

THE NORTH SEA'S \$100 BILLION DECOMMISSIONING CHALLENGE

By Eric Oudenot, Philip Whittaker, and Martha Vasquez

IT'S A \$100 BILLION problem—in the North Sea alone. And the bill could double or even triple depending on decisions oil and gas operators make now. Shareholders, employees, suppliers, governments, and taxpayers are all on the hook for the tab.

The problem is the decommissioning of oil and gas wells and installations, many of which are more than 30 years old. The task is massive. In the Gulf of Mexico, the industry took more than 1,000 structures out of service from 2010 through 2014—at a total cost of \$9 billion. The US Government Accountability Office estimates continuing decommissioning liabilities in the Gulf at an additional \$38 billion.

Now it's the North Sea's turn (which involves the UK, Norway, the Netherlands, and Denmark). Here, platform size and complexity as well as the physical and regulatory environment make decommissioning a far more complex and difficult challenge, and we are already seeing common and systemic pain points emerge among

North Sea operators, which add complexity, time, and cost. Current North Sea decommissioning estimates cover removing more than 500 fixed installations and more than 500 subsea production systems, and plugging and abandoning (P&A) more than 10,000 wells.

Aggregate cost estimates for North Sea decommissioning start at close to \$100 billion and rise quickly. In the UK, for example, the current midpoint cost estimate for continental shelf decommissioning through 2050 is approximately £47 billion (\$59 billion)—with an uncertainty range of plus or minus 40%—according to the UK Oil and Gas Authority. The Norwegian Petroleum Directorate's estimate for Norway's continental shelf is around NOK160 billion (\$19 billion). According to the Netherlands' EBN, the current estimate for decommissioning onshore and offshore infrastructure in the country is €6.7 billion (\$7.2 billion). And Denmark's decommissioning exposure could be as much as \$4 billion, assuming unit costs similar to those in the UK.

Operators face the greatest costs and risk, but there are ramifications for everyone. Handled improperly, decommissioning can cause a production domino effect as old platforms and pipelines are scrapped, cutting off neighboring facilities and smaller reservoirs that are yet to be developed. Employment will be affected; oil and gas upstream operations support some 330,000 jobs in the UK alone. National tax laws mean that taxpayers are on the hook for 50% to 80% of decommissioning costs, depending on the country, a prospect unlikely to go down well either at kitchen tables or in government offices. And if current projections hold, much of the work will be done—and paid for—with today’s oil prices of around \$55 a barrel. (The low price of oil does offer one advantage: oil-field services are relatively inexpensive. However, operator cash constraints make it difficult to put a priority on projects that can be deferred—decommissioning typically falls in this category—which could mean higher costs down the road.)

For many North Sea operators, an intense period of decommissioning activity is about to ramp up, even as they struggle to get their arms around their commitments. While it is still early days, operators are exhibiting big differences in approach and cost. Our analysis of eight decommissioning

projects among North Sea operators, which compared cost performance across assets of similar size, found that some operators are two to three times more cost efficient than others. (See Exhibit 1.) Extrapolate that level of difference across the North Sea and the numbers get big in a hurry.

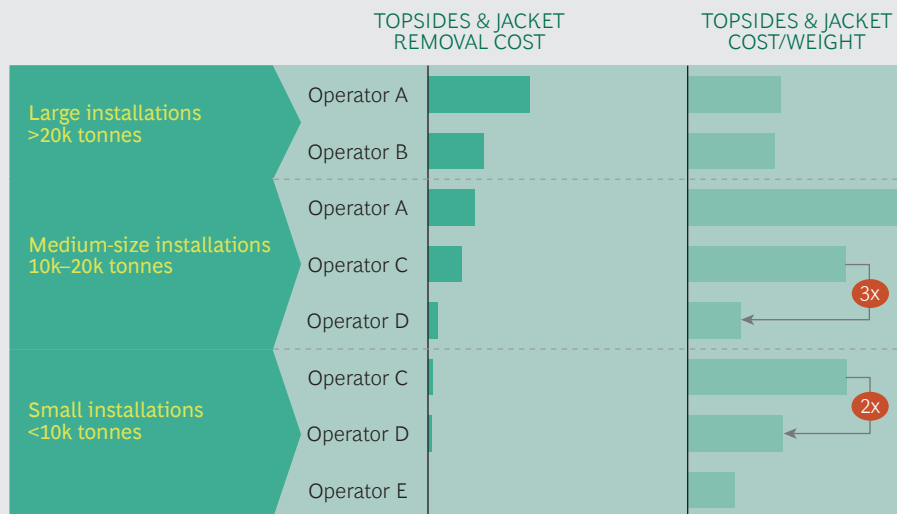
Six Pain Points That Make a Difference

BCG has worked with several operators, contractors, and government agencies involved in North Sea decommissioning, and we see six big problem areas beginning to emerge. Not all the issues we have identified apply to all operators, but each one can deal a big individual blow. How each operator addresses its own pain points will affect the cost and the timeline of its decommissioning program. Here’s a high-level look at the challenges and how smart operators can address them. (See Exhibit 2.)

Strategy and Roadmap

Many operators have some form of decommissioning strategy in place, but few so far have brought all their assets, business units, and global operations together under a single vision and execution roadmap. As a result, they fail to take into account such factors as timing, well proximity, and talent

EXHIBIT 1 | Some Operators Are Two to Three Times More Cost Efficient Than Others



Source: BCG Decommissioning Database.

EXHIBIT 2 | Six Pain Points That Make a Difference

STRATEGY AND ROADMAP Few operators have brought all of their assets and global operations together under a single vision and execution roadmap	DATA AVAILABILITY AND QUALITY Lack of centralized data; varying types of data and data formats; and poor-quality data (especially on old wells and non-operated assets)	COST-ESTIMATING METHODOLOGY AND ACCURACY Lack of benchmarks and limited standardization lead to cost overruns of 30% to more than 100% and a 14% increase in asset retirement obligations annually ¹
TECHNICAL STANDARDS No single, low-cost methodology for plugging wells; P&A standards and designs vary by operator and country	ORGANIZATION AND TEAM Misalignment between decommissioning strategy and team structure; unclear split of responsibilities between HQ and business units; insufficient decommissioning experience	CONTRACTORS Some operators are not open to new suppliers, models, contractual arrangements, and integrated offerings

Source: BCG analysis.

¹ARO increase for the seven largest international oil companies.

deployment, and they can overlook lessons learned, all of which can be costly in terms of inefficiency, poorly allocated resources, and missed opportunities. Some operators recognize the scale of the challenge. They are investing in their decommissioning strategy and aligning their organizations around it, building a comprehensive but flexible long-term plan that encompasses all business units and countries. They are working to support the strategy and plan with the requisite tools and organization, including a detailed database, a forecasting model, and a dedicated decommissioning team.

Data Availability and Quality

The availability and quality of data on the wells and facilities to be decommissioned typically create multiple challenges for operators and governments. Each company experiences a different mix of difficulties, which can include the lack of centralized data, varying types of data and formats among business units, and old data of questionable or even unknown quality, especially on wells more than 30 years old. Companies have limited resources to collect, clean, and analyze all the data they need. And the problem is exacerbated if assets that they do not operate directly are included.

The best operators and governments are establishing central databases that combine information, timelines, and costs across all their operations. These databases give management and regulators a comprehensive view of the decommissioning challenge,

allowing them to develop an informed strategy. The databases also centralize the tracking of all decommissioning-related costs, which enables comprehensive budgeting and performance benchmarking. With the ability to estimate demand years before starting a project, companies can identify ways to increase efficiency through well-planned operator and supplier collaboration. They can also identify opportunities for the reuse and repurposing of facilities, components, and equipment.

Cost-Estimating Methodology and Accuracy

Operators so far have not proved adept at estimating decommissioning costs. As a result, many projects have experienced overruns of 30% to more than 100%, with particular variation around well P&A operations. This is a big issue given that asset retirement obligations (AROs) account for about 11% of the market cap of major oil and gas companies; indeed, eight international oil companies have AROs of more than \$10 billion each. And since 2010, the AROs of the seven largest international oil companies have increased by 14% a year.

There appear to be multiple reasons for the poor cost estimates. One is a lack of available performance benchmarks. Asset teams develop initial project estimates using industry rules of thumb; the assessments are not based on analysis of actual technical data. Companies suffer from limited standardization. Each operator, and each business unit within each operator,

develops its own methodology and ends up being treated as a “specific case.” This makes it complex and time-consuming to assess the impact of oil price changes on aggregate decommissioning costs and liabilities at a group or country level, and it can lead to a flurry of varying estimates (from government agencies, company technical teams, and local decommissioning teams), adding confusion to the debate.

To generate reliable estimates of the costs and time required for all decommissioning activities, operators need to build a single, global forecasting model. This model typically has three components. The first is scope, including the number of well zones requiring a barrier and the number of sites that need remediation. The second is assumptions of cost performance and time, such as the cost of P&A per well and the cost per ton of topside rig frames and steel jackets removed. The third is a data set of probabilities to illustrate uncertainty and variability.

The forecasting model serves as the basis for developing decommissioning budgets, identifying the drivers of performance (assessing the impact of changes in project scope versus actual performance, for example), designing a decommissioning plan, and monitoring execution performance.

Technical Standards

This is a tough nut for operators to crack on their own. There is no single, low-cost methodology for plugging wells, and P&A standards and designs vary by operator and country. Since well P&A typically constitutes between 40% and 50% of offshore decommissioning spending—and far more for onshore—each company’s approach plays a significant role in overall costs.

Doing the job safely and thoroughly is the paramount consideration, of course, but operators have lots of leeway in how they achieve this goal. The structural differences in individual wells (the number of zones to isolate, for example, or the integrity of the wells) play a big role in the P&A design and intervention methods, as do the

technical standards operators choose to apply. Many operators opt for P&A designs that go far beyond the minimum regulatory requirements of the countries where they operate. A recent assessment of one operator’s P&A standards showed that the company exceeded local requirements in seven of ten critical categories. Our benchmarking of six P&A campaigns in the North Sea found that while some operators opt for two barriers of different types, others use as many as six. (See Exhibit 3.)

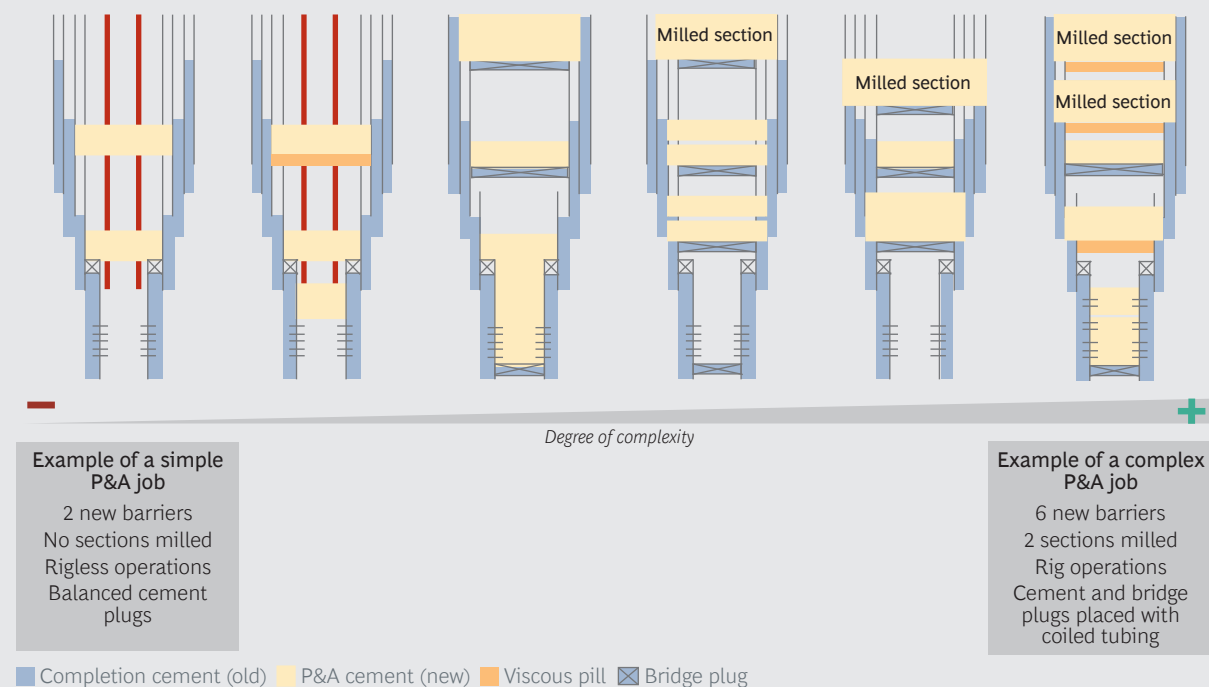
One solution that could have a big impact on overall costs is giving decommissioning teams greater latitude to interpret company and government P&A standards. This would put operators on more certain technical footing and reduce the need to seek derogations, or exemptions. Companies do not always have the capacity to pursue derogations—even when they can result in significant savings—because of the effort and expense involved and the low likelihood of success. Some operators have implemented structured stakeholder engagement strategies to guide collaboration with other industry players and industry forums (such as the MER UK Forum, which helps bring government and industry together around eight key issues, including decommissioning) to shape the regulatory environment. These efforts, for example, have advocated for industrywide derogations for offshore installations.

Organization and Team

Operators thus far vary widely in how they approach decommissioning organizationally and in the engineering talent they have to do the job. They follow a range of organization models, from tight headquarters control to a high degree of delegation to the business units, and the size of the teams varies from fewer than 10 to more than 100, depending on the organization model and level of activity. Despite other differences, all seven North Sea operators we studied have a dedicated multidisciplinary team at the center.

Among the companies we have worked with, the best first define their ambition

EXHIBIT 3 | P&A Standards and Designs Vary in Complexity



Source: BCG Decommissioning Database.

and their strategy—including the pace, intensity, and timing of their decommissioning efforts. Only after their strategy is in place do they look at their existing organization and talent base to begin building the decommissioning structure and teams that can best deliver on their goals. They also adapt their performance management systems and KPIs to reflect decommissioning metrics and success factors. The least effective operators do not align their organizations with their plans, and their division of responsibilities between headquarters and business units is often unclear. They also tend to suffer from insufficient decommissioning experience at all levels.

Most operators will have to make hard choices regarding their operating model. For example, how much decommissioning work will they outsource? There is no “right” approach. We have seen great examples of successful decommissioning programs among operators that decided to fully outsource the work while maintaining very lean in-house teams and from those that opted for a central team, or “flying

squad,” that they used to tightly manage the decommissioning of every asset.

Talent is another tough challenge since decommissioning requires a range of technical and nontechnical skills and experience, and it competes with other, more exciting activities such as exploration, development, and even late-life asset operation. Ensuring that the necessary talent is available when you need it is no simple task.

The impact on employment from changes in the industry is making it easier to attract staff for both technical and nontechnical roles in decommissioning. At one major company, 40% of business unit staff expressed interest in a decommissioning career. Many of the engineers we have talked to acknowledged that decommissioning is the future of the industry in the region. That said, many engineers with decommissioning experience are at or close to retirement.

Leading operators are recognizing that they need tailored talent acquisition and

development plans for decommissioning that include sourcing and training interdisciplinary teams of technical and non-technical staff. These operators are starting to highlight decommissioning careers to attract the right talent to both central and business unit roles.

Contractors

Sluggish levels of drilling activity and growing recognition of the scale of the decommissioning challenge are leading traditional oilfield suppliers to reorient their service offerings and prompting new players to enter the business. New and innovative business models, contractual arrangements, and integrated offerings are emerging that offer operators that embrace them opportunities for cost-saving relationships with contractors.

The more nimble oil and gas operators are adapting to the evolving industry environment. They work with both traditional and new suppliers and are open to new contracting models. One such model involves integrated services. Perenco in the Thames Complex has recently contracted with joint-venture partners Boskalis and Scaldis to provide topsides lifting and subsea removal services. Another model receiving attention is structured around duty holder services. Petrofac recently entered a duty holder agreement with BP for the Miller oilfield and with Tullow Oil for the Horne & Wren field. Under this agreement, Petrofac assumes responsibility for the assets, including preparation and

execution of decommissioning activities. We are also seeing interest in long-term multiplatform contracts. For example, in 2015 Centrica signed a five-year agreement with Atkins to provide pre-FEED (front-end engineering design) decommissioning services.

One additional area that is starting to receive more attention is greater collaboration among operators, suppliers, and countries (a subject that we intend to explore in depth in the future). Collaboration does not come easily to companies used to being competitors, but a strong case can be made for cooperation in some drilling fields to maximize efficiencies, safety, and environmental compliance. For example, in late 2016, EBN brought together industry, government, and other stakeholders to develop a Netherlands master plan for decommissioning and reuse.

AS WITH MOST corporate undertakings, leadership counts. Forward-looking CEOs and COOs will champion their decommissioning campaigns and their importance to the organization. They will insist that their companies start now to set out the strategy, collect the necessary data, and build the required teams. They will personally monitor progress against the plan. It will be time well spent. For larger players, the prize is cost savings that could run into the billions—with a direct impact on the company's bottom line—and a dramatic improvement in their risk and liability exposure.

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