In this edition of Horizons, we examine the longevity challenge facing 30 of the world's biggest oil and gas companies, spanning the Majors, national oil companies (NOCs) (but excluding resource-holding giants in the Middle East), international oil companies (IOCs) and North American E&Ps.

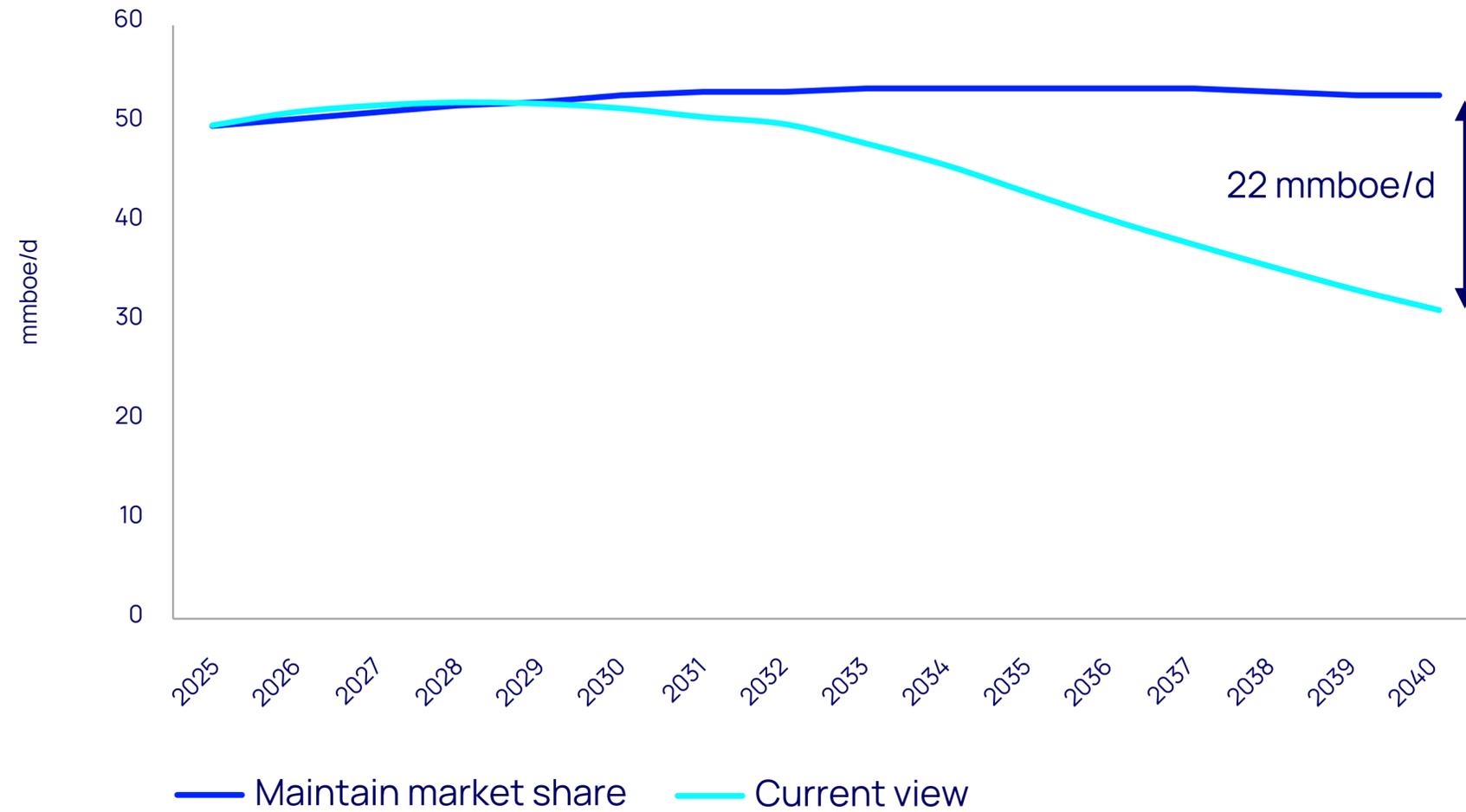
The group of 30 has a production shortfall the size of nearly two Permian basins



Source: Wood Mackenzie Corporate Strategy and Analytics Service (CSAS)

These 30 companies collectively produce around 50 million barrels of oil equivalent per day (mmboe/d), meeting close to 30% of global oil and gas demand. Based on today's portfolios of commercial assets, however, they will require an additional 22 mmboe/d by 2040 to maintain their share of the world's supply. Filling that gap would require the group to add additional volumes equivalent to nearly two Permian basins or 14 Guyana-scale plays.

Production outlook – the group will need to find 22 mmboe/d to maintain its market share



Note: Doesn't include sub-commercial volumes

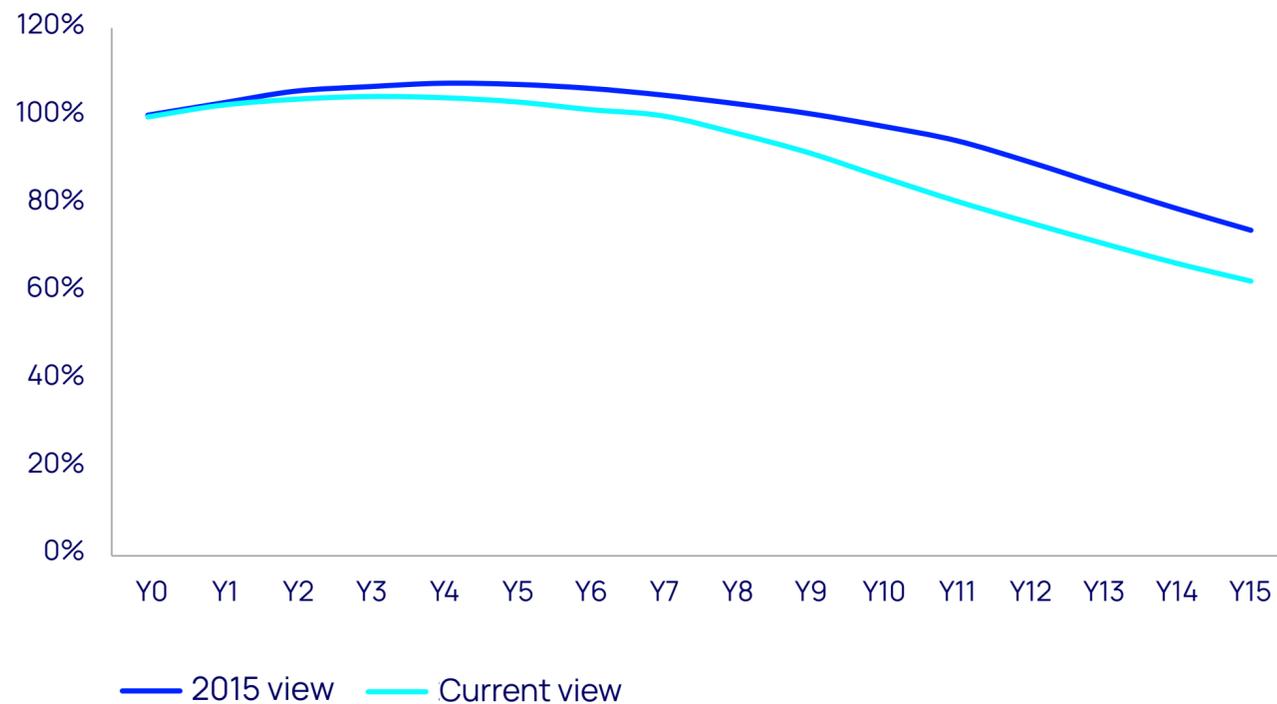
Source: Wood Mackenzie Corporate Strategy and Analytics Service (CSAS), Upstream Benchmarking Tool

Plugging the gap was easier in 2015

This group of 30 has form when it comes to adding new volumes to sustain production, but a lack of business development and exploration success in the early 2020s has left many of them with fewer growth options – and a bigger gap to fill – than a decade ago.

Back in 2015, we forecast that production from this group would fall 25%, or 11 mmboe/d, through 2030. That is a far less substantial decline than the nearly 40%, or 19 mmboe/d, fall in production from commercial assets we are now forecasting between 2025 and 2040.

Indexed production – the outlook today is worse than it was in 2015



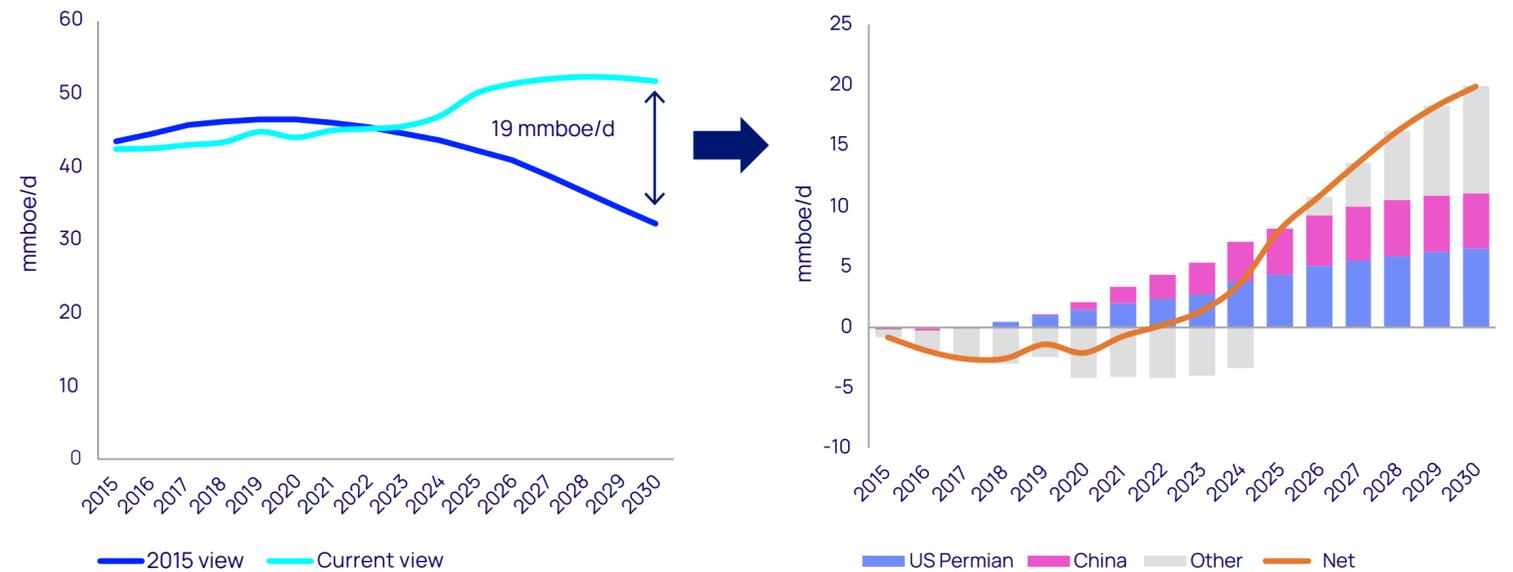
Note: Doesn't include sub-commercial volumes
 Source: Wood Mackenzie Corporate Strategy and Analytics Service (CSAS), Upstream Benchmarking Tool

The corporate cohort closed the gap last time around, delivering an additional 19 mmboe/d on top of our 2030 production forecast through a mixture of exploration, increased recovery, and mergers and acquisitions (M&A).

Most companies will produce more in 2030 than we forecast in 2015; only Petrobras and PetroVietnam will produce less. The big 'winners' have largely been US focused: ExxonMobil, Chevron, ConocoPhillips and Occidental have each added more than 1 mmboe/d, mainly through M&A-led US tight oil expansion. PetroChina and CNOOC have delivered similar results by doubling down on domestic plays in China.

These additions helped the peer group maintain its global market share but US tight oil – largely through M&A in the Permian Basin – and upgrades to the Chinese NOCs' domestic volumes dominated. Barring the emergence of a new Permian-scale play, this is unlikely to be replicated. Even if it were, the peer group would still fall 3 mmboe/d short of what is needed to fill the looming gap to 2040.

Production outlook (2015 v 2025 view) – US Permian and China came to the rescue last time



Source: Wood Mackenzie Corporate Strategy and Analytics Service (CSAS), Upstream Benchmarking Tool

Why things are different this time around

Ten years on, not only is the next-decade gap bigger, but these companies have fewer obvious options for plugging it.

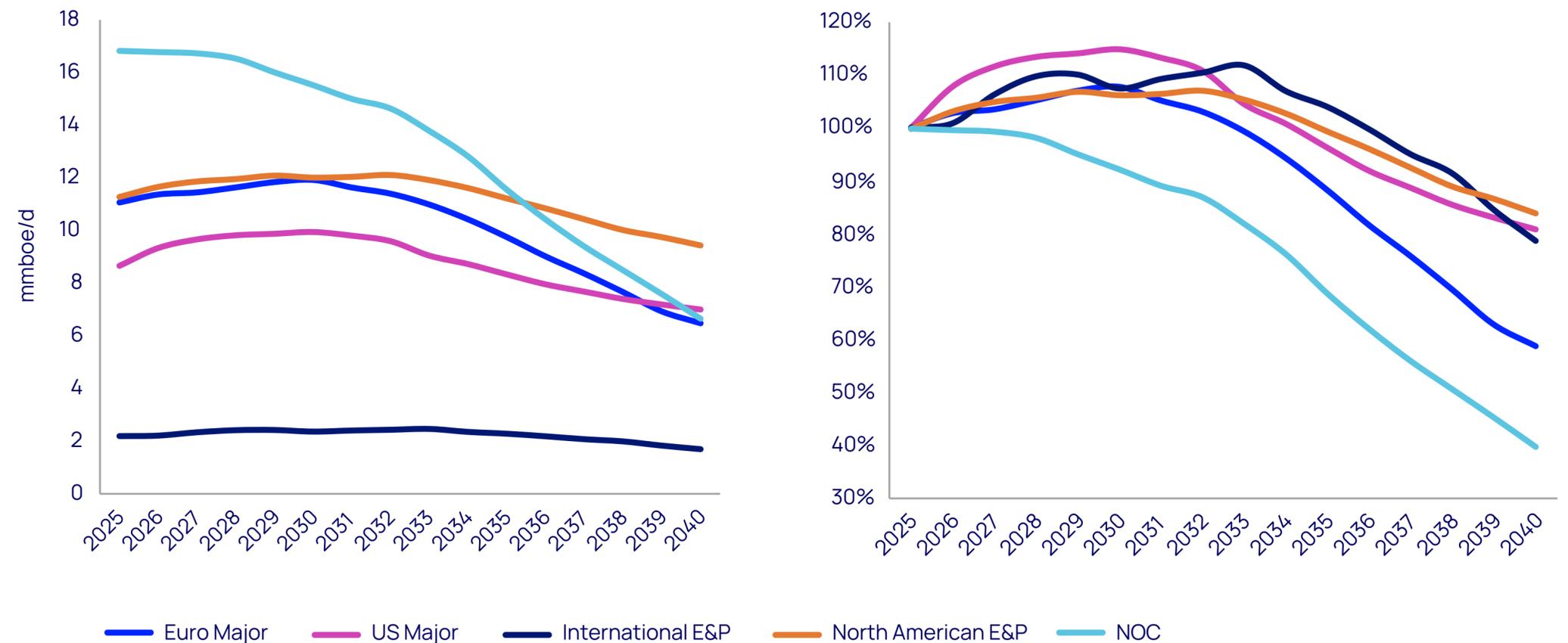
The great phase of US tight oil growth is ending. Production is nearing – or has even passed – its peak and is set to plateau in the coming years. Many of the most attractive corporate M&A opportunities to bolster E&Ps' portfolios have already been snapped up. Chinese barrels are becoming increasingly costly to develop. What's more, top resource-holding countries, such as Saudi Arabia, Russia and Iran, are closed for business, at least for now. The potential reopening of [Venezuela](#) has attracted headlines, but comes with a long list of challenges.

Of the 30 companies in our peer group, only Expand Energy, INPEX and Santos are set to produce more in 2040 than they are today based on our current view of their portfolios. Most companies will struggle to hold production at anywhere near today's levels.

The situation is most acute for the Euro Majors and NOCs, who will need to find or access more than 1 mmbœ/d – or 50% of their current production base – on average, to grow in line with demand. In absolute terms, CNPC has the biggest shortfall, with Pemex the most challenged in percentage terms. Equinor and Shell have the biggest gaps to fill among the Majors and IOCs.

Most companies will struggle to hold production at anywhere near today's levels

Production outlook by peer group – the Euro Majors and NOCs have the biggest gaps to fill



Note: Numbers don't include sub-commercial volumes. NOC category doesn't include Middle East resource holders.

Source: Wood Mackenzie Corporate Strategy and Analytics Service (CSAS)

Why companies cannot spend their way out

Compounding the challenge, the E&P sector is no longer constrained just by opportunity, but by capital. Fundamentally, [oil and gas](#) is a maturing business. To have a credible investment thesis, companies need to generate free cash flow at flat production under mid-cycle conditions to support sustainable shareholder distributions.

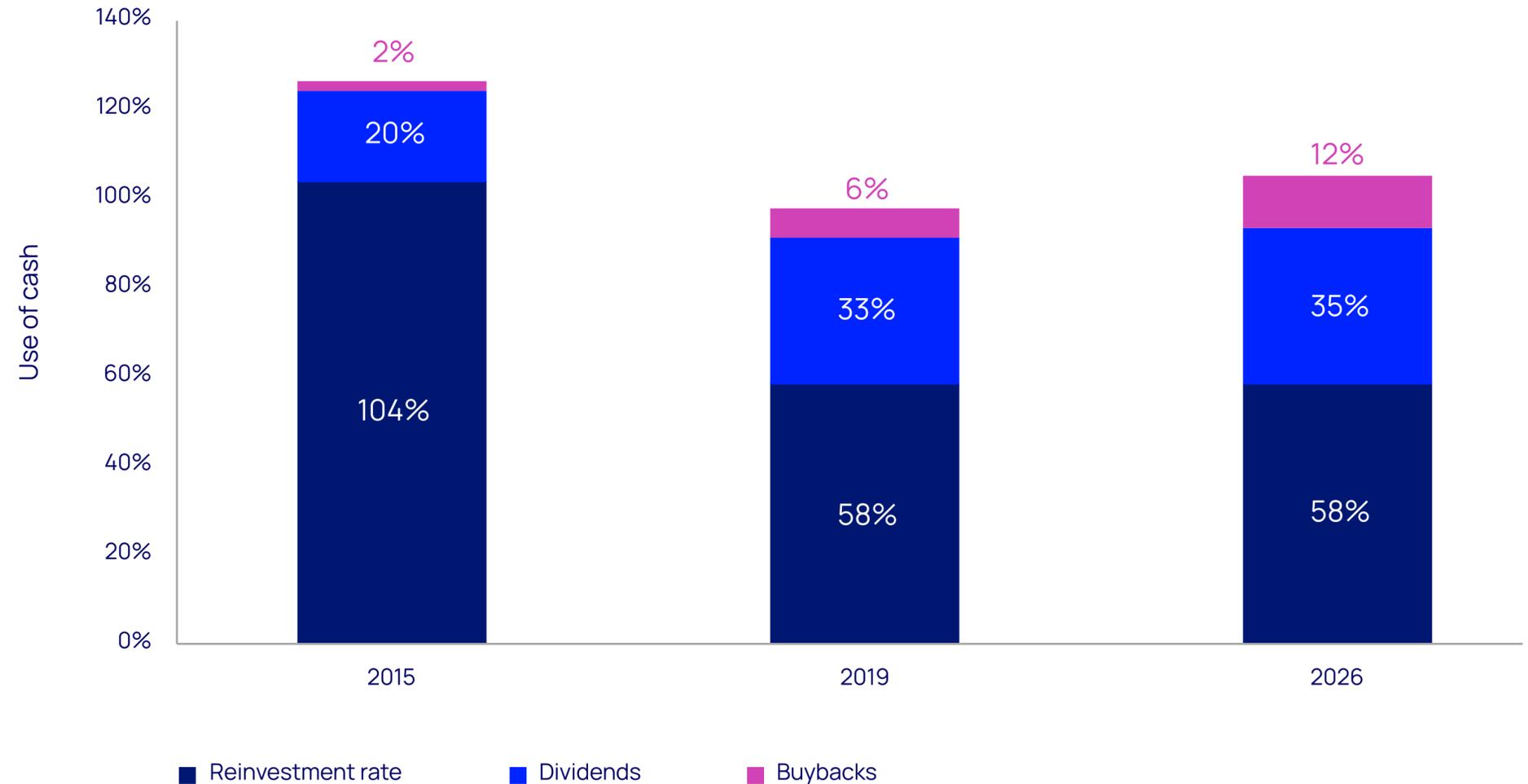
Since 2015, a smaller, more cautious investor base has redefined value. Scarred by weak equity returns – led by a shale sector that had threatened to overproduce its way to destruction – investors are now rewarding quarterly earnings and return of capital rather than long-term growth.

Valuation upside now accrues to scale and credibility. Larger, more diversified producers have been re-rated as the market prioritises balance-sheet strength and through-cycle distributions. The rise of passive and momentum-based investing has exacerbated this large-cap premium by ensuring that larger companies continue to attract investors.

Investors increasingly expect these large companies to return 30% to 50% of operating cash flow by way of dividends and buybacks, with distribution resilience valued even above growth at attractive returns. Yet maintaining production remains essential to underpin cash generation, particularly in the absence of new, material growth engines, such as low-carbon businesses.

Because capital discipline is now a defining feature of how E&P companies are valued, companies cannot simply spend their way out of this dilemma. The core strategic challenge for the industry is, therefore, how to sustain output when reinvestment rates are roughly half of mid-2010s levels – a seemingly impossible equation that demands creative solutions.

Use of operating cash flow – reinvestment rates have almost halved since 2015



Source: Wood Mackenzie Corporate Strategy and Analytics (CSAS), Corporate Financial Models (CFMs)

The path to portfolio sustainability

Companies will need to take a two-pronged approach in order to maintain (or grow) oil and gas production and cash flows through the 2030s.

The first is **operational**. Companies will have to do more with less. Can our corporate cohort lead the deployment of artificial intelligence (AI) and new technology to find and produce more hydrocarbons at a lower cost?

The second is **structural**. Companies must find a way to increase investment while still satisfying investors. Are there business models, forms of collaboration and avenues of finance that companies could employ at greater scale to bridge the gap between short-term demands and long-term requirements?

Path 1: the efficiency play

AI and recovery: the 470-billion-barrel prize

Wider and better deployment of technology could be a game changer, particularly in plays with low recovery factors. As we highlighted in a recent edition of [Horizons](#), better recovery from existing fields could yield an additional 470 billion boe globally. Some regions may already be pushing the limits of recovery, such as China and the North Sea, but they still provide good analogues for what could be repeated elsewhere.

Our analysis shows that IOCs typically outperform NOCs when it comes to recovery factors, offering greater opportunities for technology transfer and 'win-win' collaboration. Scale and building first-mover advantage will play an important role in capitalising on efficiency opportunities.

Those players that invested in super-computers and structuring their data during the digitalisation phase of the late 2010s will have a head start in deploying large language models to extract operational efficiencies. While typically behind the curve when it comes to cutting-edge technology, NOCs' unique size and integrated single-country operations could give them an edge in AI deployment.

Companies will need to step up investment in AI, forging new partnerships with technology firms and leveraging existing competitive strengths to build their capabilities.

ExxonMobil's Permian growth strategy is an early test case of leaning on proprietary technology to do more with less. The company is deploying data science, proprietary proppant and integration to boost tight oil recovery factors and reduce unproductive capital. This, in turn, is creating M&A opportunities by enabling it to extract more value from assets than their existing owners can. Others will use their own differentiating technologies to build a competitive edge.

Companies will also need to ensure they have the right geographical exposure to capture discovered resource opportunities. Key battlegrounds include the Middle East, as well as North American and international unconventional plays.



NOCs' unique size and integrated single-country operations could give them an edge in AI deployment



Smarter exploration:
finding more but spending less

We don't expect a dramatic increase in exploration budgets even if companies are in a new phase of acreage reloading. Rather, they will need to continue building more optionality to allocate exploration capital to the best opportunities.

The number of explorers has shrunk significantly over the last decade, offering an opportunity to access the best wells and the best acreage in key plays such as the East Mediterranean, Atlantic Margin in Latin America and West Africa, and the Black Sea.

AI and computing power could play an increasingly important role in driving improved performance, such as better and faster seismic processing and interpretation. However, explorers also have other options to improve exploration performance, including:

• **Integrating exploration and development**

phases: early engineering in anticipation of positive results can shorten the time to market. Eni has run project development in parallel with exploration activities to accelerate commercialisation of its discoveries. The alignment of interests in the North Sea and early engagement with the supply chain, meanwhile, has allowed Equinor to fast-track several discoveries using existing infrastructure.

- **Finding and monetising:** taking on more risk by drilling high-equity wells provides the option to accelerate cash flow and boost returns by selling down a stake in the event of a material discovery. Most companies' lack of longevity means any advantaged discoveries will not lack buyers. High-impact discoveries also become a source of acquisition currency for follow-on deals. Eni has used exploration success to enable large farm-downs and innovative deals, most recently with Vitol in Côte d'Ivoire and the Congo, and the NewCo JV with Petronas in Asia.

• **More joined-up strategic thinking:**

linking exploration with a broader business development strategy for a new or emerging region can pay dividends. TotalEnergies has reinvigorated its Southeast Asian portfolio, for instance, by acquiring entry into Malaysia and developing its strategic partnership with Petronas. Building up a detailed understanding of partnership opportunities, particularly with regional NOCs, can also help manage development risk by reducing investment exposure and tapping into cash-generative assets to fund new developments.

Long lead-time investment in exploration is a tough sell to investors, though. While industry returns average 15%, value creation is typically concentrated in a subset of companies, and single-digit returns are common at an individual company level. But consistent execution of a winning business model can fill the production gap and drive value creation.

As Eni's industry-leading full-cycle returns prove, exploration can deliver, but not every company can replicate that model. That is where structural innovation becomes critical.

Consistent execution of a winning business model can fill the production gap and drive value creation

Path 2: creative capital structures

M&A 2.0: beyond traditional dealmaking

M&A remains essential to solving oil and gas companies' longevity challenge, but traditional acquisitive growth has got tougher. While further industry consolidation is inevitable, many of the most attractive corporate acquisition opportunities have already been snapped up.

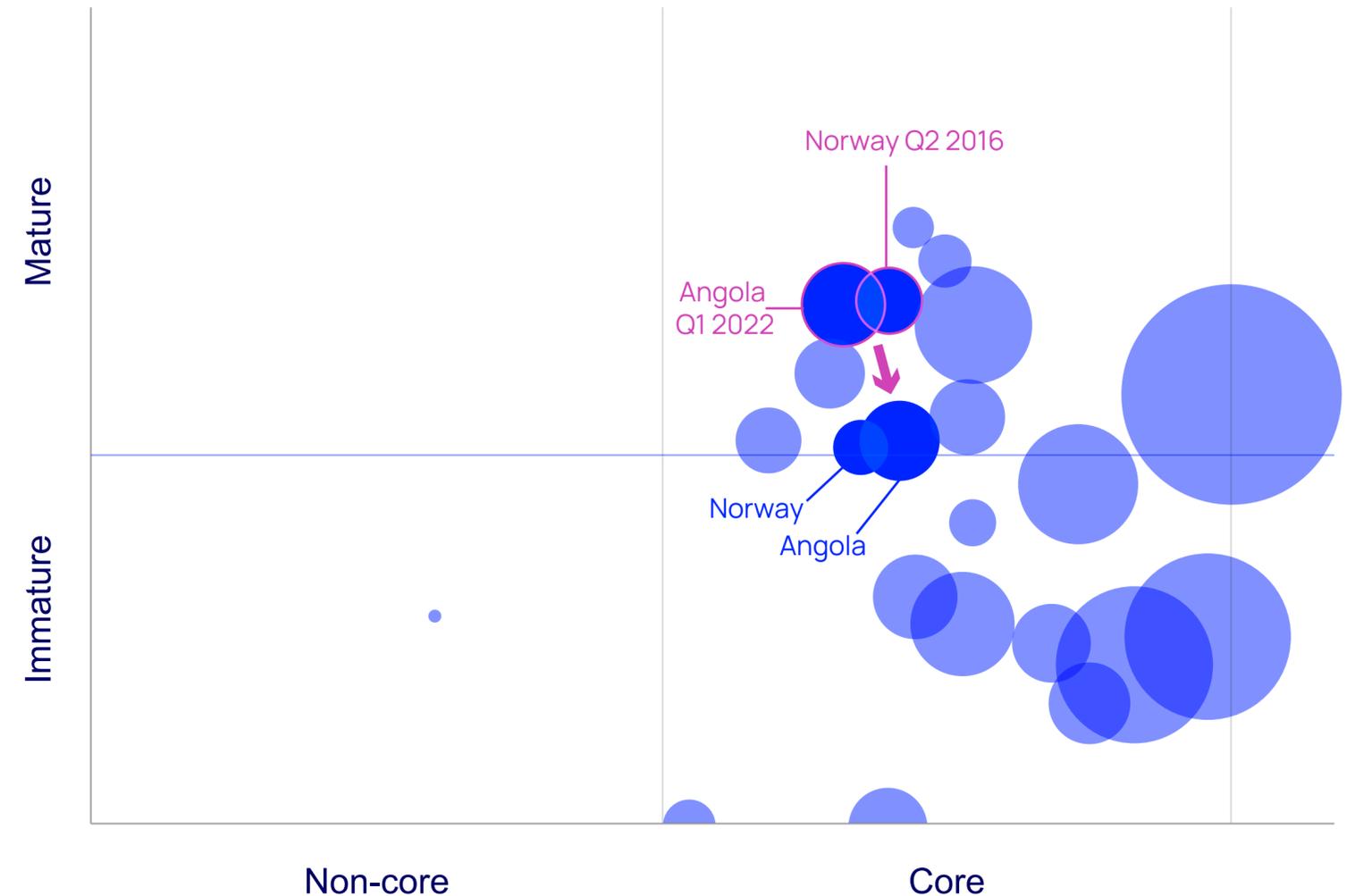
There are relatively few targets of scale with strong long-term growth outlooks. The reduction in IOC-led exploration activity has also reduced the flow of pre-final investment decision (FID) opportunities on the upstream asset market. Moreover, not every asset offers buyers as many synergies as tight oil and shale gas.

In upstream, strategic ventures allow a company to pursue more opportunities more quickly

Oil and gas companies, therefore, will need to get more creative in their next phase of M&A-led growth. A greater capital pool for longevity might be unlocked if M&A were considered at a broader level, including:

- **Strategic ventures:** bringing new targeted investors into transition-focused vehicles prevents capital being drained by nascent growth businesses. In upstream, strategic ventures allow a company to pursue more opportunities more quickly by moving beyond the straitjacket of a group-level capital allocation framework in which non-core regions struggle to attract investment. Strategic ventures have unleashed a new phase of growth in the mature North Sea (Eni, BP, Repsol/TotalEnergies and Shell/Equinor), Africa (BP/Eni) and, most recently, in Southeast Asia (Eni/Petronas). More will follow.

BP strategic fit – Norway and Angola have thrived under their new strategic venture structure



Source: Wood Mackenzie Corporate Strategy and Analytics (CSAS), Upstream Benchmarking Tool (UBT)



- **Partnerships:** strategic partner selection has long been critical to development risk sharing in pre-FID projects and the same logic applies to legacy portfolios. The key is finding partners with complementary strengths – cash-generative assets, infrastructure or regional expertise. Eni's Kutei Basin partnership with Petronas is a prime example: the NOC's producing assets will fund the development of multi-tcf gas discoveries from Eni's selective M&A and exploration, turning a marginal legacy position into a regional growth engine.
- **New financial structures:** Saudi Aramco and ADNOC have recently agreed the sale and leaseback of midstream gas facilities to private equity investors. Similar structures have been deployed in US liquefied natural gas (LNG). Widespread leaseback arrangements could further benefit shareholders if they unlock hidden upside through cost-of-capital arbitrage.
- **Contingent payments:** when dealmaking collapsed on the back of the 2015 price downturn, the once-limited use of contingent payment structures exploded as companies and financiers worked to get transactions flowing again. The use of royalties and volumetric payment production sales are not typically seen in the playbook of major oil and gas companies but they could be part of the solution to the industry's capital allocation challenge. TotalEnergies and Galp's recent deal in Namibia, for instance, used a more traditional carry component with repayment deferred until production start-up.

Widespread leaseback arrangements could further benefit shareholders if they unlock hidden upside through cost-of-capital arbitrage

CONCLUSION

Squaring the circle

Replacing 22 mmboe/d by 2040 is a gargantuan task.

Not every E&P will succeed. Players that lack portfolio depth, quality and financial capacity will either be bought or wither away. The share of global production will continue to shift from IOCs to NOCs.

Stakeholder demands differ, but it is difficult to see investor sentiment shifting materially in favour of investment in growth, even if the energy transition continues to progress at a slow pace. For both IOCs and NOCs, particularly those from importing countries, the task is the same: aligning the needs of investors while addressing the longevity challenge in oil and gas.

Companies will need to deploy every tool in the playbook to square the circle. Business development will continue to prop up portfolios, but more creative strategies will be needed to access capital and support both M&A and exploration, including strategic ventures.

Forging new partnerships and leveraging existing competitive strengths can help build capabilities and enable growth. Companies will also need to ensure that they have the right geographical exposure to capture new discovered resource opportunities. Those that rank high on resilience and sustainability should get stronger, if they play their cards right.





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