North Sea Transition Authority

# UKCS Decommissioning

## Cost and Performance Report 2023

# Contents

The UK's offshore oil and gas industry spent £1.6 billion on decommissioning in 2022 – its highest annual total to-date. There is significant opportunity ahead for the sector, with £21 billion of spending on decommissioning forecast for the next decade alone. However, industry must maintain its focus on performance, collaborate effectively and urgently commit to decommissioning plans to achieve further cost-efficiencies in the face of challenging market conditions. The NSTA will continue to work closely with industry to drive continuous improvement.

The sector has developed an impressive track record of decommissioning wells and infrastructure to a high standard whilst keeping costs competitive, marking it out as a world leader in decommissioning. Between 2017 and 2022, industry spent around £8 billion on decommissioning projects, helping it establish a solid foundation of decommissioning expertise. A strong ethos of continuous improvement has been embedded into the planning and execution of projects, contributing to a reduction in the overall cost estimate of UKCS decommissioning by £15 billion, or 25%, in the same period.

In late 2022, the NSTA re-baselined the estimate to £37 billion and, in an effort to maintain focus on cost-competitiveness, established a target to reduce the total by a further 10% by end-2028. Following what has been an extremely challenging and unpredictable year for the global and UK economy the current estimate now stands at close to £40 billion. We must leverage the momentum of the past six years to address the current headwinds and deliver the agreed target.

UK suppliers are in line to secure around 70% of the work associated with UK North Sea decommissioning projects listed in Supply Chain Action Plans (SCAPs) lodged with the NSTA last year. A clear indication of the sector living up to its North Sea Transition Deal pledge to ensure at least half of spending on decommissioning projects goes to the UK supply chain.

Indeed, the coming decade will be pivotal to delivering a marked and sustainable improvement in cost efficiency as half of remaining expenditure on UKCS decommissioning is to be committed in this period. This represents a huge, immediate opportunity for the UK to further develop its capabilities and reinforce its status as the global centre of decommissioning excellence. Building the capacity and capability of the UK's supply chain will not only deliver UK decommissioning but will position the industry to win lucrative contracts for decommissioning work overseas. Its experience and expertise could also be transferred to other energy sectors which will require decommissioning services, such as offshore wind.

To help achieve these ambitions, the NSTA is working with industry to develop a range of updated performance metrics which, combined with the ongoing focus on costs, will provide a balanced view of performance and drive improvements over the next decade. Emphasis must be placed on decommissioning readiness, performance and actual costs, while close collaboration between operators and suppliers will be vital. Operators must develop and commit to clear decommissioning plans and schedules, with the upcoming work being made visible in a timely manner.

# Decommissioning at a glance

*"The North Sea decommissioning sector is highly active and productive, and the industry is ideally placed to realise the massive £21 billion opportunity which will come its way over the next 10 years."*

Pauline Innes, NSTA Director of Supply Chain and Decommissioning

## 2017–2022/2023

**£8bn** actual spend to date

**25%** cost reduction from 2017 baseline

## 2022 re-baseline[1]

**£37bn** re-baseline forecast

**10% target** cost reduction by 2028

## 2023 current forecast[2,i]

**£40bn** updated forecast

**£1.6bn actuals in 2022** versus £2bn forecasted

## Next decade outlook

**> 50% of forecast**
next decade of decom

**Top 10 operators**
80% of next decade spend

**70% local content[3]**
SCAPs submitted in 2022

[1] 2021 price basis
[2] 2022 price basis
[3] SCAPs relating to upcoming decommissioning projects expected to cost £2.19bn

# Section 1

## 2017–2023 close out report

## 1.1 Progress & achievements

In 2017 the NSTA set a challenging target to reduce decommissioning cost estimates by 35% by end 2022.

As of end 2022, a £15bn, 25% reduction in the forecast cost of UKCS decommissioning had been delivered by industry.

## 1.2 Successes & learnings

Over the past six years industry has demonstrated its ability to learn from experience, share lessons and, aided by the deployment of new technologies and techniques, it is executing projects more efficiently. Clear targets have helped sharpen focus on cost competitiveness.

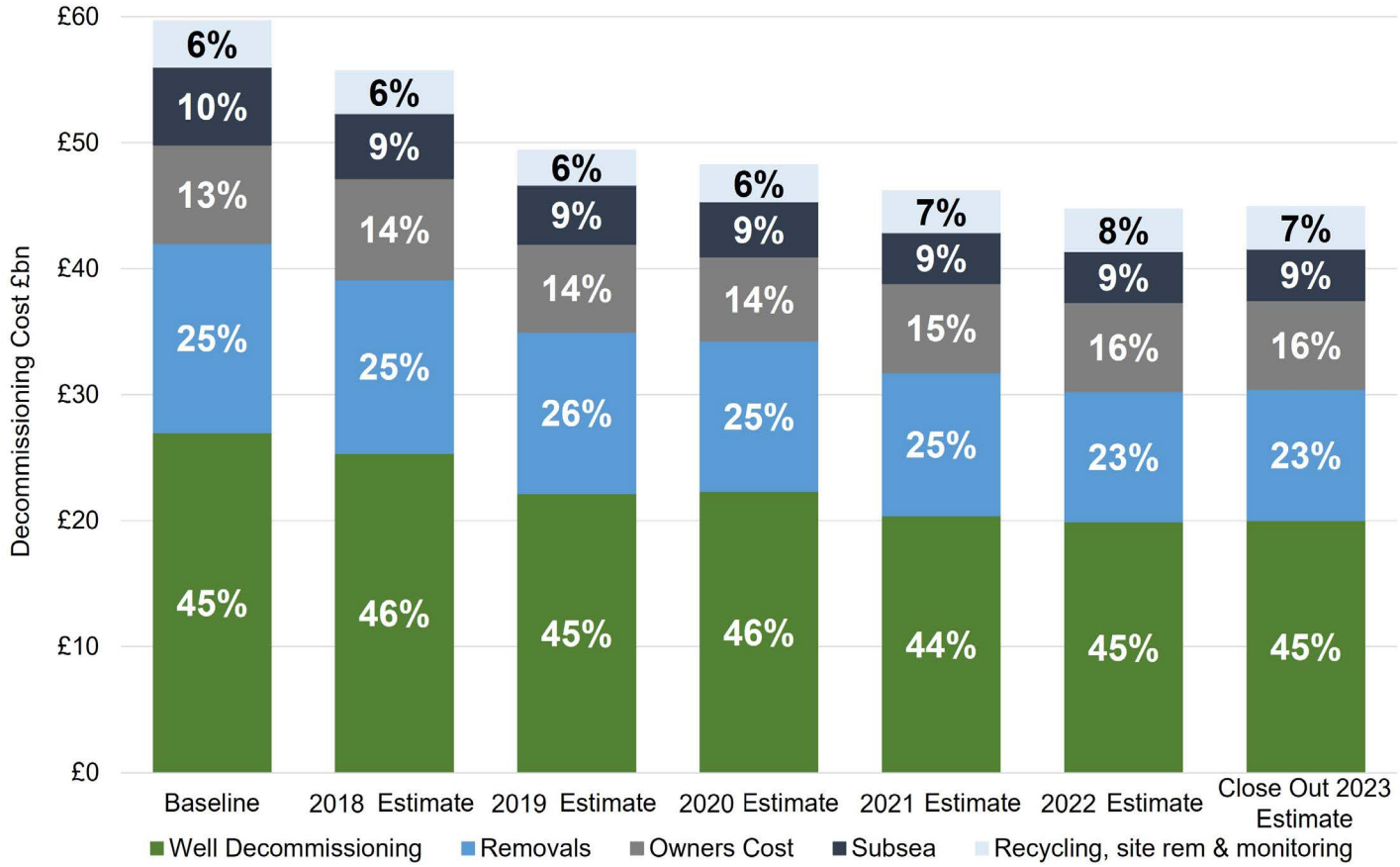
Key lessons learned include:

- Increased emphasis on decommissioning and improvements in decommissioning readiness during late life operation plus execution practices now exist
- Updates to decommissioning strategies including adoption of delivery and execution models based on scope aggregation and collaboration (e.g. well decommissioning campaigns) plus updated and optimised strategies for efficient execution of well decommissioning (e.g. wellhead and conductor removal being managed in batches using optimum vessels as opposed to rigs)
- A growth in data visibility (e.g. Energy Pathfinder; NSTA suspended well app) to the UK supply chain of the upcoming decommissioning work-scope, stimulating collaboration and providing opportunities for organic growth of the UK decommissioning supply chain and access to investment finance and capital
- Increased regulatory focus on well decommissioning compliance and “on time” execution of statutory/regulatory obligations (e.g. decommissioning of outstanding legacy E&A wells)
- Improved data and insight being made available to industry (e.g. benchmarks) providing operators/owners the opportunity to establish performance targets and outcomes based on tangible actual performance
- Growing appetite from within industry to push boundaries of “traditional” contracting models and relationships between operators/owners and the supply chain
- Reducing post Cessation of Production (CoP) OPEX through decommissioning of inactive platform wells pre-CoP plus instances of investment being made to convert facilities to not normally manned status ahead of final decommissioning
- Revolutionary technological breakthrough and offshore deployment of heavy lift capability and capacity (e.g. Jacket Lift System (JLS)).

## 1.3 Cost estimate breakdown by Work Breakdown Structure (WBS) (2017–2023)

In accordance with previous years' cost forecasts and reports, the breakdown of costs per OEUK WBS has followed a consistent pattern (Fig.1).

**Figure 1: Decommissioning forecast estimate change by WBS (like-for-like) period 2017–2023[4]**




[4] Like for Like/probabilistic/2017+/2016 prices

## 1.4 Actual spend (2017–2022)

The cumulative decommissioning actual spend over preceding six years was around £8bn (see Fig. 2a, 2b).

**Figure 2a: Actual spend profile relative to 2017[5]**

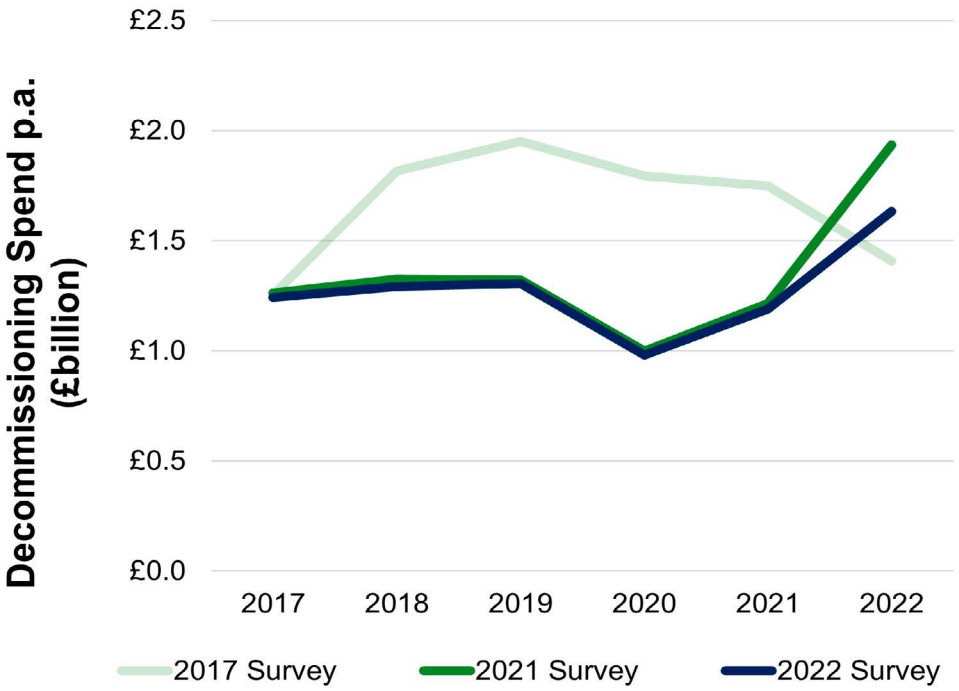
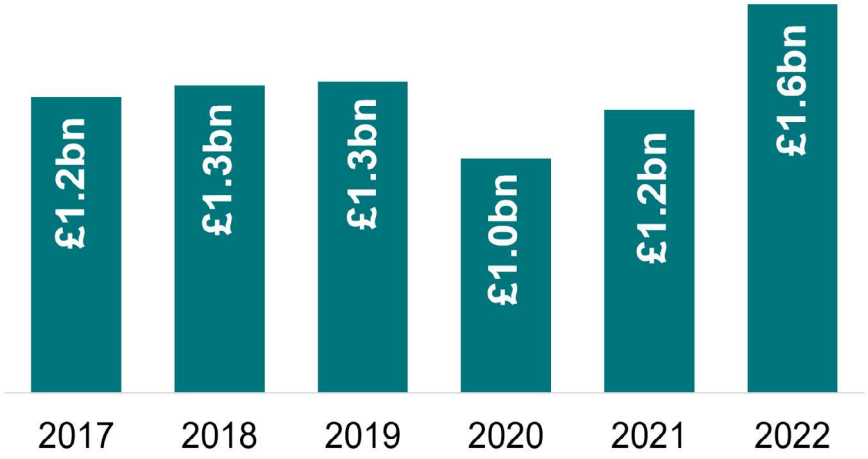



**Figure 2b: Actual spend profile p.a.[5]**




The COVID-19 pandemic had a material impact on offshore execution and spend during 2020 and 2021 however activity levels and spend returned to a six year high in 2022. Beyond the effect of the pandemic, the discrepancy between planned and actual spend can be attributed to a combination of;

- Re-scheduling/deferral of decommissioning
- Increased efficiency of execution

[5] Nominal prices

# Case study:
## *Key innovations result in efficiencies on North Sea's largest ever pipeline removal campaign*

### The question

In recent years, comparative assessments have been used to determine if technology had progressed to allow for the safe, timely and cost-efficient removal of pipeline and associated infrastructure in the North Sea.

Incumbent industry solutions, lack of technological focus on the subsea infrastructure proportion of the market and pipelines being left in-situ or buried to sufficient depth have created barriers to innovative thinking.

### The motivation

To remove all future liability by removing the full extent of subsea infrastructure from the seabed.

### The answer

Utility ROV Services (URS) with their UTROV Technology and suite of decommissioning tooling, has now been proven over multiple large scale North Sea projects to reduce subsea infrastructure removal costs by 30%. This is through the multi-tool functionality, significant decreases in recovery cycle times and ability react to unplanned project elements.

The next step for URS was to engineer a project solution centred around the core fundamentals, with a focus on marginal gain 'production line' processes, enabling higher project efficiencies compared to what has been witnessed in the industry before.

### The project example

A progressive North Sea operator provided the contracting platform for the proven technology to complete large scale pipeline removal within a Southern North Sea field.

Several notable factors which included high costs, areas of hard seabed and piggyback detachment from the main line, prohibited trenching the pipeline to the industry required 600mm below surface.

The primary scope was to cut and recover 26.1km of 18" pipeline assembly, complete with 3" piggyback line and plastic shroud incorporating a self-burial fin. The solution was to cut the assembly into 13m sections subsea, for subsequent recovery and respective transport ashore for recycling purposes.

Over and above the pipeline removal, the operator included significant complimentary works to the scope, including pipeline end and 500m zone remediations, utilising the array of decommissioning tooling to complete; pipeline cutting & recovery, mattress recovery, surveys, rock installation, structure recovery and debris clearance using a multi-tool philosophy.

# Case study:
## *Key innovations result in efficiencies on North Sea's largest ever pipeline removal campaign*

The project was delivered over 144 days, split into two summer campaigns in 2022 and 2023.

As with all subsea infrastructure removal projects, a key challenge is safely maximising an efficient material handling exercise, with vessel deck capacity and stability crucial to augment the amount of recovered cargo. A focus was on limiting the number of transits for offloading purposes, minimising vessel time, fuel burn and emissions output.

The project was completed from a 98m construction support vessel of opportunity due to limited access to larger vessels in the market. Deck carrying capacity of this CSV was maximised through innovatively engineered pipe recovery deck layouts and collaborative consideration of vessel stability. 8400Te of recovered pipeline was transported over 10 separate pipe offloading port calls during each of which, the vessel carried its largest deck cargo to date.

During the planning phase, when comparing full removal viability against trenching or rock-dump, the operator evaluated URS cycle times relative to the use of traditionally operated WROVs and tooling. Due to the number of cycles required across 26.1km, for every 1-minute additional time taken on either cutting or recovering a single length of product, this would add 1.5 days operational time onto the overall project duration.

The table below shows a project comparison between traditional methods and the UTROV solution executed. The variation in overall duration becomes apparent when cycle time is extrapolated over the project. The value shown in the 'Best' column identifies what the fastest cycles achieved when the pipeline was fully exposed with no CFE required.

| | Duration (average) | | |
|---|---|---|---|
| | **WROV, tool & crane** | **UTROV (executed average)** | **UTROV (best)** |
| Cut & move 13m | 22 mins | 16 mins | 12 mins |
| Recovery (13m length) | 25 mins | 15 mins | 11.5 mins |
| Total duration – 26km cut & recovery | 66 Days | 43 Days | 32 Days |

Innovative cutting blade profiles were utilised, reducing the forces experienced when performing the subsea cuts, providing marginal gains in the cutting cycle time. These were monitored live to determine operational performance against the project baseline.

A hydraulic, remote level correcting grab, capable of dealing with high seabed suction forces was developed to optimise pipe

recovery cycle times. Once recovered to the landing frame on deck, innovative handling machinery was utilised to concurrently rehandle the pipe sections with minimised personnel intervention.

Lessons were learned relating to two key factors affecting cut and recovery productivity:

1. The pipeline had a varying degree of burial along the length of the line, in many instances more significant than historic depth-of-burial surveys indicated. Control flow excavation (CFE) passes were performed to expose the buried sections prior to cutting operations. The requirement to CFE the pipeline to expose enough product for cutting engagement, increased the cut and recovery duration by around 14% over both campaigns, with 35% of the route requiring unplanned CFE.
2. Significant areas were noted where the piggyback pipe was detached from the main pipeline, not notable in either pre-decommissioning or as-found surveys. This prohibited simultaneous cutting of both products using the shear and meaning that often hundreds of meters of piggyback were to be cut and recovered in isolation. Detached piggyback increased the cut and recovery duration by around 21% during the 2022 campaign. In 2023 a more productive solution was devised which reduced this to around 14%.

Configuration of the vessel in a production engineering set up, whilst maintaining flexibility for reactive project elements, along with the experienced crews that operate in line with the efficiency focus of the UTROV, led the project to reduce cost, fuel burn and total emissions by 30% compared to incumbent market offerings.

## A lens to the future

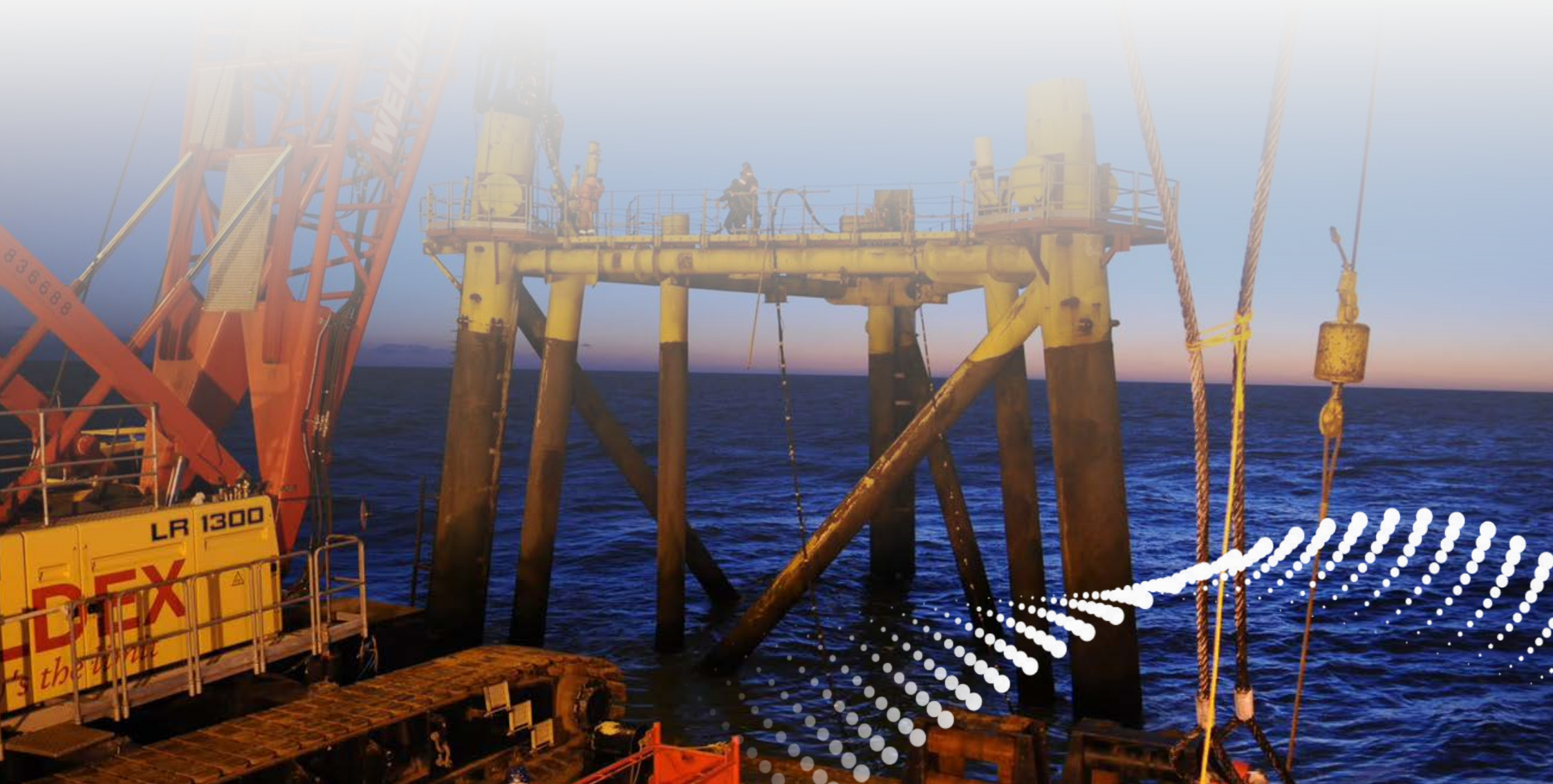
Through innovative engineering from the local supply chain, large scale subsea pipeline removal is now a proven methodology for the decommissioning future landscape. With the continued aging of assets in the North Sea, further technological development is needed to cater for the increase in demand and the future requirement for removal of larger diameter products.

This leads to further innovation potential with a requirement for a suitable, repeatable cutting solution with cycle times comparable to smaller diameter products.

With the conjoining impact of other energy industry requirements, vessels capable of completing large sale decommissioning projects will be at a premium. The current fleet is not optimised in a 'production line engineering' set up and requires significant modification prior to execution to provide a platform for efficiency. Investment and commitment to tonnage in the industry is needed to ensure suitable vessels are available with the high carrying capacity required to maximise productivity.

# Section 2

## 2022 re-baseline and next decade



## 2.1 Re-baseline

In November 2022 the NSTA re-baselined the estimated cost of decommissioning infrastructure to £37bn[i], setting a new target with industry to reduce costs by 10% by end-2028.

Decommissioning cost estimates are based on the "best estimate" of the forecast cost of decommissioning with forecast figures (unless otherwise stated) being in constant money/prices.

The new cost reduction target aims to narrow the gap in performance to first quartile (below P25) decommissioning performance.

The target will be applied to the actual cost of projects as well as the overall estimate, to demonstrate real cost savings are delivered through completed projects.

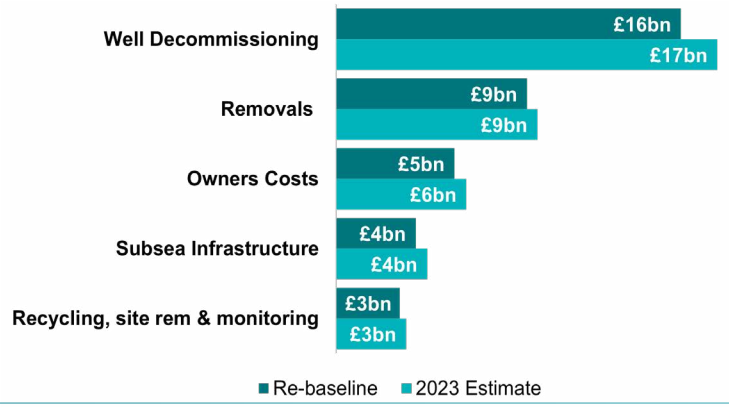
The NSTA is working with industry to develop performance metrics to enable a balanced view of both decommissioning performance and cost whilst also supporting delivery of the new cost reduction target. Further information is provided in Section 3 (Decommissioning performance).

## 2.2 Progress versus re-baselined estimate

The total estimated cost of decommissioning stands at £40bn (see Fig. 3a). Industry cost estimates have increased by £3bn over the last year, with an increase in all key Work Breakdown Structure (WBS) elements being reported (see Fig. 3b). Appendix 1 details the estimation methodology applied and the corresponding decommissioning scope.

### Figure 3a: Cost estimate 2023[i]

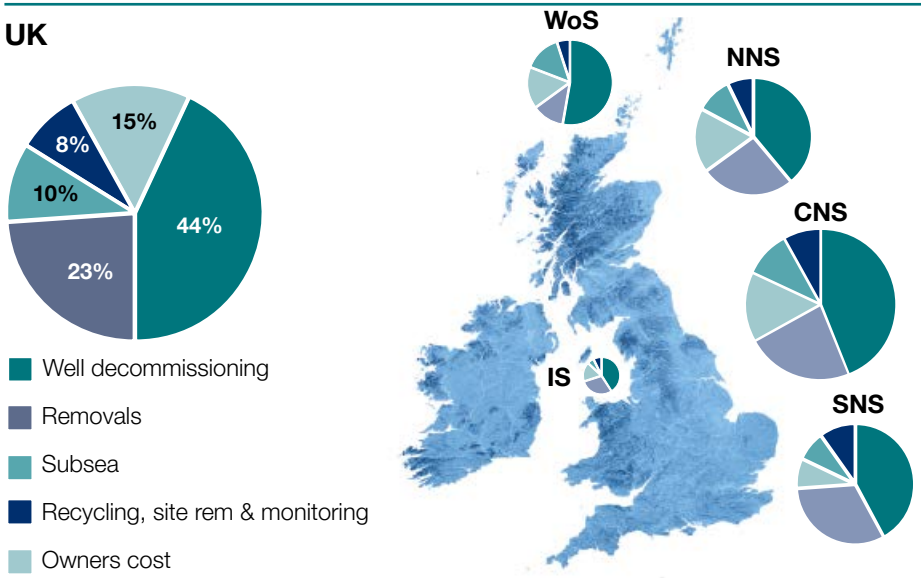

### Figure 3b: Cost breakdown by WBS and increase from re-baseline[i]



An increase in the cost of decommissioning is not unexpected given both the economic environment and market conditions that prevailed during 2022 and continue to exist across the energy industry today (see Section 4: Economic conditions and outlook).

The updated contribution (%) and geographical distribution of costs by WBS are shown in Fig. 4. This pattern and spread of costs remains consistent with the trend over preceding years (see Fig. 1 in Section 1.3). Refer to Appendix 2 for a more detailed breakdown of WBS by geographical distribution.

**Figure 4: Geographical decommissioning cost split by WBS (2023–2071)[i]**




There are multiple headwinds facing industry today. Increasing costs and the ongoing challenging economic environment reinforce the need to focus on the next decade of decommissioning and implement updated performance measures (see Section 3). A balanced scorecard which portrays a picture of both decommissioning performance plus actual and forecast costs will be developed to demonstrate progress.

Significant opportunities to deliver cost efficiencies across the full range of WBS elements still exist through many pathways including,

- Strategic and tactical collaboration
  - Integrated resource and execution planning with other UKCS energy businesses
  - Development and implementation of new decommissioning business models and strategic partnerships across industry
- Improved late life planning; decommissioning front end loading and strategic execution decisions including,
  - Minimising post CoP running costs through platform well decommissioning pre vs post CoP
- Delivery of efficiencies through economies of scale – aggregation of scope and campaigning e.g. Subsea Decommissioning Collaboration (SDC).
- Technology acceleration and deployment
- Increased visibility of short-medium term decommissioning plans to the market (NSTA data visibility dashboard )
- Commitment to, and execution of, stable decommissioning plans aligned with regulatory obligations.

Case study:
*A global perspective on decommissioning*

## Project description

Project Boomerang bundles together significant scale, scope, and duration for the turnkey decommissioning of 12 offshore installations in shallow water Gulf of Mexico (GoM) across seven worksites in Federal and State waters (one at 250m, 10 at 60m and one at 3m water depth). The project includes 15,000t topsides, 20,000t of conductors & 41,000t jackets; 211 wells; and 36 pipelines, with anticipated completion over 5–6 years.

## "Boomerang" from Fieldwood's bankruptcy

The bankruptcy of Fieldwood Energy resulted in ~450 installations and ~3,600 wells reverting to the US Government, who then issued Decommissioning Orders returning the decommissioning liabilities to the original field installers or predecessors in title (hence, project "Boomerang"). Most recipients had not been involved with the returning assets for 10+ years, creating challenges regarding knowledge of the condition of the installations during the early stages of the project.

## The solution

bp selected Petrofac to lead a tightly integrated project management, planning, engineering, procurement and field execution oversight solution, with the field operatorship taken on by Guardian Decommissioning, a GoM licensed operator, focused only on decommissioning.

The outsourced operator solution enables the installations to be Guardian worksites, with work activity led by Petrofac in alliance with Danos. To do this, the project uses a modified standard GoM care, custody and control Joint Operating Agreement, with liquidation of the decommissioning work scope to be done safely, efficiently and affordably and in accordance with the legislation in relevant jurisdictions.

The commercial model is a transparent "cost-plus" reimbursable model which efficiently handles the inevitable "discovery surprises" from these old and unfamiliar fields without building in any risk premiums or contingencies or triggering contentious scope and price contract amendment processes.

Governance is guaranteed via a rigorous approval for expenditure (AFE) process, where every task has a scope of work, supporting technical justification, thorough risk review, cost build up using best available market pricing, and a line by line, to the dollar, cost estimate, which is tracked and reported daily.

Petrofac leverages its decommissioning experience in the UK as well as its and Danos' relationships in GoM with over 250 vendors to secure best fit and best priced equipment, services, and capable crews, in a very tight and competitive market.

## Moving safely, at pace

As the Government issued Decommissioning Orders required immediate action, the Boomerang team was set up and mobilized from a standing start in 30 days to take over custody of the field, beginning with assessment and make-safe work. The Petrofac team assembled have collectively completed >2,500 wells, >250 platform and >350 pipeline decommissioning projects and bring knowledge, experience, relationships, and a passion for decommissioning to the project.

The discovery work highlighted that two platforms required mitigation due to a higher risk of platform toppling in a hurricane event. Therefore, the project focused on mitigating this risk prior to the 2023 hurricane season by draining the platform hydrocarbons, decommissioning 48 wells and cutting and pulling the conductors on these two platforms. This work is being completed in August 2023.

## Benchmarking and repetitive gains

The scale of the project invites continuous improvement in efficiency and approach. The AFE per activity provides good cost governance, but also enforces the gathering of granular data for project benchmarking, making continual improvements and learning part of the project's DNA. Project "CostBusters" are also sought and tracked daily, with 28 (>$16m) captured to date.

Some savings come from new approaches: For example, prior to well work starting, extensive diagnostic and wellhead maintenance work is done by smaller, lower cost crews ahead of the main well decommissioning campaign. This enables better planning, permitting and cost estimating and better campaign planning.

Other savings come from efficiencies: well work is being "batched" into groups of 3-6 for execution in parallel to improve equipment and crew utilization and minimize non-productive time. Then asset by asset well work uses a blended "campaign" approach where the easiest wells are started to ensure utilization, and immediately the harder wells begin troubleshooting, with the goal of liquidating all troublesome wells before the last "easy" well is completed.

Every step involves detailed risk reviews and after action and lesson learned reviews. All data is benchmarked and run through comparative analysis processes to verify incremental gains or identify future improvements.

## Team players

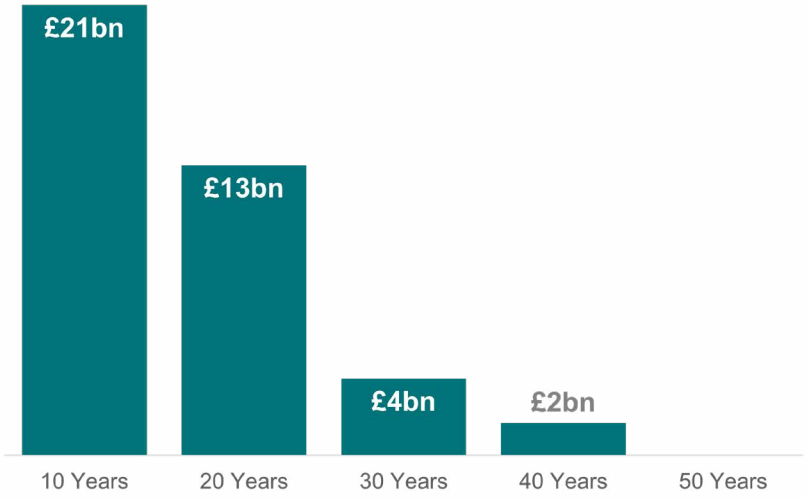
By cleaning and removing old oil and gas infrastructure, seeking re-use and repurposing opportunities for materials recovered, and enhancing biodiversity through authorised reefing programmes, decommissioning projects support the energy transition. Execution requires people from multiple disciplines and backgrounds to come together and fuse global best practices into fit-for-purpose Gulf of Mexico solutions, creating a diverse and exciting office culture, with people whose careers are committed to decommissioning and a shared passion for doing decommissioning well.

## 2.3 Four decades of decommissioning

Decommissioning will span the next four decades (see Fig. 5) but around 90% of spend will complete in the next 20 years, with the decade up to 2032 forecast to deliver peak activity.

The next 10 years (current decade 2023–2032) are regarded as pivotal for decommissioning across the UKCS basin. The window of opportunity to effect and embed a material change in the cost of decommissioning and drive sustainable long term decommissioning performance efficiency and cost reduction exists now and is a key priority and focus for both industry and regulators.

### Figure 5: Decommissioning cost profile from 2023 per decade[i]




A detailed breakdown of the forecast spend per decade broken down by region and WBS is provided (see Fig. 6a and Fig. 6b).

### Figure 6a: Cost per decade by region[i]

2023 2071

| | 10 years | 20 years | 30 years | 40 years | 50 years | Total % |
|---|---|---|---|---|---|---|
| CNS | 25% | 21% | 2% | 0% | 0% | 49% |
| NNS | 15% | 8% | 2% | 0% | 0% | 25% |
| WoS | 3% | 1% | 5% | 3% | 0% | 12% |
| SNS | 7% | 4% | 0% | 0% | 0% | 11% |
| IS | 2% | 0% | 0% | 0% | 0% | 3% |
| Total % | 53% | 34% | 9% | 4% | 0% | 100% |

### Figure 6b: Cost per decade by WBS[i]

2023 2071

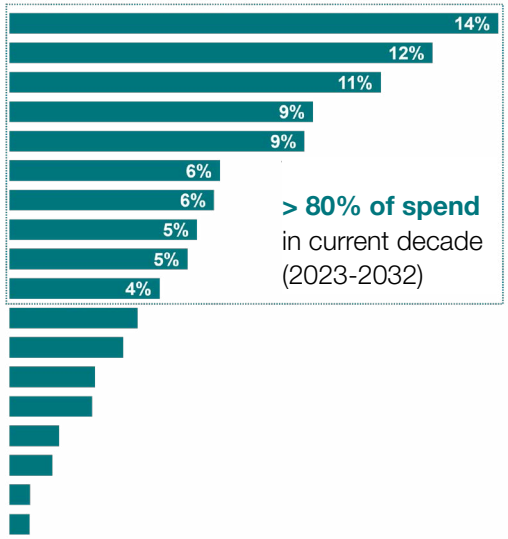
| | 10 years | 20 years | 30 years | 40 years | 50 years | Total % |
|---|---|---|---|---|---|---|
| Well decom | 26% | 12% | 4% | 1% | 0% | 44% |
| Removals | 10% | 10% | 2% | 1% | 0% | 23% |
| Owners cost | 8% | 5% | 1% | 1% | 0% | 15% |
| Subsea | 6% | 3% | 1% | 0% | 0% | 10% |
| Recycling | 3% | 4% | 1% | 0% | 0% | 8% |
| Total % | 53% | 34% | 9% | 4% | 0% | 100% |

### 2.3.1 Current decade (2023–2032)

Approximately 50% (£21bn) of the total basin forecast spend is to be committed by early – mid 2030s with 10 operators contributing over 80% of current decade spend (see Fig.7).

- CNS ~50% of basin forecast
- Well decommissioning remains the dominant cost centre (~44%) with significant well decommissioning scope spanning the next two decades
- Irish Sea decommissioning forecast to be complete within current decade

**Figure 7: Proportion of decommissioning spend (%) by operator in current decade (2023–2032)**



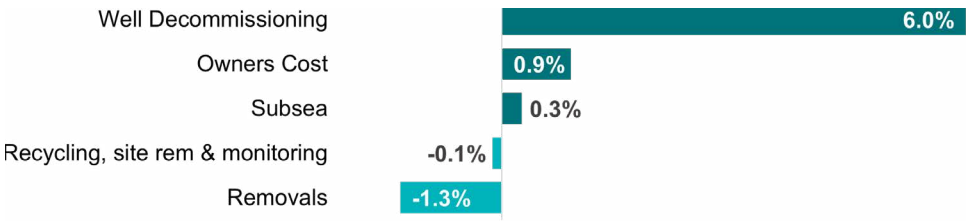

### 2.3.2 Change in cost per decade and WBS

With the next decade being pivotal for decommissioning and forward focus for industry and NSTA, understanding the pattern and drivers of change in forecast cost of decommissioning for this period is key.

Of the £3bn increase in the full cost of decommissioning, the contribution to increase from cost over current decade is £1.1bn (~6%).

The cost increase (~6%) for period to 2032 is dominated by an increase in the cost of well decommissioning (see Fig. 8). For reference the corresponding analysis for period 2033-2042 is provided in Appendix 3.

**Figure 8: Decommissioning cost change in next decade by WBS (2021 vs 2022 Survey)[i]**



# Section 3

## Decommissioning performance

## 3.1 Performance metrics

Forecast cost estimates have historically been the main metric through which the NSTA and industry have reflected on UKCS decommissioning progress.

The ability to understand both decommissioning performance and cost will lead to a more balanced and informed view of decommissioning across the basin. To address this, a range of joint industry leading and lagging decommissioning performance metrics are being phased in[6] to improve focus and drive targeted outcomes.

The NSTA decommissioning benchmarks are also being updated to include a combination of financial and non-financial benchmarks aligning with and supporting the needs of the industry.

The Decommissioning Performance Metrics are laid out in Tables 1a [Project management metrics] and 1b [Wells metrics]. Table 1a includes a range of project management measures while the measures defined in Table 1b are specific to well decommissioning.

[6] Informed by UKCS Stewardship Survey updates scheduled over 2023–2024

## Table 1a: Project management metrics

| Metric | Leading metric | Lagging metric |
|---|---|---|
| Ratio of planned pre and post CoP platform well decommissioning | % | Post CoP OPEX |
| Plan stability relative to CoP date | Change in CoP and forecast decom cost and profile (relative to baseline) | Decommissioning cost |
| Planned duration from CoP to well decommissioning completion & final platform disembarkation (cold stack status)[7] | Duration | Post CoP OPEX |
| Capital efficiency and plan attainment | | Planned vs actual scope and cost (in year) |
| Decommissioning readiness (front end loading) | Glidepath progress up to CoP (NSTA Stewardship Expectation 10) | |

[7] Red text – pending collation of updated industry data via UKCS Stewardship Survey

## Table 1b: Wells performance measures

| Metrics | Leading metric | Lagging metric |
|---|---|---|
| Number of barriers | | Number of barriers |
| Operator technology spend on well decommissioning | UK pounds p.a. | |
| Technology deployment status[7] | | Number of unique technologies deployed in well decommissioning p.a |
| Well decommissioning campaigns | Planned campaigns | Campaign capital efficiency |

[7] Red text – pending collation of updated industry data via UKCS Stewardship Survey

## 3.2 Performance measurement and reporting

### 3.2.1 Performance scorecard

A balanced scorecard (see Table 2) reflecting a combination of leading and lagging measures, based on currently available data[8], has been developed to inform decommissioning progress and support delivery of cost efficient decommissioning.

The 2023 scorecard sets the baseline for several new metrics against which progress will be tracked and reported in subsequent years.

## Table 2: Decommissioning scorecard

| Metric | Units | Measure leading | Measure lagging |
|---|---|---|---|
| Forecast decom Costs (2023+) | £bn | £40bn | |
| Actual Spend 2022 | £bn | | £1.6bn |
| UKCS platform wells forecast to be decommissioned pre CoP | % | 60% | |
| Total UKCS post CoP cost (forecast, 2023+) | £bn | £2.1bn | |
| Change in 10-year forecast | % | 6 | £1.1bn |
| Number of assets that are expected to CoP between 2023-2028 | Number | 171 | |
| Capital efficiency (NPT/WoW) well decommissioning[9] | % | | 18% (platform)<br>12% (subsea) |
| Wells decommissioned 2022 (platform & subsea wells) – see Appendix 4 for more detail | Number | | 95 (platform)<br>21 (subsea) |
| Barriers placed in 2022 (platform & subsea wells) – see Appendix 4 for more detail | Number | | 301 (platform)<br>34 (subsea) |
| Technology spend (operator) on well decommissioning[10,11] | £MM p.a. | £7.4MM<br>2023 forecast<br>£4.6MM<br>2022 actual | |

[8] Data Source: UKCS Stewardship Survey 2022
[9] Excludes Project Management and Facilities Upgrade costs
[10] Data source: UKCS Stewardship Survey: Technology
[11] Direct operators spend, excluding supply chain

As per Table 1a, two of the new metrics being used to understand and represent decommissioning performance are capital (ABEX) efficiency and plan attainment.

These metrics are equally applicable to other key WBS elements including subsea infrastructure and removals.

Given the contribution and magnitude of well decommissioning to the cost of decommissioning, plan attainment and capital efficiency for well decommissioning during 2022 is illustrated in Section 3.3.

When sufficient data exists, subsequent cost reports will provide insight and feedback against these same metrics for a broader range of WBS elements.

## 3.3 Well decommissioning: planned vs actual scope liquidation & capital efficiency

The cost and quantities for platform and subsea wells decommissioned versus planned are shown in Fig. 9a and Fig. 9b.

**Figure 9a: Planned vs actual platform well decommissioning 2022**

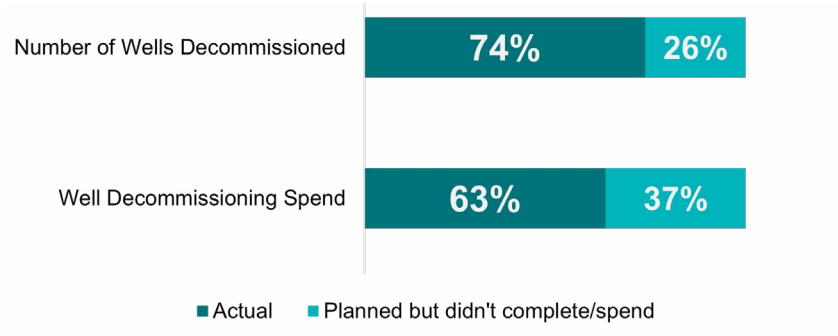
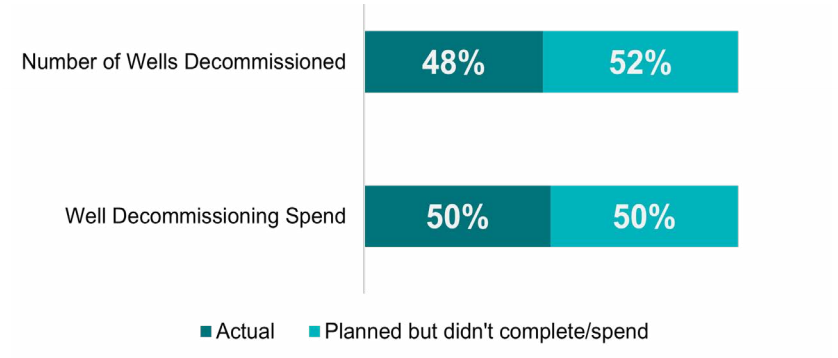



**Figure 9b: Planned vs actual subsea well decommissioning 2022**



Insights from well decommissioning performance (2022):

- Platform well decommissioning: While fewer wells were completed in year than originally forecast (see Fig. 9a) an encouraging trend (circa16% reduction) in the aggregated average cost per well is observed. Deeper analysis of the actual cost of well decommissioning will be provided in the forthcoming NSTA 2023 benchmark report.
- Subsea well decommissioning: Approx 50% of subsea wells are reported as completed relative to the forecast for the period (2022).

While fewer wells were reported as fully decommissioned than planned for 2022, this may in some way be explained by the changes in well decommissioning planning and execution practices now commonly employed across the industry. Decommissioning of wells in phases aligned with optimum combination of vessels and rigs (e.g. rig campaign work followed by batched wellhead removal from a vessel) is becoming a recognised industry common practice. Updates to the UKCS Stewardship Survey to align industry reporting of well decommissioning costs and progress with the employed industry practices are planned for 2023.

The increased global competition for rigs and marine vessels (see Appendix 5) re-enforces the need to provide certainty and committed work to the supply chain.

## 3.4: Performance improvement opportunity

For key WBS elements, significant variance in the forecast cost of decommissioning currently exists across the basin highlighting the opportunity to narrow the bandwidth and close the gap to first quartile (below P25) performance, improving both future forecasts and actual final outturn costs.

Insight and reporting of the cost reduction opportunity (gap to the equivalent of current first quartile performance (below P25)) for well decommissioning is illustrated in Section 3.4.1. This same format of reporting will feature across a broad range of key WBS elements in subsequent reports as benchmarks develop.

### 3.4.1 Well decommissioning performance improvement opportunity

Figures 10a-d[12] show the forecast costs of well decommissioning (platform and subsea respectively) for the next decade (2023–2032) relative to the respective NSTA P25 and P50 benchmarks. NSTA benchmarks are based on actual outturn costs of work completed while the data points shown are current forecast of aggregated costs by operator.

[12] As of date of publication the reference benchmark used for well decommissioning performance have not been finalised and are subject to change

Understanding the basis of, and drivers for, a particular outcome along with the ability to share lessons across the industry will be a key part of changing performance.

NSTA is currently working with industry to identify and implement a range of updated performance and cost benchmarks and as part of this process new data will potentially be collected as part of the UKCS Stewardship Survey.

For reference the corresponding analysis of full lifecycle well decommissioning performance and forecast costs is provided in Appendix 6.

**Figure 10a: Platform Well decommissioning (NNS/CNS/WoS) (2023–2032)**

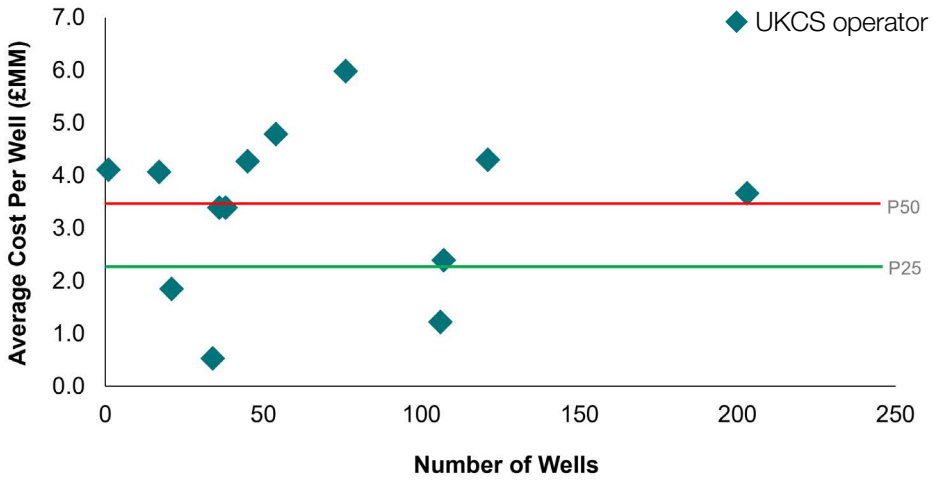
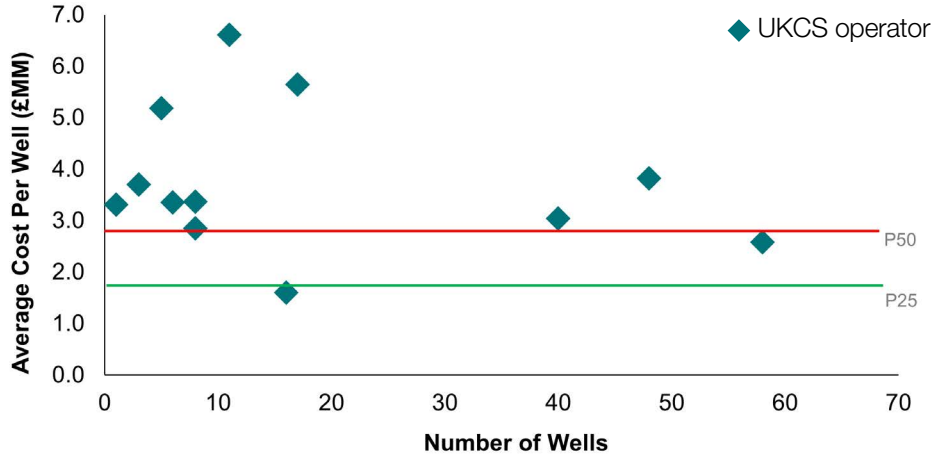



**Figure 10b: Platform Well decommissioning (SNS/IS) (2023–2032)**




Significant number of platform wells are forecast to exceed the current second quartile (above P25) cost outcomes showing significant opportunity for shared learning and performance improvement exists.

**Figure 10c: Subsea well decommissioning (NNS/CNS/WoS) (2023–2032)**

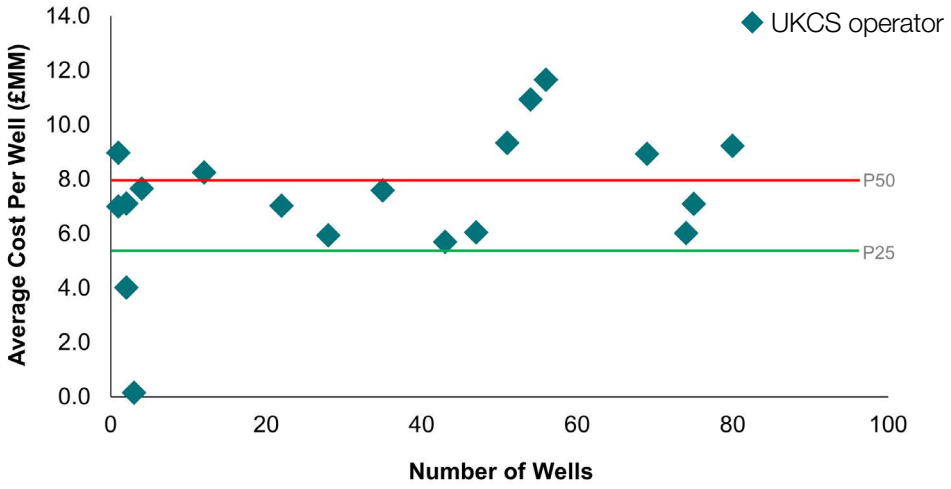
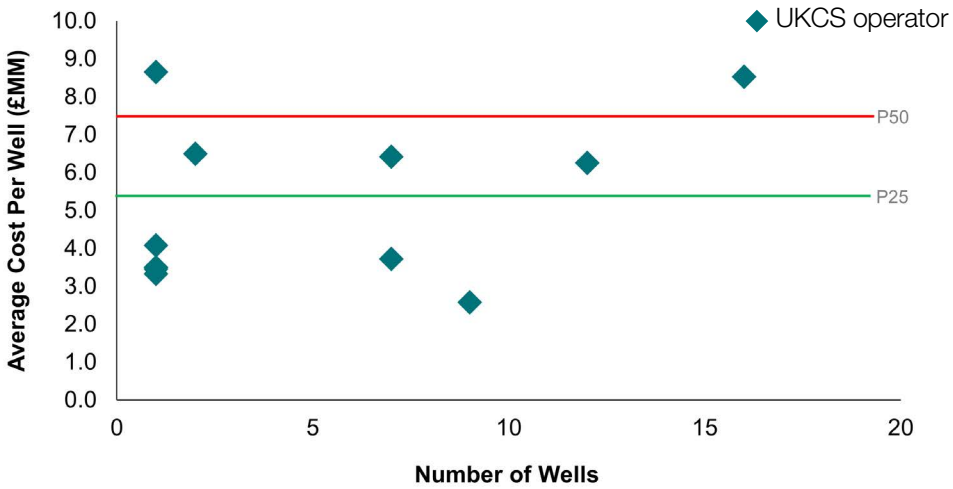



**Figure 10d: Subsea well decommissioning (SNS/IS) (2023–2032)**



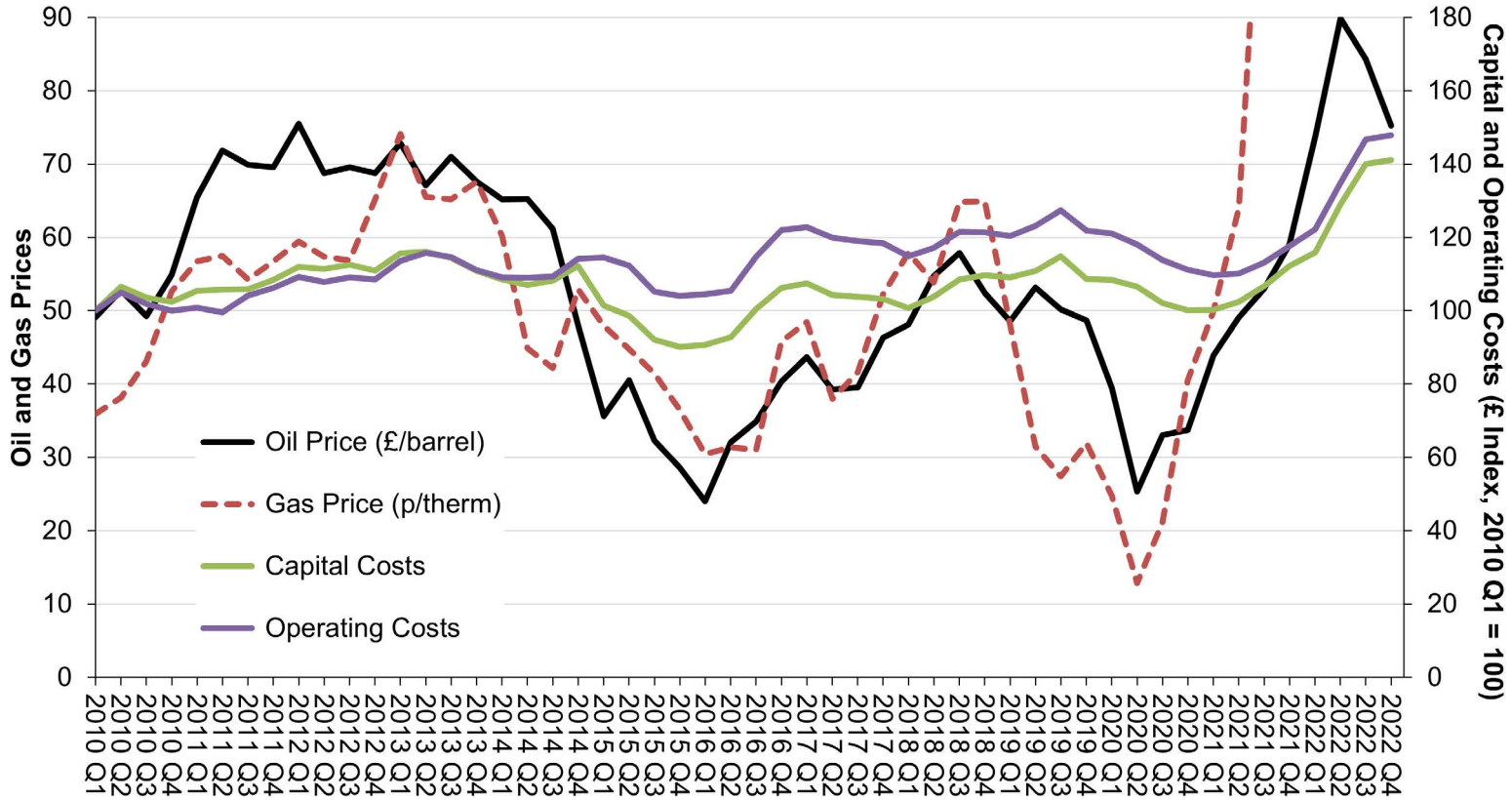

For the same time period, the gap between current subsea well forecasts and first quartile performance (below P25) is much narrower than that of platform wells, however given the unit cost (average cost per well) for subsea decommissioning is significantly more expensive there still remains a notable cost reduction opportunity, particularly relevant to NNS/CNS/WoS (see Fig. 10c) forecasts.

# Section 4

## Economic conditions and outlook

Unprecedented economic conditions prevailed in UK and globally during 2022 (see Fig.11) concurrent with an acceleration and growth in the energy transition.

**Figure 11: Oil and gas prices, capital and operating cost (£ sterling) profile by quarter/year[13]**




[13] Includes data from: S&P Global Commodity Insights

A range of factors are impacting on the immediate short-term actual cost of decommissioning as well as the longer-term forecast cost of decommissioning across the basin.

1. Energy transition – the global shift to clean growth is creating opportunities in renewable energy including offshore wind, hydrogen and Carbon Capture and Storage (CCS). These markets are using the same resources currently supporting oil and gas decommissioning leading to increased competition and potentially increasing the overall cost base for the industry.
2. Growth in global decommissioning – The Energy Industries Council (EIC) estimates the global value of upstream decommissioning to be worth at least USD 200 billion[14] (2021 to 2040). The North Sea offshore industry is building expertise that is exportable to other markets.
3. Increased global demand for energy and a focus on security of supply – is attracting capital and resources that might otherwise have been directed to decommissioning. The increase in aggregate demand without growth in the supply of goods and services is inflationary.
4. Economic outlook – the global economy has faced strong headwinds over the past year with high levels inflation driven by the effects of significantly higher commodity prices and supply chain disruptions. This has been accompanied by volatility in exchange rates and financial markets, tightening of monetary policy and a slowdown in short-term growth prospects.

The UK offshore oil and gas market previously established to service the oil and gas lifecycle has responded to and adjusted to account for many of the factors outlined.

A change in offshore supply chain utilisation and global (geographical) relocation has started to occur. Examples of some of the shift in demographic being:

- Heavy lift contractors being contracted by offshore wind developers for offshore wind installation. The strategy of continuing to offer supply chain flexibility in timing and windows of execution for removals is supported as this continues to create opportunity for mutual benefit to all parties.
- Rig providers relocating resources to other global regions where rates are higher and more certainty of work exists.

Further insight and assessment of how the supply chain is changing in line with energy transition and global demand is provided through assessment of changes in the rig market and future outlook (see Appendix 5).

[14] https://www.the-eic.com/TrainingDetail?dateid=2730

# Section 5

## Risks & opportunities

Industry efforts to decommission UKCS infrastructure more cost efficiently remain subject to risks and opportunities, including:

## Risks

**Geopolitical instability, macro-economic pressures and economic policies, including:**

- Direct and indirect impact of global and UK inflation on the energy sector and decommissioning
- Effect of fiscal policy on investment decisions
- Global finance and exchange rates

**Maintaining a steady and predictable UKCS decommissioning workload and creating a sustainable supply chain:**

- Competition for UKCS supply chain capability/capacity from other energy sectors or other global regions.
- Availability and competition for transferable skills and resources

**Net zero, re-use and re-purposing:**

- Scope and cost growth from increased CCS licensing rounds and well stock being decommissioned to a CCS standard

**Increased UKCS decommissioning scope arising from changes to regulatory requirements and scrutiny in UKCS.**

## Opportunities

Export of UK decommissioning capability and knowledge to other regions.

Alternative decommissioning business models (e.g. consortium or joint venture models) formed on the principle of collaboration between owner/operators and strategic supply chain partners.

Economies of scale and efficiency from learning through aggregation of scope across multi-entities to establish campaign models of execution.

Accelerated investment in new and emerging technologies and deployment of proven incremental and disruptive technologies.

# Section 6

## Next steps & upcoming publications

## NSTA Decommissioning Benchmark Report

The NSTA Decommissioning Benchmark Report will be issued (available online accessible from the NSTA website decommissioning homepage) in Q3 2023.

The benchmark report will be published as a PowerBI dashboard and is intended to add greater value to industry by providing more user specified functionality and depth of analysis.

## Performance scorecard

The 2023 performance scorecard (see Section 3.2.1) sets the baseline for several new performance metrics against which progress will be tracked and reported in subsequent years.

## Additional supporting information

Further information on the role of NSTA decommissioning can be found at North Sea Transition Authority (NSTA): Decommissioning.

For queries relating to this report specifically or broader decommissioning matters please contact NSTA at decom.team@nstauthority.co.uk

# Appendices

## Appendix 1: Cost forecasting methodology (2023)

Unless otherwise indicated, the 2022 UKCS Stewardship Survey was used as the predominant data source for all analysis and reporting, with decommissioning cost inputs provided by all operators for all current and unsanctioned offshore facilities, pipelines development wells, suspended open water exploration and appraisal wells and onshore terminals. Data was collected using the Offshore Energies UK (OEUK) Work Breakdown Structure (WBS)[15].

In November 2022, a new baseline (re-baseline) was set of £37billion, alongside a new target of 10% reduction by end-2028[16].

The re-baselined figure, sourced from the 2021 UKCS Stewardship Survey, represented the industry's total best estimate of future decommissioning costs for period 2023 onward.

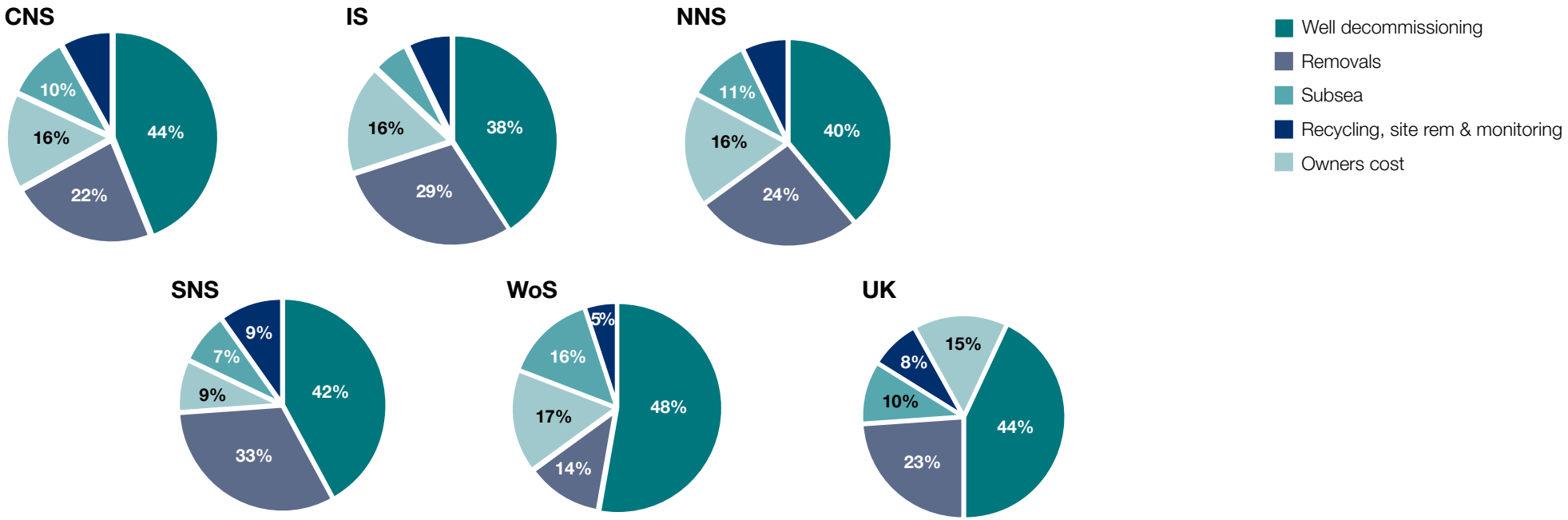
| Method | Re-baseline | 2023 Estimate |
|---|---|---|
| **Cost Estimate** | £37 billion | £40 billion |
| **UKCS Stewardship Survey** | 2021 | 2022 |
| **Prices (£money)** | 2021 | 2022 |
| **Years (included)** | 2023+ | 2023+ |
| **Scope** | All UKCS Fields and:<br><br>Unsanctioned Projects<br>Sanctioned, Non-Producing Fields<br>Terminals and Trunk Pipelines<br>E&A Wells | All UKCS Fields and:<br><br>Unsanctioned Projects<br>Sanctioned, Non-Producing Fields<br>Terminals and Trunk Pipelines<br>E&A Wells |
| **Profile Type** | Best estimate<br>Full (not like for like) | Best estimate<br>Full (not like for like) |

[15] OEUK: Decommissioning Work Breakdown Structure Guidelines: (oeuk.org.uk)
[16] North Sea Transition Authority (NSTA): New oil and gas target reinforces UK's place as global leader in decommissioning and boosts decarbonisation projects - 2022

## Appendix 2: Cost breakdown by region and WBS

Figures 12 a–f represent the forecast cost (full cost lifecycle) breakdown by region and WBS.

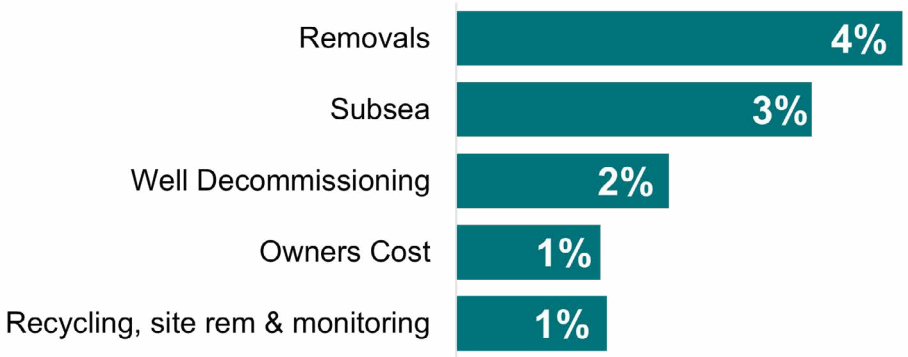
### Figures 12a–f: Geographical decommissioning cost split by WBS (%) (2023–2071)[i]



## Appendix 3: Cost change for period 2033–2042

Pattern of increase across the key WBS elements for period 2033–2042 (see Fig. 13).

**Figure 13: Decommissioning cost change 2033–2042 by WBS (2021 vs 2022 Survey)[i]**

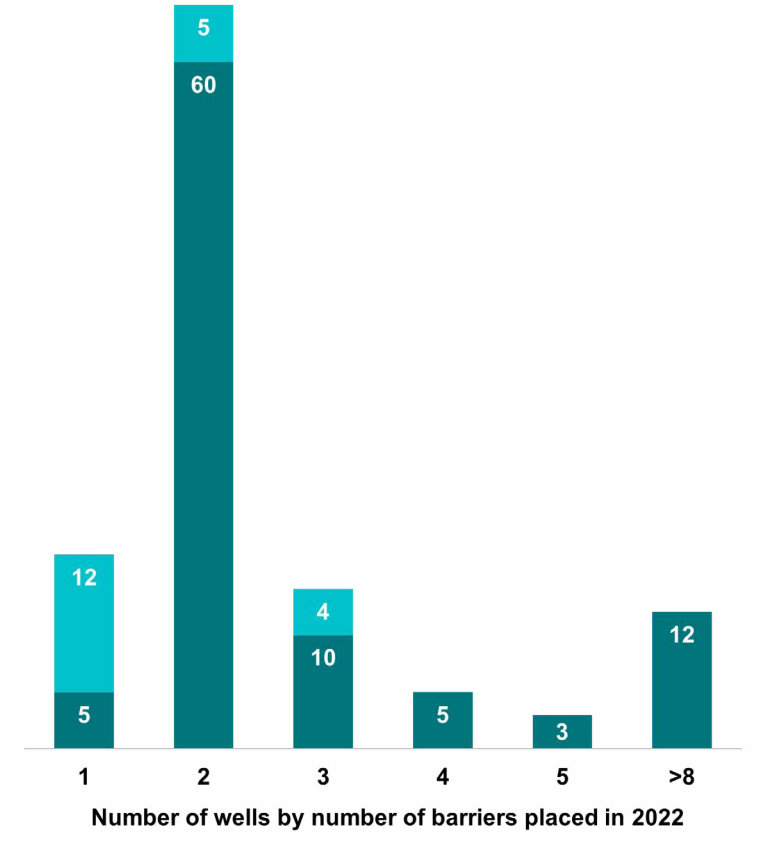



The change in spread of costs for the period 2033–2042 is in part a reflection of the change in distribution of offshore execution with an increase in offshore removals and subsea infrastructure scheduled for execution in the period up to early – mid 2040s.

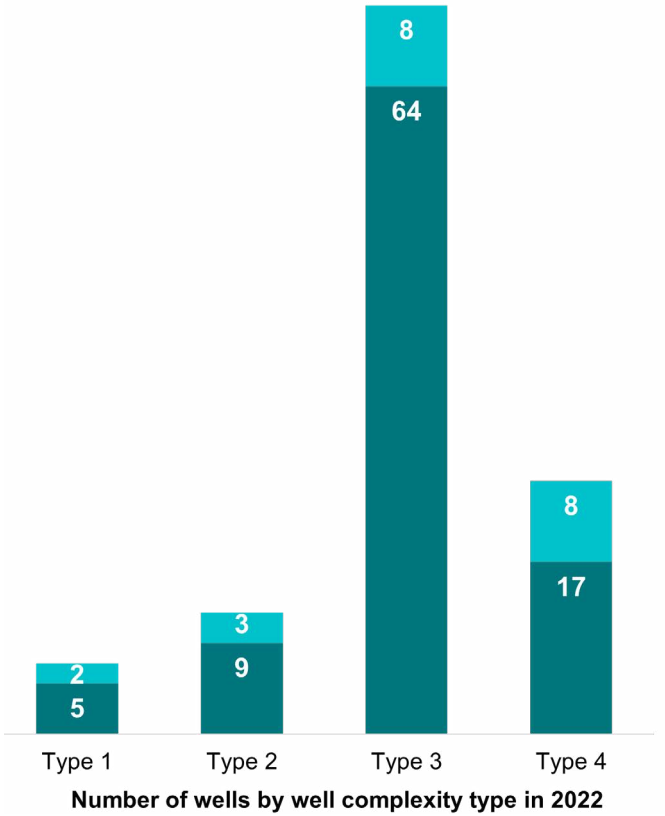
## Appendix 4: Performance metrics – well decommissioning

Analysis of actual wells, reported via 2022 UKCS Stewardship Survey, decommissioned during 2022 relative to barriers placed plus well complexity type.

### Fig 14a: Number of wells by number of barriers placed in 2022




### Fig 14b: Number of wells by well complexity type[17] in 2022




Platform Subsea

[17] NSTA Well Consents Guidance

## Appendix 5: Rig Market analysis[18]

With well decommissioning making up over 40% of the next decade's decommissioning spend, changes in rig and marine vessel market have the potential to radically influence the future cost of UKCS decommissioning.

Key insight and summary of rig market analysis:

- Forecast day rate increases across the board over the next five years, as market activity globally and across all sectors of energy industry continues to ramp up
- Higher rates offered in other regions are drawing capacity away from Northwest Europe. This same trend is being seen across semi-subs and jack-ups
- Jack-up rates are anticipated to continue increasing between 2023 and 2027. This will be mostly driven by demand from out-with UKCS, which will continue soaking up much of any excess available supply, subsequently driving rig pricing upwards globally
- Longer durations of campaigns in other regions with better potential for follow-on work after the initial deal is a further draw for rigs to move away from the UKCS

It is recognised that parts of the industry are proactively exploring and applying alternative strategic business and contractual models whilst also securing long-term contractual commitments (rigs and marine construction vessels) to mitigate the risk of any potential future shortfall in rig/marine vessel capacity and rate changes.

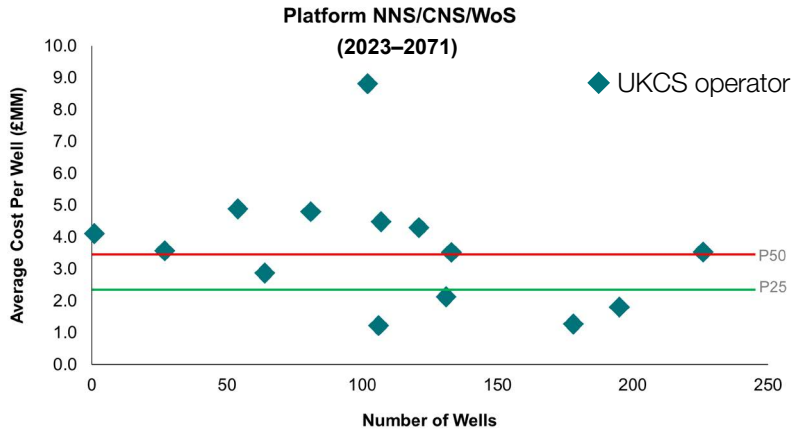
Further action is required by industry, with support from NSTA, to mitigate longer term market changes and the risk of further loss of supply chain capability within the UKCS.

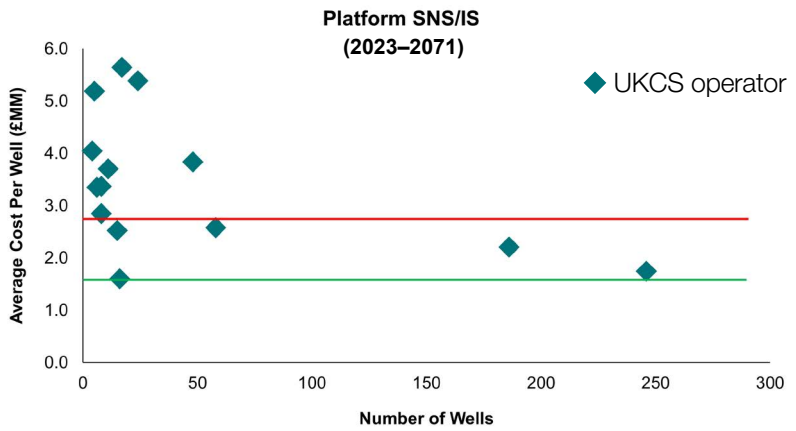
[18] Source of data: Westwood RigLogix

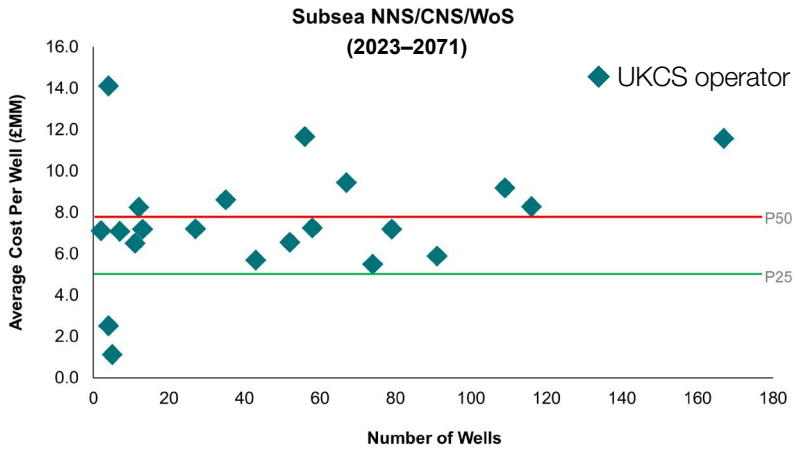
## Appendix 6: Well decommissioning performance opportunity – full lifecycle assessment, 2023–2071

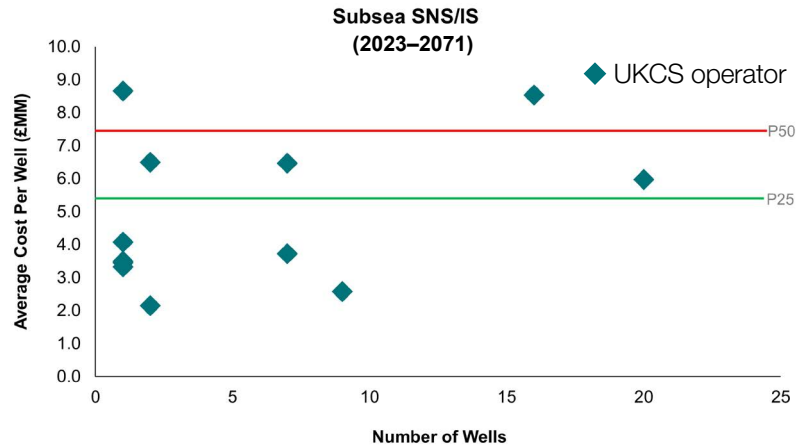
Figures 15 a–d represent the range of well decommissioning performance vs benchmarks split by region for period from 2023 to 2071.

## Figures 15a–d: Expected average cost per well by operator (2023-2071) vs benchmark[12]



# Glossary of acronyms and abbreviations

**ABEX** – Abandonment and decommissioning expenditure

**AFE** – Approval for expenditure

**CCS** – Carbon Capture & Storage

**CFE** – Control flow excavation

**CNS** – Central North Sea

**CoP** – Cessation of Production

**CSV** – Construction support vessels

**E&A** – Exploration & appraisal

**EIC** – Energy Industries Council

**GoM** – Gulf of Mexico

**IS** – Irish Sea

**JLS** – Jacket lift system

**NNS** – Northern North Sea

**NPT** – Non-productive time

**NSTA** – North Sea Transition Authority

**OEUK** – Offshore Energies UK

**OPEX** – Operating expenditure

**p.a** – per annum

**SCAPs** – Supply Chain Action Plans

**SDC** – Subsea Decommissioning Collaboration

**SNS** – Southern North Sea

**UKCS** – UK Continental Shelf

**URS** – Utility ROV Services

**WBS** – Work Breakdown Structure

**WoS** – West of Shetland

**WoW** – Waiting on weather

**WROVs** – Work-class remotely operated vehicles

**£MM** – UK pounds (millions)

**£bn** – UK pounds (billion)

[i] – Includes adjustments (unsanctioned projects, sanctioned non-producing fields, terminals and trunk pipelines etc.)

North Sea Transition Authority



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