WHITE PAPER

Oil and Gas Decommissioning: Lessons from Mature Basins

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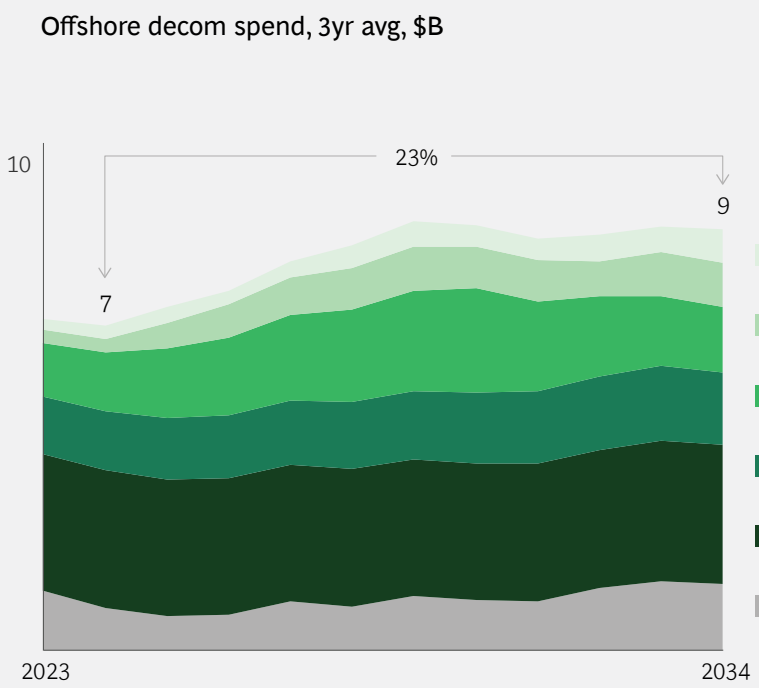
By Eric Oudenot, Martha Vasquez, Henning Streubel and Rajiv Murali

Major financial expenditure but minimal sustained institutional knowledge

Decommissioning (decom) expenditure is significant. Global decom of oil and gas (O&G) facilities, wells and pipelines costs $10B annually, of which 75% is spent offshore (Exhibit 1). In mature basins like the UK, decom can account for 25% of the overall sector spend. The top ten global decom liability holders publish combined liabilities of $140B. In a mature basin, top decom liability holders could spend $1B to $2B each in the next decade. However, true cost estimates can vastly exceed published liabilities. One major O&G company spends $500 million on decom activity annually. A late life independent in the UK has published a $5B decom liability while its cashflows decline 90% by 2035.

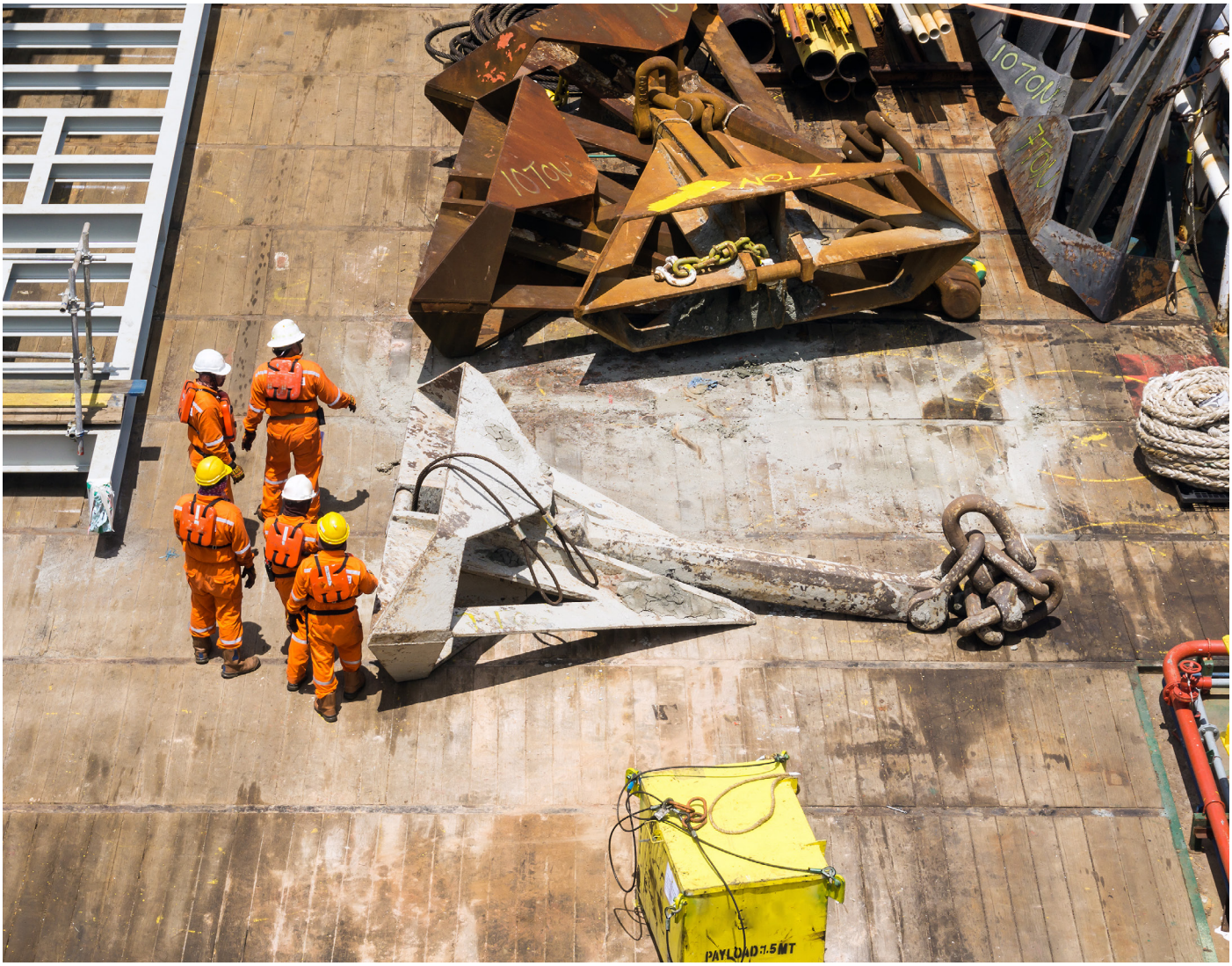
EXHIBIT 1. 10 years from now, North Sea remains a decom hot spot, but others have emerged



	Spend ($B)		CAGR
	2023	2034	2024-34 (%)
Africa	0.2	0.7	9%
Asia	0.3	1.0	14%
Australia	1.1	1.4	1%
S. America	1.2	1.5	2%
North Sea	2.8	2.9	0%
N. America	1.2	1.4	5%

Sources: Rystad Energy; CODA Report 2023; S&P Global; BCG Decommissioning.

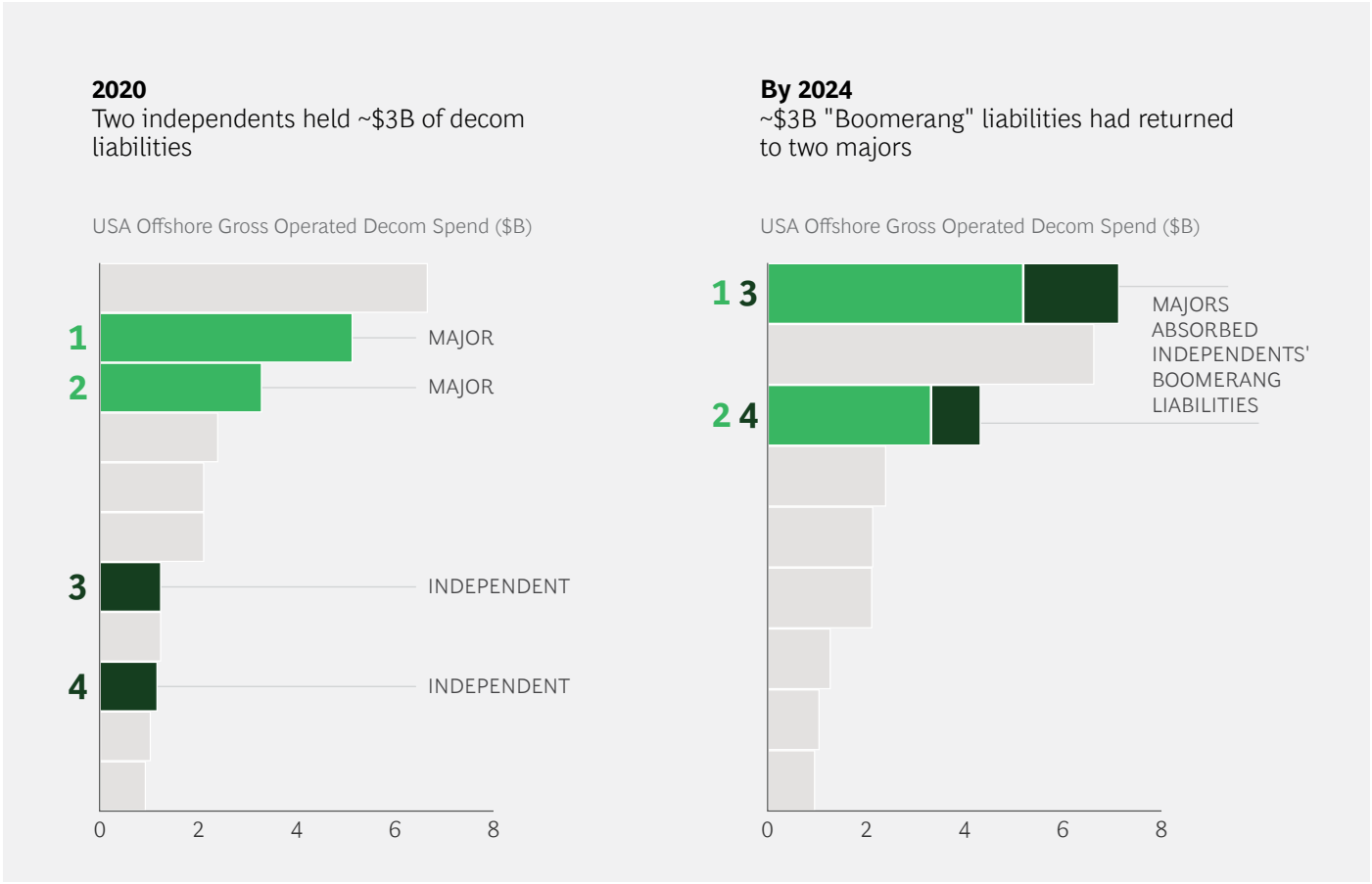
Decom is not new, but much experience is lost or missing. Most of the industry's offshore decom experience is in the Gulf of Mexico, primarily in shallow water assets, where companies have permanently plugged and abandoned (P&Ad) more than 25,000 wells, and removed or reefed more than 5,000 offshore facilities. Onshore, experience is even greater, with more than a million wells P&Ad in the USA. Each year in Texas alone, the industry abandons more than 8,000 onshore wells. Unfortunately, many decom teams have disbanded as such projects end in their company or basin. Meanwhile, O&G companies, governments, and local suppliers in many basins with emerging decom liabilities have minimal experience. It is therefore important to capture knowledge and experience from throughout the industry before it dissipates, so it is available as newer basins mature and prepare for decom.



As an industry, we know a lot about decom pain points and solutions …

Pain points are well known and systemic. Many that we face today have hindered decom performance for years. In an article seven years ago, BCG discussed multiple pain points, including: the failure to develop and follow an appropriately comprehensive strategy and execution roadmap; low quality data and cost estimates; inadequate technical standards, organization and governance; and inefficient relationships with contractors. Our recent experience across jurisdictions and operators confirms these pain points remain valid, and uncovers further challenges such as boomerang liabilities (reversionary liabilities that return to past asset and equity owners when current owners become insolvent and cannot cover the decom costs of facilities, wells, or pipelines, Exhibit 2); unstable fiscal regimes; weak due diligence during M&A transactions (especially regarding the validity of cost estimates); insufficient financial assurance of operators and asset buyers; scarcity and price inflation of supply chain assets and equipment; non-existent or unattractive career paths; project controls not fit for purpose; and mindsets and culture incompatible with decom. Integrity problems are also increasing. We know of two floating, production, storage and offshoring (FPSO) vessels which were recently removed from service due to integrity issues.

EXHIBIT 2: After two independents went bankrupt, two majors absorbed their combined $3 billion decom liabilities



Sources: Rystad Energy; Public Announcements and Reports; BCG Decommissioning.

Solutions have demonstrated value for years. In an article published six years ago outlining a roadmap for cutting decommissioning costs by 30%, we shared six cost reduction levers operators and governments had applied successfully. These were: fit for purpose designs and technologies; intelligent campaigns; excellent planning and execution; decom-specific processes; innovative contracting models; and the right team. Our experience since that time confirms the validity of these levers. Later in this document, we lay out additional concrete actions oil and gas companies, suppliers and governments can take to reduce costs and create value.

Decom is a major issue in terms of current spend, published liabilities, and potential risk. It is not new; we are aware of both problems and solutions. But like so many aspects of the industry, it is also undergoing dramatic shifts.

Example pain points in mature decom basins

While we observe many pain points, these examples illustrate some of the most serious affecting mature decom basins:

- **Large performance variance.** In the UK, costs to P&A comparable offshore wells can vary by a factor of up to 3x. In some US jurisdictions, the variance is up to 5x (median vs. P-90). Global companies, where each business unit (BU) manages its own decom, risk inconsistent strategies and execution, potentially limiting knowledge transfer and full-scale benefits.

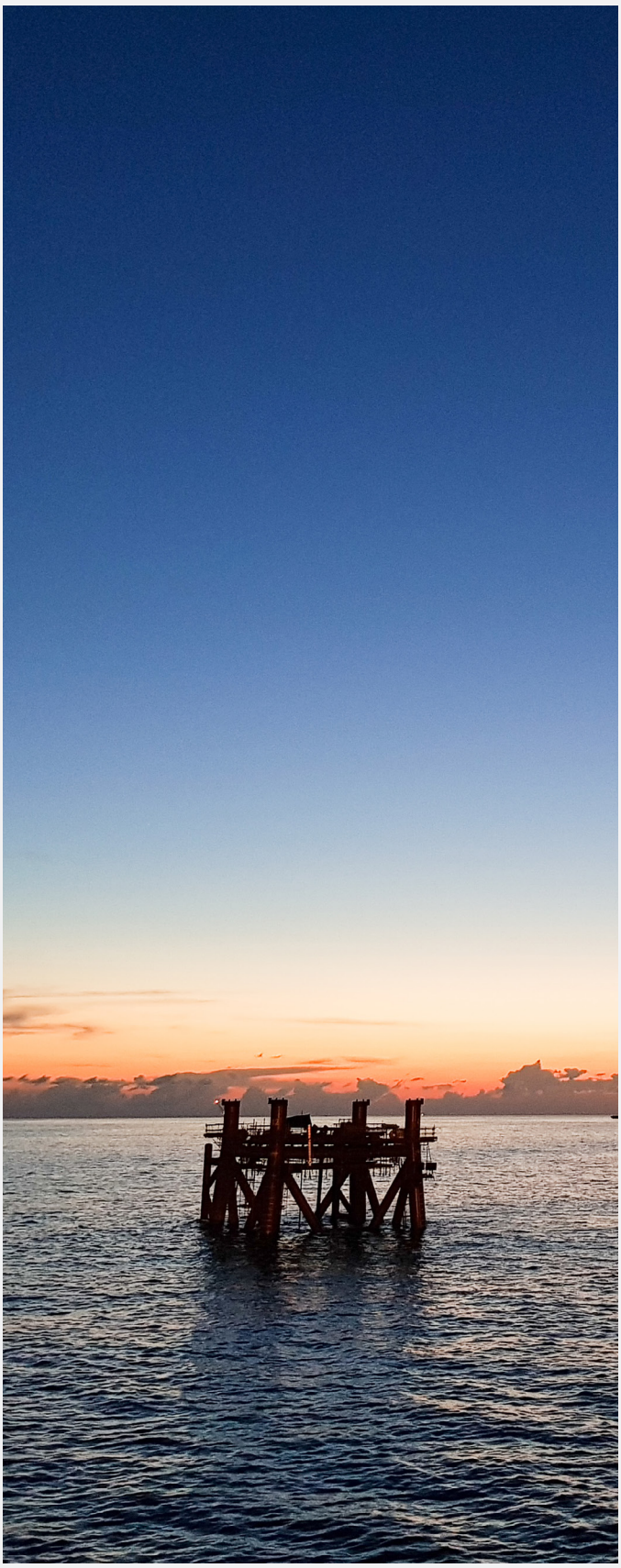
- **Severe activity delays.** In Canada, in 2022 there were 139,000 inactive wells – i.e., not producing and unlikely to be reinstated – waiting to be plugged and abandoned.

- **Missed deadlines.** In Gulf of Mexico, 40% of the 10,600 relevant wells and 50% of the 2,300 platforms missed decom deadlines between 2010 and 2022.

- **Orphan wells.** In the USA, some estimate there could be more than 1 million orphan wells. These are inactive wells not yet P&Ad with no solvent owner, whose decom responsibility consequently falls on the government.

- **Boomerang liabilities.** In the USA, two former operators recently each inherited multi-million dollar liabilities, as result of the current operator's bankruptcy.

- **Methane leaks.** In the USA, EPA estimates that inactive wells emit over 300k tonnes of methane a year (8.8 million tonnes of CO2e, using a global warming potential of 28), equivalent to four percent of the total methane emissions from oil and gas operations. Actual measurements could result in a much larger footprint.



… But much has changed in the last 24 months

OVER THE PAST TWO YEARS, THE ENERGY TRANSITION (ET) HAS TRIGGERED MOVING DECOM TIMELINES, THE EMERGENCE OF NEW DECOM LIABILITY OWNERS, INCREASED COST RISK, AND HIGHER SCRUTINY ON DECOM'S ENVIRONMENTAL IMPACT. AS THE ET CONTINUES TO ACCELERATE, SO TOO WILL THE IMPLICATIONS FOR O&G DECOM.

Moving timelines. The ET is pushing many companies and governments to decarbonize, incentivizing the shutdown of under-producing emissions intensive assets and intensifying scrutiny on timely decom execution. Meanwhile, heightened focus on energy security is increasing demand for domestic production, extending O&G asset life. As a result, some companies have accelerated or delayed cessation of production (CoP) dates, making it more difficult to decommission assets efficiently.

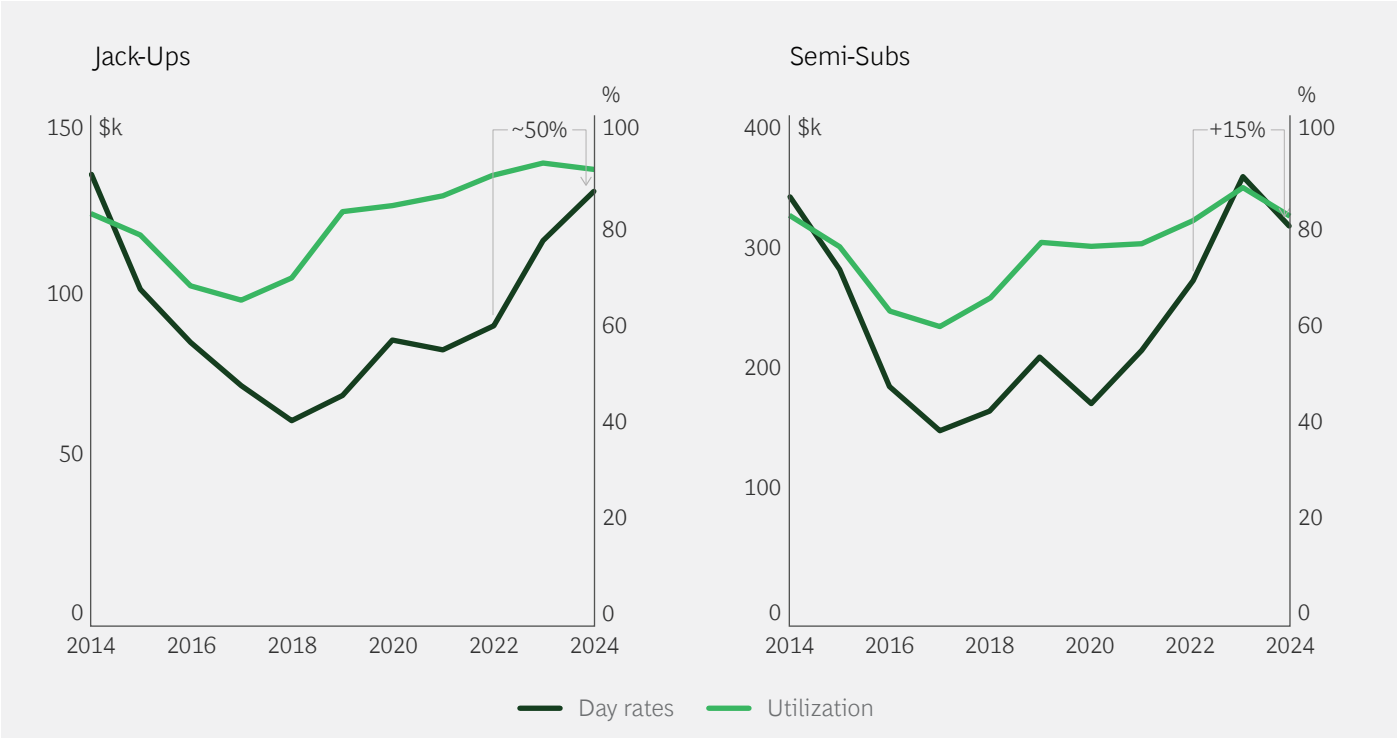
M&A risks and synergies. Some companies have divested their most emissions intensive assets, leaving new owners, many of whom lack decom experience, to manage the associated liabilities. Others, meanwhile, are using their decom capability to underpin M&A synergies. But weak due diligence is creating exposure for all parties: some buyers are realizing that the true cost estimates far exceed sellers' claims, while boomerang liabilities for both sellers and governments are becoming a major risk in the face of financially weak buyers.

Competition for rigs and vessels. The ET, combined with the depletion of oil and gas fields, is also shifting the demand for assets like offshore rigs and vessels away from some mature basins (with highest decom activity) towards less mature ones (construction focus). It is also pulling demand away from O&G altogether, towards renewables and carbon capture and storage. As a result, prices and leasing rates have significantly increased in the last 24 months. We see a ~50% increase for jack-ups and 15% for semi-subs globally, and more than 50% for standard jack-up rigs and 2x for support vessels in the UK (Exhibit 3).

New business opportunities for companies with a strong ET agenda. Several companies are re-purposing their depleted reservoirs for carbon or hydrogen storage, while some are converting their plants into energy hubs. These hubs are now refining renewable fuel, producing hydrogen or low emissions fuels, and providing EV charging services for trucks. Some suppliers are positioning themselves as the partners of choice for operators seeking to decarbonize their operations or their scope 3 emissions (as described in another recent BCG article).

Higher scrutiny on decom's environmental impact. Beyond low GHG emissions, decom execution – including methane leaks, air and water pollution, and circularity (including re-use, re-purpose – including reefing, and waste tracking) – is becoming a hot topic. Sentinel Subsea, a supplier of solutions to monitor subsea equipment (wellheads, trees) integrity and hydrocarbon leaks, is now serving operators in five basins. The Bureau of Ocean Energy Management (BOEM), a USA regulator, recently launched a study to understand the impact of abandoned oil and gas wells on air and water quality in the Gulf of Mexico. An O&G major recently decided to repurpose eight platforms into artificial reefs in Australia.

EXHIBIT 3: Day rates increased ~50% for jack-ups and 15% for semis in the last 2 years



Note: Leading-edge dayrates exclude exercised fixed price options or any other pre-priced contracts.

Sources: RigLogix; Westwood; BCG Decommissioning.

POLICIES AND REGULATION ARE EMERGING OR STRENGTHENING, ACCELERATING DECOM EFFORTS AND INTENSIFYING SCRUTINY ON DECOM PERFORMANCE.

New policies and regulation continue to emerge. These now include legal liability in perpetuity, obligations to put money in escrow accounts, and deadlines to meet decom commitments. Many governments finance more than 50% of the decom costs (see our related article), but have few mechanisms to limit their exposure in case of operator bankruptcies or underperformance. Governments are recognizing this issue and taking action. For example, in 2020, Australia introduced liability in perpetuity for past asset owners, higher levels of financial scrutiny for future asset buyers, and deadlines for decom activity (described in our recent article). In 2023 Nigeria introduced new regulation obliging asset owners to establish a decom fund in an escrow account.

Existing policy and regulation is tightening. In 2023, Brazil amended its 2021 law and introduced tighter financial requirements (e.g., surety bonds to cover the full estimated decom costs) and deadlines to fulfil these requirements. Early this year, USA updated 20-year-old regulations and introduced further financial assurance for asset owners without an investment-grade credit rating or sufficient proven cash reserves.

SPECIALIST DECOM SUPPLIERS AND SUPPLIER CONSORTIUMS ARE DEMONSTRATING VALUE.

Specialist suppliers are in demand. As recently as 2022, two UK-based decom specialist companies went out of business. Since then, however, conditions have started to turn in such companies' favour – Well-Safe, a UK-based specialist established in 2017, today owns three dedicated P&A rigs, six dedicated crews, and a two-year backlog (across the three rigs). See our article on supply chain specialists. This success reflects Well-Safe's performance and resilience, and operators' greater openness to employing decom specialists. AF Offshore Decom, a Norway-based specialist founded in 2013, recently won a contract for the removal and recycling of 10 platforms in the Netherlands and launched Kitar Solutions, a joint venture with Sapura Energy, to deliver decommissioning services in Southeast Asia.

Consortiums of suppliers are also gaining traction. Between 2020 and 2023, a consortium of three suppliers in the Netherlands delivered a 75-well onshore P&A campaign for an O&G major with costs more than 25% below the initial decom cost estimate. (A campaign, in this context, is continued activity across multiple wells, facilities or pipelines, by the same crew, using the same equipment – an effective way to embed learning, unlock full potential from scale, and realize operational and cost savings.) The same major recently awarded a P&A contract to a consortium for more than 900 wells. Largely as a result of original consortium's performance, but also thanks to operator's strategic choice to outsource the largest well decom scope in its history, leadership was willing to embrace a new approach.

OPERATORS' CHOICES ARE ALSO EVOLVING, AS THEY COLLABORATE WITH OTHER OPERATORS AND SUPPLIERS ON EVER-LARGER DECOM PROJECTS.

Multi-operator campaigns continue to emerge – though there are still relatively few. In 2022, NexStep initiated a campaign involving six O&G operators for the P&A of a combined 42 subsea mud line suspension wells — with costs 30% lower than the initial decom estimate. NexStep's purpose is to facilitate collaboration among operators in the Netherlands. This year, four operators launched a joint bid for the removal of 40 platforms in the Southern North Sea. This facilities campaign builds on the wells campaign success. It also reflects operators' strategic choice to outsource at scale.

Operators are increasingly trusting suppliers with large scopes and control. Recently in the US, a major and an independent each awarded a supplier decom operatorship, with responsibility for end to end decom of multiple facilities and hundreds of wells. Both companies had inherited hundreds of millions' worth of boomerang liabilities, and the regulator was enforcing tight deadlines. Neither had a decom team. Both made the strategic choice not to build an in-house decom team, but instead to outsource to an integrated energy services company. In the UK, an independent awarded a supplier operatorship of both late life operations and past-CoP assets. Benefits include access to improved contracts with subcontractors, ability to deploy fit for purpose (leaner) requirements for equipment and people offshore, and lower labour costs.

ADOPTION IS INCREASING FOR SOME CRITICAL TECHNOLOGIES AND APPROACHES, THOUGH NOT YET WIDESPREAD, WHILE DEVELOPMENT OF CRITICAL NEW TECHNOLOGIES IS IN PROGRESS.

More efficient well P&A. Some operators make systematic efforts to minimize (or avoid) the use of a rig during P&A, potentially saving up to 30% of P&A spend (which itself constitutes 40-70% of the overall decom cost). This also improves personal safety and reduces environmental footprint. Thru-tubing operations can enable rigless operations – for the full or a subset of well P&A, with or without a rig onsite. Even with a rig onsite, thru-tubing operations can unlock significant savings. Among the technologies that could further enable more efficient operations are multi-string logging, resin alternative barriers, and through-tubing cable retrieval. Multi-string logging can avoid the need for a rig to remove the production tubing by using a thru-tubing logging process to identify the cement bond quality behind casing. Resin alternative barriers can avoid needing a rig for section milling to remediate integrity (sustained annular pressure) challenges ahead of a full scale P&A operation. Removing the cable outside the production tubing could enable cementing the tubing in place in a subset of the wells (e.g., those with artificial lift or downhole monitoring equipment), thus avoiding the need for a rig for tubing retrieval. Finally, riserless light weight intervention vessels, alongside through-tubing technologies, could also enable rigless P&A for suitable wells. However, multi-string logging, resin alternative barriers, and through-tubing cable retrieval are either not yet fully commercial or not yet approved by regulators.

More efficient offshore platforms and subsea infrastructure removal. We also see companies opting for simpler and more cost-efficient approaches to clean, cut, lift and transport subsea and surface facilities. For example, Petrodec reactivated and converted a stacked drilling rig into a multi-purpose decom unit for both P&A and topsides removal – removing the need to hire a heavy lift vessel, in addition to a P&A unit. CUT developed its castellated and step cuts operation to allow the jacket and topsides to remain in-situ after the cut until lifting operations occur, introducing schedule flexibility. AF Offshore Decom developed a new lifting block methodology that needs no welding and no heating, with no additional risk of failed non-destructive testing (NDT) inspection. This reduced the time required to prepare lift points and wait for NDT.

What can oil and gas companies, supply chain, and governments do?

Oil & Gas Companies

OVER THE PAST DECADE WE HAVE WORKED WITH MANY OIL AND GAS COMPANIES, SUPPLIERS, AND GOVERNMENTS ACROSS JURISDICTIONS TO ADDRESS THEIR DECOM CHALLENGES AND AMBITIONS. WE HAVE DISTILLED SIX ACTIONS THAT O&G COMPANIES CAN TAKE TO ACHIEVE DECOM EXCELLENCE.

Rethink your decom strategy. Unfortunately, we often find the decom strategy is missing, fluid, not aligned, or incomplete. At highest level, strategic choices impacting decom go beyond decom itself. Should you remain a late life operator? Should you become a decom operator to build a competitive advantage in a mature basin and for M&A, or design "decom-ready" assets? With such broader direction considered, strategic decisions specific to decom include:

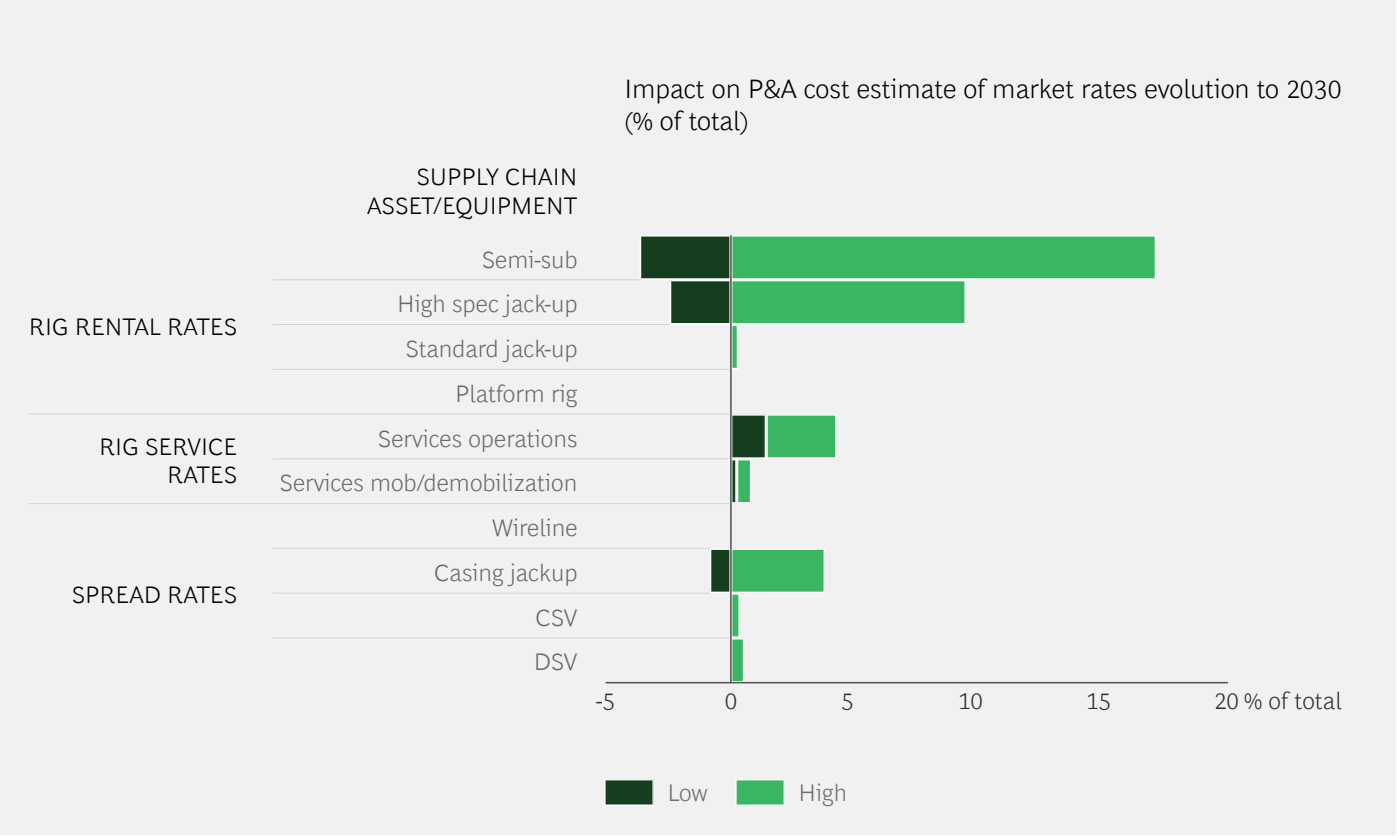
- An asset's cessation of production date
- Technical choices – for example, adhering to minimum viable risk-based designs which comply with local requirements vs. imposing a technical standard across jurisdictions
- Decom operatorship – you vs. a third party, for late life operations and assets past CoP across facilities and wells
- In-house vs. an externalized model – for example, build a full decom team or keep a mini decom team working side by side with an external project manager
- Contracting approach – for example, fragmented by scope and asset using existing frame agreements vs. appointing a supplier consortium to manage a project
- Late life operations vs. decom interface – significant opportunity lies in optimizing opex vs. abex and managing these two under a common team
- Centre vs. business unit or asset-led approaches.

Revisit your decom cost estimates. The first step is to bring together your facilities, wells and pipelines inventory, cost estimation models and assumptions, and key information underpinning assumptions like asset condition, market rates, and operational parameters. We often find multiple, unconnected excel files; outdated market rates; inadequate information on asset conditions; and divergent operational approaches for comparable assets. Some jurisdictions lack a recent decom track record, making it hard to find meaningful benchmarks. Our recent analysis warns that cost estimates could increase by 30% or more if market rates were to return to their highest levels (Exhibit 4).
At the other extreme, some companies have reviewed their decom cost estimates many times and applied future factors or aggressive assumptions to underpin paper savings – and now find themselves struggling to deliver against their promises.

Challenge your plan and budget. The optimal plan and budget build on your strategy and inventory characterization; so if these are weak, your plan, budget, and spend will suffer. We also see several common issues with the plans themselves. Too often they:

- Are not backed by high-quality campaigns – for example, they lack continued activity across wells using the same rig and vessels, or wellhead recovery batching
- Lack true understanding of wells' integrity (no recent technical studies), and late characterization (e.g., discovering integrity problems in a well) could negatively impact the schedule
- Miss opportunities to run concurrently with other activities in the facility
- Lack sufficient preparation for decom ahead of CoP – for example crane or rig maintenance, and anything that accelerates the point at which the facility becomes hydrocarbon free
- Don't fully reflect regulatory requirements. Late or insufficient alignment with the regulator can result in costly execution delays
- Include gaps in the schedule of contracted rigs or vessels, or are not optimized taking into account activity elsewhere in the company – for example with well intervention and drilling teams
- Allocate decom teams a fixed annual budget irrespective of the spend that could decommission most efficiently.

EXHIBIT 4. P&A cost estimates could increase by >30% if market rates return to highest levels in the last decade



Note: CSV=Construction Support Vessel; DSV=Diving Support Vessel.
Sources: Riglogix; Rystad; ONS; Clarksons OIN; BCG Decommissioning

Establish or access a "fit for purpose" operating model. Decom is distinct from other oil and gas activities, in at least five ways:

- There is no investment decision – but there is nevertheless a project that must be well defined and executed, which needs tailored governance
- There is no first production date driving the schedule – so the project may benefit from flexibility, especially for suppliers of rigs and vessels
- Scope uncertainty can be large (e.g., number and condition of wells) – demanding investment to reduce uncertainty and adequate risk allocation between operator and contractors
- Much of the capability, experience, know-how, and mindset for cost efficient decom don't sit with the operator but with the supply chain (if at all)
- There are no incentives to improve – managers of late life assets are incentivized to maximize plant uptime and production, to the detriment of decom activity
- There is no attractive career path in decom or no path at all – people come and go into decom and much experience is lost
- Activity occurs when the asset no longer generates revenue – so securing funds for decom early in an asset's life is essential.

This means that an operating model that worked well for a different stage or company may not be fit for purpose when the priority is decom. Our experience working with multiple operators over the years shows that unless you are set up end-to-end for decom, it is hard to deliver excellent results. When designing your fit for purpose operating model, consider organization, governance, policies, procedures, workflows including management of change and project delivery process, technical standards, performance management, project controls, mindsets and culture. Experienced specialist suppliers have all the above tailored and set up specifically for safe and efficient decom operations.

Secure your rigs, vessels and crews at competitive rates. Availability is tight for rigs, vessels and crews. Global rig utilization has increased to ~90% from 75% three years ago. In the last ten years, more than 300 rigs were scrapped – but only half that number of new builds came online. At the same time, activity is rapidly declining in some basins while increasing in others. Rigs, vessels and crews are moving from traditional oil and gas hubs to new hot spots with O&G construction, renewables, and continued decom activity. For example, in the last three years, 20 rigs left the North Sea for West Africa, Southeast Asia, North America, South America, Middle East, Australia and the Mediterranean, whereas only 4 arrived. In the same time period, rates have doubled for platform supply vessels in the North Sea. Offer suppliers of rigs and vessels line of sight of demand, sign long-term contracts that allow rigs and vessels owners to optimize utilization of their assets, allocate risk appropriately to avoid P-90 costs – for example via open book vs. lump sum contract terms, and share gains with them to incentivise continued improvement.

Test alternative contracting models and join forces with other operators. Over the past five years, much of our project work has reflected the industry evolution toward creating supplier consortiums, distinctive contracts, and collaborative ventures across operators. We continue to see strong campaigns accompanied by a high-quality relationship and contract between operator and supplier delivering significant improvement over initial estimates. For example, a recent P&A campaign in the UK achieved a 5x reduction in number of days required per well. Both mature and emerging basins are ripe for improved collaboration along the supply chain and with other operators. These arrangements can be of particular value to suppliers when they include:

- Visibility, stability, and continuity of work – for example five years of continued work rather than ten years of summers
- Aligned performance incentives and optimal risk allocation – for example consider open book vs. lumpsum contracts for key supply chain assets like rigs and heavy lift vessels. Sharing abex and opex savings with supply chain partners can incentivize them to invest and become truly the best in decom
- Time window flexibility and early involvement in solution design.

Meanwhile, operators can benefit from excellent HSE performance and service quality (license to operate and liability in perpetuity are top of mind for operators), cost certainty, and timely delivery. Our experience shows high quality contracts and relationships can unlock substantial value for all parties. Multi-operator collaboration could be the foundation for efficient decom in emerging basins.

Suppliers

OUR EXPERIENCE ALSO POINTS TO FOUR ACTIONS SUPPLIERS CAN TAKE TO BETTER POSITION THEMSELVES AS DECOM LEADERS.

Review your decom growth strategy. Think through and align your leadership team, Board, and investors around what to offer, where and how, considering any competitive advantages in each market and geography. What we see is:

- Very few companies focus only on decom, as activity timing can be uncertain and margins lower than for construction services.
- Within decom, companies are adopting clear "operator" roles including late life operations and decom operator (end to end project delivery accountability), facility operator (accountable for facility operations and maintenance), and well operator (accountable for plugging and abandonment). These operator roles are replacing in-house decom teams, simplifying interfaces, or enabling more efficient processes.
- Companies are decisively targeting one or more regions outside their core – alone, in partnership with local companies, or via acquisition.
- Companies are making acquisitions to strengthen their offering.

Betting on decom is a serious choice. Decom is, however, a $10 billion market annually, concentrated in a few basins where the supply chain is still being shaped. This means it can become a growth driver for those capable and determined to seize the opportunity.

Build a flexible business model. When a major inherited millions of liabilities from a bankrupt independent and the regulator imposed a tight deadline for decom, a contractor took over as the decom operator and was able to mobilize the team and assume custody of the field within thirty days. Several elements of this contractor's business model enabled such an agile response. It had assembled a team of world-class technical experts from throughout the industry. Its management and digital systems were all built fit for purpose – including KPIs, dashboards, procedures, and project tools – with no legacy systems detracting from decom effectiveness. And it was agile in its contracting arrangements, willing to work with a variety of subcontractors as needed to meet project obligations.

Deploy decom-advantaged rigs, vessels, equipment, and crews. Some rigs, vessels and people can enable the most cost-efficient decom. Only a few rigs are adapted to P&A (these include lighter and custom-built units able to work on old wellheads), driving up to 30% cost reduction vs. traditional solutions. Only a few vessels and intervention units can replace a rig for a subset of the P&A activities in some wells, enabling rigless operations, which can also be up to 30% more cost efficient than their traditional counterparts. These include light weight intervention vessels, offshore supply vessels with a license for live well intervention, hydraulic workover units, and coiled tubing units. Some crews are fully dedicated to decom, thus able to transfer lessons from one well to the next, and across platforms. A few companies have decom-specific equipment, technologies and know-how (e.g., for multi-string cutting, conductor, and wellhead recovery), allowing more efficient decom operations.

Orchestrate multi-operator campaigns and scopes. High-quality campaigns remain among the most effective mechanisms to unlock the full potential from large-scale decom efforts. Recent learning curves in 30-well campaigns show up to 50% improvements in efficiency (i.e., 50% reduction in days per well), though 20-30% is more common. Some companies' decom inventory is large enough to accommodate this scale on their own. Others, however, have smaller inventory or their decom schedule is fragmented. These companies can benefit from multi-operator campaigns and scopes of work, for example as described in the Netherlands case studies earlier. Oceaneering, a technology company, was the leading contractor in NexStep's multi-operator 30-well P&A campaign. Exceed Energy, a wells and reservoir management company, also recently led a multi-operator 6-well P&A campaign. Well-Safe, a well P&A specialist, actively markets P&A clubs for this purpose. Earlier in the document we also mentioned the recent 40-platform tender in the Southern North Sea. Unfortunately multi-operator work today remains negligible compared to the levels of activity by companies who we believe could benefit.

Governments

DECOM IS A HIGHLY STRATEGIC TOPIC WITH ECONOMIC, SOCIAL, ENVIRONMENTAL, AND SAFETY IMPLICATIONS. GOVERNMENTS CAN PLAY A CRUCIAL ROLE MAKING DECOM EXCELLENCE PART OF COMPANIES' LICENSE TO OPERATE AND THE COUNTRY'S ENERGY TRANSITION NARRATIVE. BEYOND PROVIDING A COMPETITIVE, SUPPORTIVE, AND STABLE FISCAL AND REGULATORY FRAMEWORK, GOVERNMENTS CAN TAKE SIX ACTIONS TO ENSURE EXCELLENT GOVERNANCE AND MANAGEMENT OF DECOM LIABILITIES.

Introduce a world-class decom framework. In many countries there is no specific law addressing O&G decom and no commercial or technical framework. Many oil and gas agreements lack the appropriate clauses specifying decom activities and responsibilities. For example, it is unclear which JV partner is accountable for what, or the tax treatment for decom costs and funding provisions. A world-class framework can ensure safe and cost competitive decom, and could protect the State from companies' failure to fulfil their decom obligations. In the 5 largest decom markets, past owners and equity partners are legally liable for an asset's decom in perpetuity including spend, execution, and post-decom outcomes. Where this has not been the case, it has proven expensive for the State. Clear legal perpetual accountability for assets' liabilities is the heart of a world-class decom framework. Introducing and reinforcing deadlines for decom activity can also be highly effective. Gulf of Mexico and Australia have done this successfully. Providing effective technical guidelines alongside performance thresholds could go along way to incentivize efficient decom.

A National Oil Company, usually equity holder in the majority of O&G agreements, is in a privileged position to orchestrate the development of the country's decom framework. It can align inputs from multiple stakeholders in its role as regulator, asset owner, lessor, and operator. However the process can be complex. It is difficult to align companies when you have skin in the game. Governments will need a structured approach and governance for the project, and senior engagement from key stakeholders.

Establish a National Strategy, Masterplan and Platform for Decom. A Decom Strategy and Masterplan align stakeholders on a country's decom liabilities, performance goals, and the action plan to achieve them. Netherlands provides an example of such a comprehensive plan. A Decom Platform can be highly effective to coordinate activity across operators and unlock the full potential of scale through shared campaigns. Netherlands and Australia have put such platforms in place. Finally, governments should ensure their decom strategy and masterplan is consistent with their broader country agenda (e.g., reservoir recovery, energy security and decarbonization).

Introduce and reinforce financial assurance mechanisms. Securing funds for decom can be a big challenge given assets' rapidly declining cashflows as they age (Exhibit 5). Monitoring owners' financial strength, and mandating letters of credit or deposits into escrow accounts or decom funds, can be effective measures. Confirming buyers' financial strength can also be useful in avoiding boomerang liabilities. Where appropriate, make loans available to the industry to accelerate decom where liability defaults to the government.

Truly understand operators' decom cost estimates and plans. Build your own or access a high-quality model and methodology to calculate operators' decom costs. Build a National Decom Database that aggregates data of individual assets to shape the spend and activity outlook for your jurisdiction. Engage operators regularly to reconcile differences. Publish the jurisdiction's decom cost estimates and plans. This creates the foundation for performance management, allows the supply chain to forecast demand and investment, and facilitates multi-operator collaboration.

Drive performance actively. Build a benchmark of both actual results and leading indicators. The North Sea Transition Authority, UK's regulator, has recently launched a benchmark clearly indicating by facility, well and pipeline archetype, the spread of performance on both operational and cost metrics. Push for campaign work, multi-operator collaboration, and efficient relationships with the supply chain. Actively support innovation in decom technology, supply chain, and business models.

Create the environment and tools to enable transfer and retention of lessons learned. As mentioned earlier, much experience gets lost. Capture the lessons, and reflect them in policy, regulation, standards, and guidelines.

EXHIBIT 5. In a mature basin, cash flows and production decline rapidly in the face of multi-billion-dollar decommissioning liabilities.

Note: FCFO = Free cashflow from operations = Revenues – Income Tax – OPEX; Revenues assume production is sold at spot market prices; analysis excludes discoveries and undiscovered resources. All values are equity share of operated and non-operated assets.
Sources: Rystad Energy; Companies Annual Reports; BCG Decommissioning.

BCG has been active in the decom space for many years, partnering with O&G companies, suppliers, and governments. This paper aims to summarize where the industry stands today, and the optimal pathways forward for key stakeholders. We also want to make it easy for readers to access earlier articles, many of which drill down on specific basins, assets, or stakeholder perspectives. For convenience, the pieces referenced throughout this paper are included below.

Resources

Asset Abandonment in Upstream Oil: A Growing Threat to the Sector
by *Henning Streubel, Oleg Mikhailov, Ivan Marten and Francois Bardi*, 2015.

The North Sea's $100 Billion Decom Challenge
by *Eric Oudenot, Philip Whittaker, and Martha Vasquez*, 2017.

A Roadmap For Cutting Decom Costs By 30%
by *Eric Oudenot, Philip Whittaker, and Martha Vasquez*, 2018.

Preparing for the Next Wave of Offshore Decom
by *Eric Oudenot, Philip Whittaker, and Martha Vasquez*, 2018.

Oil and Gas Needs Decom Models That Work at Scale
by *Eric Oudenot, Philip Whittaker, and Martha Vasquez*, 2019.

Sustaining Excellence in Decom: The Key Messages of SPE Offshore Europe 2019
by *Jon Clark, Nils Cohrs, John Hand, Caroline Lawford, Pamela Lomoro, Andy Samuel, Geir Tuft, Martha Vasquez and Philip Whittaker*, 2019.

Decom at Scale is a Winning Move for the 2020s
by *Martha Vasquez and Philip Whittaker*, 2019.

Does Oil & Gas risk a wave of idle iron?
by *Philip Whittaker, Martha Vasquez, Alberto Santos and Akshat Jain*, 2020

Boomerang Decom Liabilities: An Intensifying Risk
by *Eric Oudenot, Martha Vasquez Philip Whittaker, Alberto Santos and Akshat Jain*, 2021.

High Oil and Gas Prices Could Threaten Decom Performance and Decarbonization Ambitions
by *Philip Whittaker, Martha Vasquez, Rebecca Fitz, Borja Jimenez and Akshat Jain*, 2022.

New Wave of Value Capture in Decom Is With Supply Chain Specialists and Collaboration Ventures
by *Martha Vasquez*, 2023.

Decarbonization Pays Off for OFSE Companies and Investors
by *Eric Oudenot, Martha Vasquez, Rebecca Hood, Sandra Rodríguez Suárez, Steven Ho*, 2023.

About the authors

Eric Oudenot is a Managing Director and Senior Partner. Oudenot.Eric@bcg.com

Henning Streubel is a Managing Director and Senior Partner. Streubel.Henning@bcg.com

Martha Vasquez is a Partner and Associate Director. Vasquez.Martha@bcg.com

Rajiv Murali is a Managing Director and Partner. Murali.Rajiv@bcg.com

For Further Contact

If you would like to discuss this report, please contact the authors.

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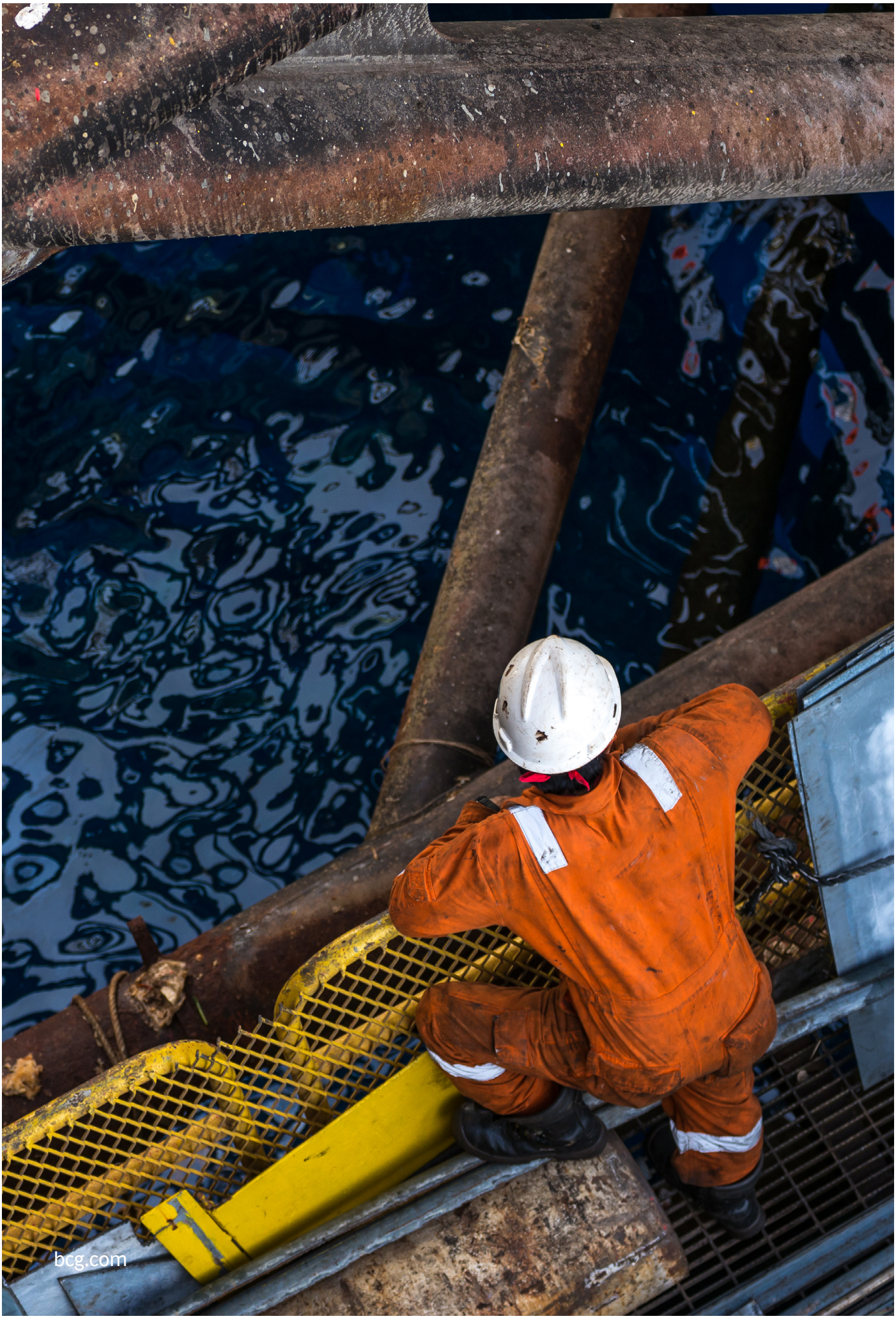
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