Oil & Gas Authority

UKCS Decommissioning Benchmarking Report

November 2021

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Executive summary

Managing the UKCS declining production to maximise value from the basin is vital to meet our energy demands, as well as reducing reliance on imports and their associated carbon footprint. Ensuring that decommissioning is carried out safely, and in a timely, cost effective manner not only helps value extraction from the UKCS, but also demonstrates industry's commitment to responsibly manage the UK's hydrocarbon legacy.

This report provides comparison data which benchmarks a wide range of UKCS decommissioning activities[1]. It follows the publication of the UKCS Decommissioning Cost Estimate 2021[2] in August. The reported benchmark information is derived from the perspective of the customer (i.e. does not necessarily reflect the costs incurred by the service provider) and, with a very small number of defined exceptions (see Appendix 2), is based on 'actual', expenditure.

Decommissioning activity in 2020 was without doubt in part impacted by Covid-19 and the low commodity price, contributing to a reduction in scope liquidation and the decommissioning benchmark sample size has hence in some instances only seen marginal change. The benchmarks for 2020 should be considered in this context.

[1]Yearly benchmarks are in current prices (e.g. 2020 benchmarks are in £2020 prices). Previous benchmarks have not been inflated

[2] OGA Cost Report 2021

With increasing emphasis placed on energy transition, reducing greenhouse gas emissions and Carbon Capture and Storage (CCS), the overall decommissioning cost impact of the energy transition plus any potential infrastructure re-use/repurposing is evolving and expected to remain so for a number of years.
To date there have been instances of cost increases, as additional work is done when infrastructure or wells are preserved or decommissioned to a different standard. The incremental decommissioning costs associated with energy transition are embedded in the current benchmarks as the data is not sufficiently mature to be explicitly differentiated.

It is acknowledged that the range of benchmarks presented are not fully normalised to account for individual Operator decommissioning circumstance or potential variance in the respective input data. As such the benchmarks should be considered as representative of costs on a simplified like-for-like basis only.

2020 benchmarks include historic data points (2017–2020 inclusive). Reference to previous benchmarks (e.g. 2017–2019) reflect previous methodology and have not been updated.

2. Benchmark summary

UKCS decommissioning cost performance benchmarks are presented for each relevant Work Breakdown Structure (WBS)[3] elements and summarised (P50) in Table 1.

Benchmarks are based on actual cost outturn i.e. not including cost estimates/forecasts (where exceptions apply these are listed in Appendix 2). Where insufficient 'actual' cost performance data exists, no benchmark data is provided.

Explanation of the benchmark calculation methodology plus metrics quartiles, P25, P50 and P75, referenced in the graphs, are provided in appendices.

Where considered to be meaningful and when sufficient actual data exists, benchmarks may be further refined and presented by UKCS geographical sector. Consistent allocation and reporting of actual costs per WBS elements by Operator is paramount in the development of robust and consistent decommissioning benchmarks.

Table 1: Overview of 2020 Benchmarks

Benchmark category	Project Management (%)		Post CoP Running Costs (£ MM)			Platform Well Decommissioning (£ MM) – Cost Per Well			Platform Rig Reactivation (£ MM)	Subsea Well Decommissioning (£ MM) – Cost Per Well				Removals (£ MM)
Type	Project <£150MM	Project >£150MM	Platform	Platform	FPSO	Platform	Platform (Jack up only)	Platform		Subsea development	Subsea development	Subsea E&A	Subsea E&A	FPSO
Area			NNS & CNS	SNS & EIS	NNS & CNS	NNS & CNS	NNS&CNS	SNS&EIS	NNS & CNS	NNS & CNS	SNS & EIS	NNS & CNS	SNS & EIS	NNS & CNS
P50	14%	9%	£115	£0.3	£11.5	£3.0	£4.3	£2.8	£18.2	£7.8	£6.3	£3.3	£4.2	£16.5

[3] OGUK Work Breakdown Structure Guidelines, October 2019

3. Project Management

Benchmarks for Decommissioning Project Management (PM) are sub-divided into two categories (1) Projects < £150MM and (2) Projects > £150MM to differentiate the potential variance in PM costs as a function of project size.

Metric: PM costs expressed as % of total decommissioning costs.

Whilst a reduction in PM % is often regarded as directionally and intuitively correct this needs to be considered within the context of the overarching objective of a reduction in overall decommissioning project execution costs. A net reduction in project costs with same PM overheads would result in a relative increase in PM metric.

3. Project Management

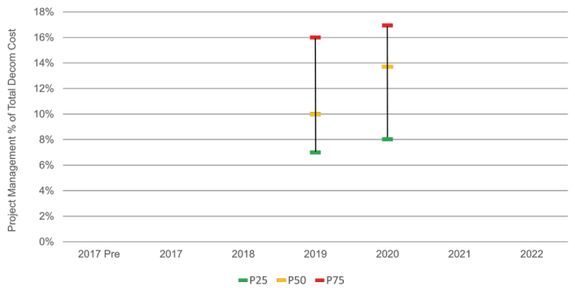
3.1 Projects < £150MM

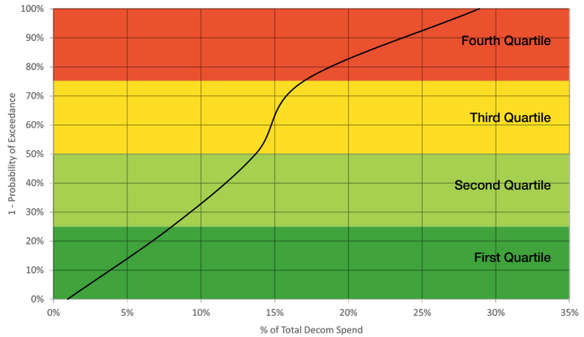
Relative to same metric for projects > £150MM a wider distribution of costs are observed for smaller scale decommissioning projects. The benefits of economies of scale seen for larger projects are not reflected in this metric.

Sample Size: 41-50

	Percentage
P25	8%
P50	14%
P75	17%

Figure 1: Project Management (Total project: < £150MM)





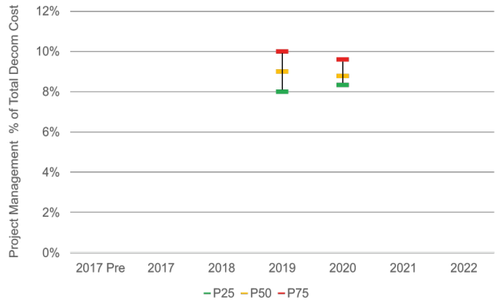
3.2 Projects > £150MM

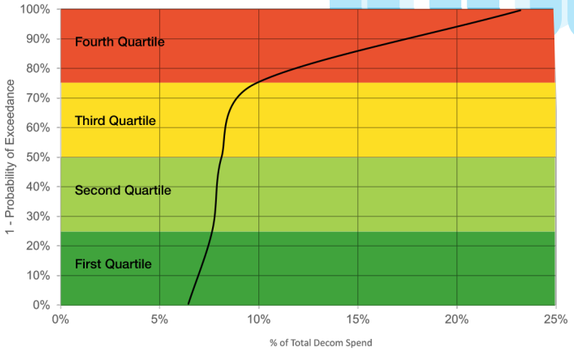
PM costs for projects > £150MM consistently reflect a narrow range.

Sample Size: 5-10

	Percentage
P25	8%
P50	9%
P75	10%

Figure 2: Project Management (Total project: > £150MM)





4. Platform post-CoP running

Delays in achieving cold stack due in part to Covid-19 have had a bearing on this metric.

To complement the post CoP running cost metric[4] an additional (new) benchmark of time (years) from CoP to cold stack status has been developed (Section 4.4).

4.1 Northern North Sea (NNS) & Central North Sea (CNS)

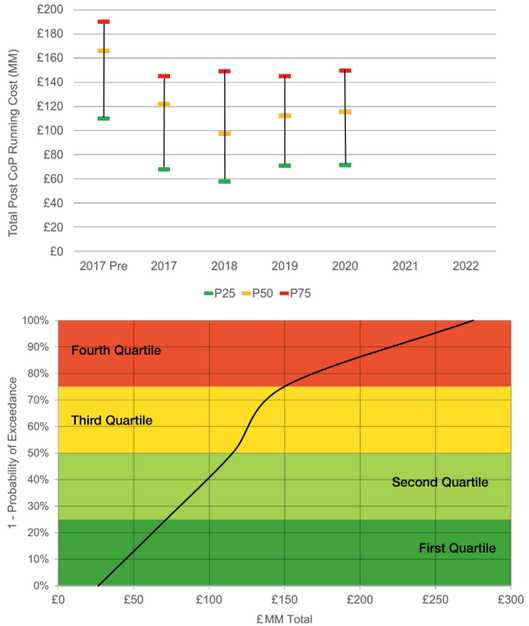
Due to the infrequent and multi-calendar-year nature of this metric no material change is observed. Instances of early and unplanned CoP continue to occur across the basin, the effect of which on the metric has yet to be fully realised. Inadequate preparation for decommissioning, including lost opportunity to execute decommissioning scope during late life phase results in additional costs (£50MM to £100MM) being incurred.

Sample Size: 5-10

	Units: MM
P25	£71
P50	£115
P75	£150

[4] Metric reflects the total incurred cost and is not measured on a per annum basis

Figure 3: Large Platform Running Cost Distribution: NNS & CNS



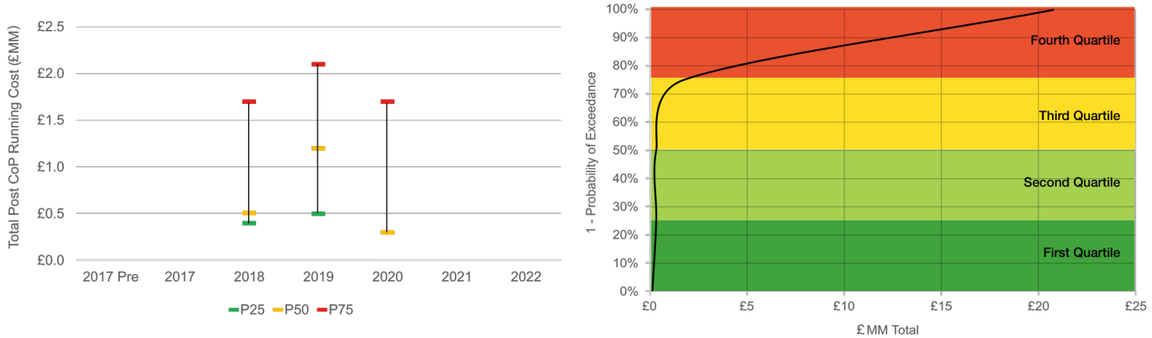
4.2 Southern North Sea (SNS) & East Irish Sea (EIS) – Normally Unattended Installations (NUIs)

Post CoP running costs are generally very low, reflective of nominally lower opex for NUI in conjunction with completion of efficient well decommissioning (typically a single P&A campaign). Despite these factors, significant outliers in cost performance are still observed.

The drivers of the significant increase in fourth quartile cost performance are multi-faceted and a function of protracted period from CoP to cold stack (including delays due to Covid-19; evaluation of re-use and CCS potential) plus instances of high opex driven by commercial and contractual agreements.Sample Size: 21-30

	Units: MM
P25	£0.3
P50	£0.3
P75	£1.7

Figure 4: Platform (Normally Unattended) Running Cost distribution: SNS & EIS



4. Platform post-CoP running (cont.)

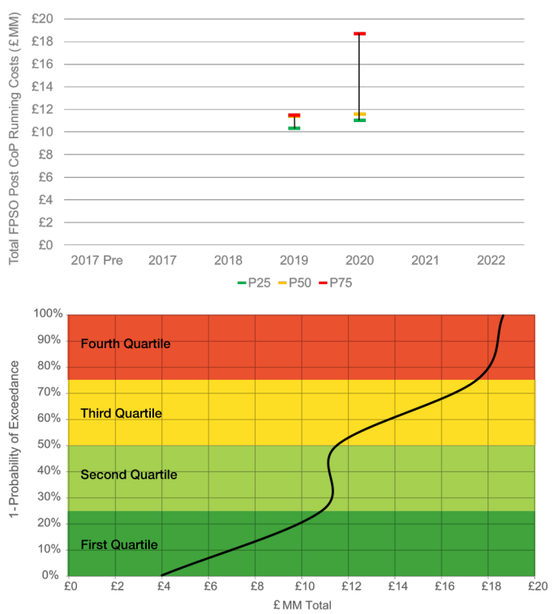
4.3 FPSO Post-CoP Running Costs in the NNS & CNS

Metric reflects a material change, however this is a function of the relatively small sample size and infrequent nature of the decommissioning activity across UKCS. The notable increase in P75 costs, relative to prior year, is due to extended shutdown, cleaning and removal from station.

Sample Size: 5-10

	Units: MM
P25	£10.9
P50	£11.5
P75	£18.5

Figure 5: FPSO Post-CoP Running Cost distribution: NNS & CNS



4.4 Cessation of Production (CoP) to Cold Stack: All areas

New metric.

CoP year is defined as the year in which the asset is expected to, or has already, permanently ceased production. Please note this is the year that the asset has stopped producing native oil and gas, and does not consider any future third-party processing dates.

Cold stack[5] is calculated as one year after the asset's last year of platform well decommissioning spend (e.g. if an asset last year of well decommissioning spend was in 2019, commencement of Cold Stack Phase is considered to be 2020).

Data based on actuals, last year of well spend is 2020 or earlier.

Further refinement of this metric to include duration from CoP to down-manning and, or duration from CoP to topsides removal is under consideration.

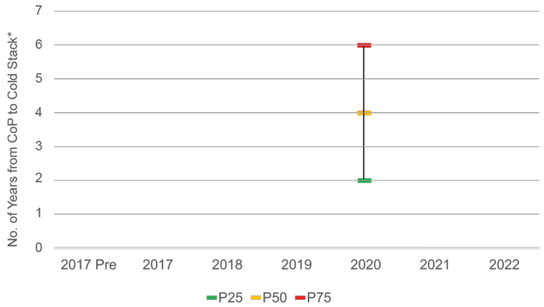
Establishing a 'flexible' window (three years from cold stack to topsides removals is considered to be standard industry practice) for topsides removal provides sufficient supply chain and execution flexibility without invoking additional incremental cost.

[5] Cold Phase is defined as when "Hazards from process hydrocarbons are not present. Sources of process hydrocarbons are isolated and air/water-gapped"

Sample Size: 31-40

	Units: years
P25	2
P50	4
P75	6

Figure 6: Number of Years from CoP to Cold Stack: All areas



5. Well Decommissioning

Currently, the UKCS has a well portfolio in excess of 4,000 wells which remain to be decommissioned.

The UKCS has 893[6] inactive suspended wells[7] (356 subsea wells; 529 platform wells; eight multilateral wells). In the next five years, a similar number of wells are forecast to become inactive and available for decommissioning.

Of the wells noted above, 176 are suspended open water Exploration & Appraisal (E&A) wells.

While adoption of campaigns to deliver cost efficient and timely decommissioning of all suspended wells has begun, significant opportunity still exists through collaboration and campaigns to drive down the per unit cost of well decommissioning.

Re-use of existing wells for CCS is now becoming a consideration/reality. The incremental cost associated with decommissioning of wells designated for CCS is a consideration in well decommissioning benchmarking.

To complement and be read in conjunction with the existing well decommissioning cost benchmarks, a secondary (new) well decommissioning benchmark (metric: days to decommission wells) has been added where applicable data exists (Section 5.5). A summary by well type is shown in Table 2.

[6] Data as of October 2021

[7] https://www.ogauthority.co.uk/data-centre/interactive-maps-and-tools/

Table 2: Well Decommissioning (days)[8] 5.1 Platform well decommissioning costs

Units: Days	Northern & Central North Sea				Southern North Sea		
	Platform well P&A	Platform well P&A via HDJU	Subsea well P&A	Subsea E&A wells	Platform well P&A	Subsea well P&A	Subsea E&A wells
P25	13	16	23	11	8	20	20
P50	21	21	31	27		26	30
P75	33	29	41	42	20	30	33

[8] Well decommissioning (days) metric are not normalised for scope variances

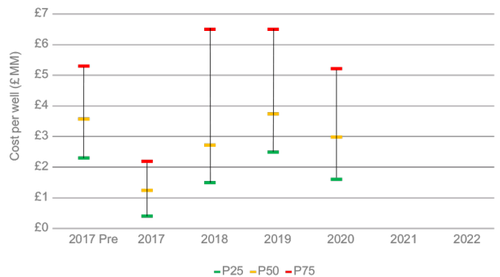
NNS & CNS

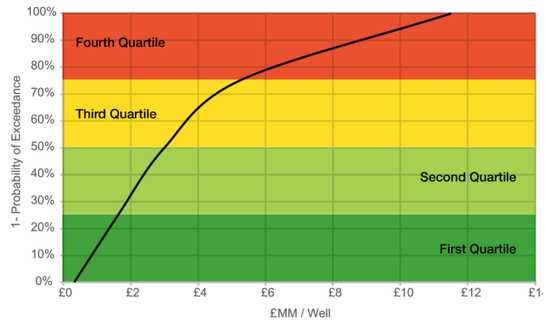
A wide range of cost outcomes continues to be observed. Metric includes costs associated with rig reactivation (where appropriate) consistent with the OGUK WBS.

Sample Size: >50

	Units: MM
P25	£1.6
P50	£3.0
P75	£5.2

Figure 7: Platform well decommissioning cost distribution: NNS & CNS





5. Well Decommissioning (cont.)

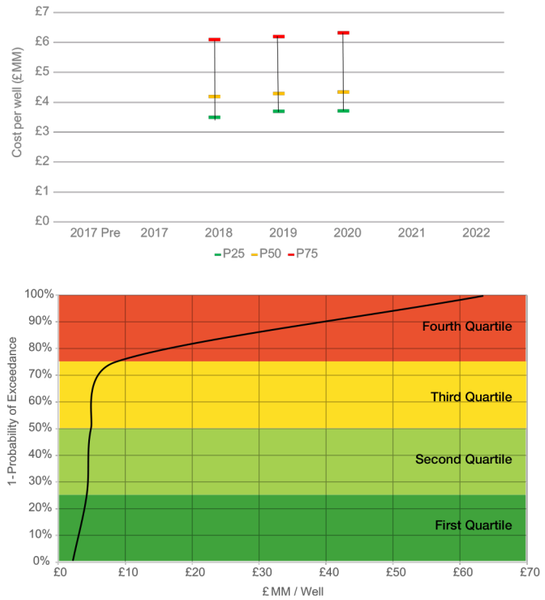
Jack-up rigs in the NNS & CNS

Metric remains largely unchanged and flat over full reporting period.

Sample Size: 31-40

	Units: MM
P25	£3.7
P50	£4.3
P75	£6.3

Figure 8: Platform well decommissioning cost distribution using jack-up rigs: NNS & CNS



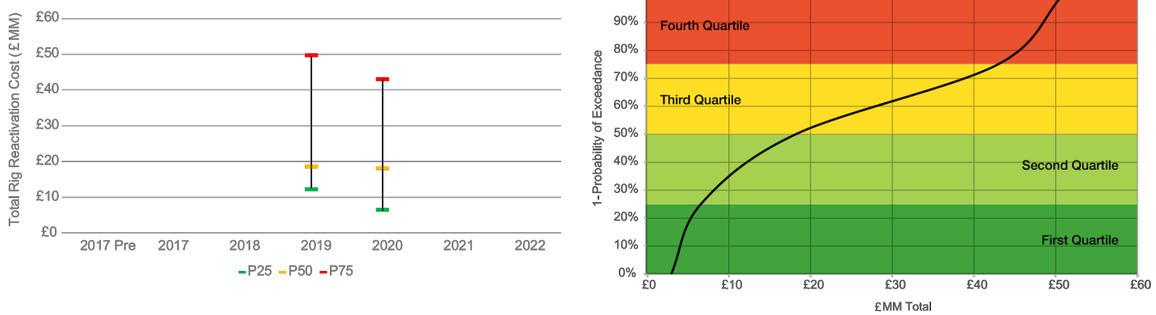
Platform rig reactivation costs: NNS & CNS

Range of cost performance influenced by a variety of factors, including direct rig scope (e.g. rig condition and time within cold stack) and indirect platform scope (e.g. ancillary/supporting services).

Sample Size: 5-10

	Units: MM
P25	£6.5
P50	£18.2

Figure 9: Platform rig reactivation cost distribution NNS & CNS



5. Well Decommissioning (cont.)

	Units: MM
P75	£42.9

SNS

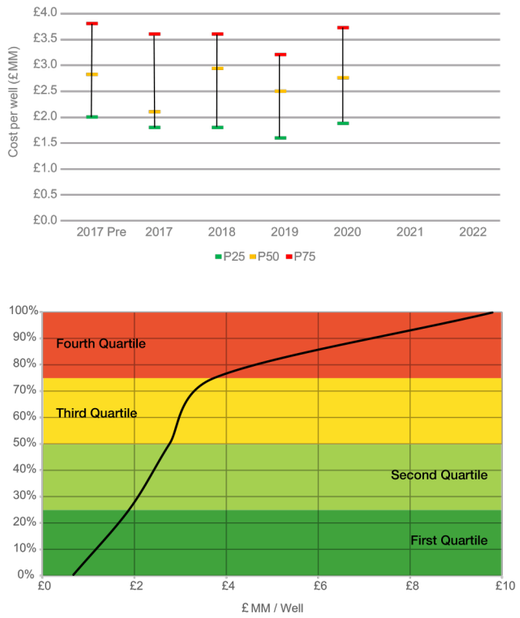
Metric reflects an increase in costs, in part attributable to decommissioning of technically unique wells plus delays incurred due to Covid-19 pandemic.

Only a marginal reduction in this benchmark is observed when consideration of well design is taken into account.

Given the increased prevalence of wells being re-used for CCS, the cost of well decommissioning to a CCS standard will become a contributory factor. As of 2020 the impact on benchmark data is not yet evident.

Sample Size: >50

Figure 10: Platform Well Decommissioning Cost Distribution: SNS



	Units: MM
P25	£1.9
P50	£2.8
P75	£3.7

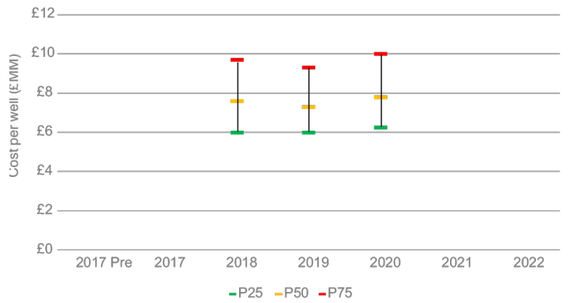
5.2 Subsea development well decommissioning costs

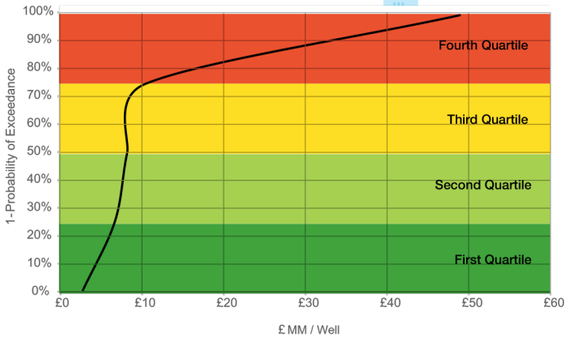
NNS & CNS

Cost uncertainty remains relatively neutral over reporting period.

Sample Size: >50

Figure 11: Subsea development well decommissioning cost distribution: NNS & CNS





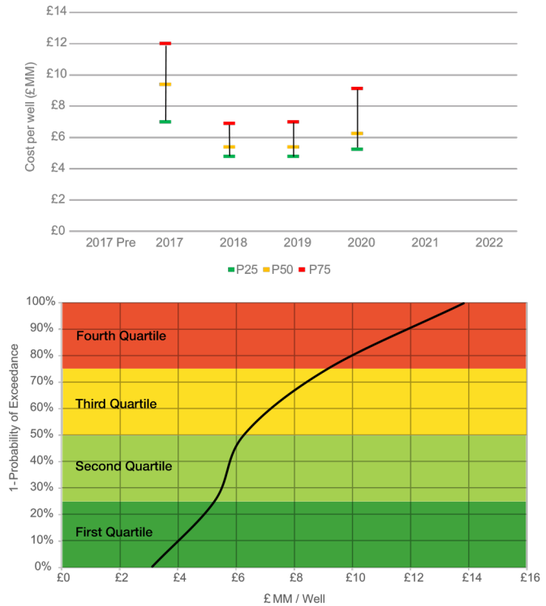
5. Well Decommissioning (cont.)

	Units: MM
P25	£6.3
P50	£7.8
P75	£10.0

SNS

Sample Size: 21-30

Figure 12: Subsea development well decommissioning cost distribution: SNS



	Units: MM
P25	£5.2
P50	£6.3
P75	£9.1

5.3 Subsea Exploration and Appraisal (E&A) well decommissioning costs

Suspended E&A wells typically have lower decommissioning costs than subsea producers and injectors, due to the absence of completion tubing and/or a simplified casing scheme. Cost data for these wells are, therefore, analysed separately to development wells.

The costs reflected here represent the full abandonment of a well i.e. 'Type 0' wells which have negligible remaining scopes are not included.

An increased focus on decommissioning of suspended E&A wells in line with the OGA suspended inactive well guidance[9] has been initiated. In support of this, adoption of campaigns is actively encouraged and promoted as a vehicle for driving cost efficient outcomes and performance improvement.

[9] Guidance for applications for suspension of inactive wells

NNS & CNS

Sample Size: 11-20

SNS & EIS

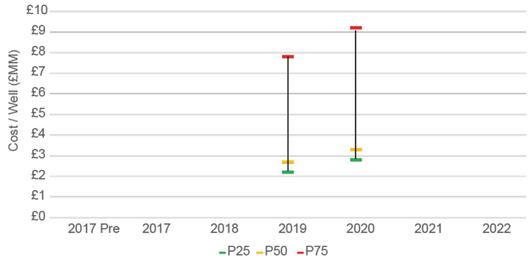
Sample Size: 5-10

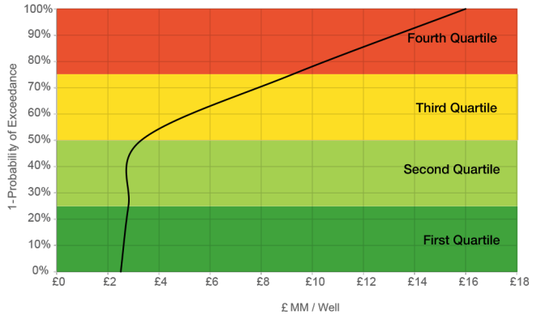
	Units: MM
P25	£2.6
P50	£4.2
P75	£6.8

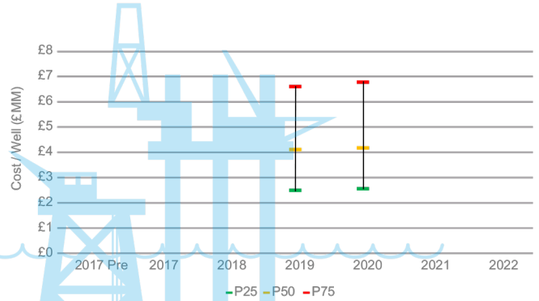
	Units: MM
P25	£2.8
P50	£3.3
P75	£9.2

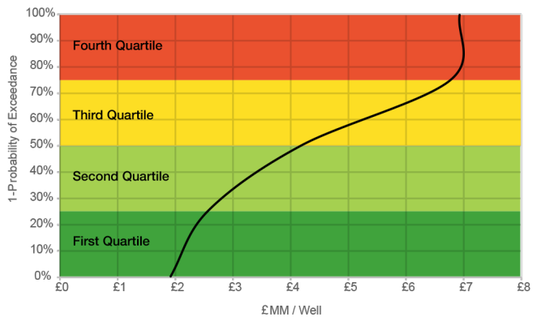
5. Well Decommissioning (cont.)

Figure 13: Subsea E&A well decommissioning cost distribution: NNS & CNS







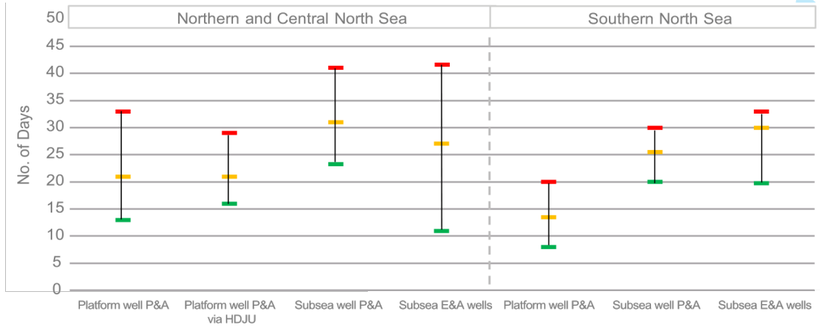


5.4 Well decommissioning (days)

New metric.

Sample Size: per table

Figure 15: Well decommissioning (days to complete P&A – all well categories)



Units: Days	Northern & Central North Sea				Southern North Sea		
	Platform well P&A	Platform well P&A via HDJU	Subsea well P&A	Subsea E&A wells	Platform well P&A	Subsea well P&A	Subsea E&A wells
Sample size	>50	21-30	>50	5-10	>50	21-30	5-10
P25	13	16	23	11	8	20	20
P50	21	21	31	27	14	26	30
P75	33	29	41	42	20	30	33

6. FPSO Removal (incl. disconnection and tow)

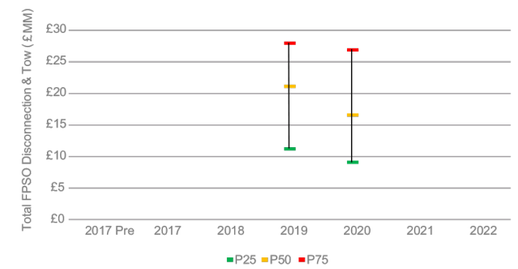
6.1 NNS & CNS

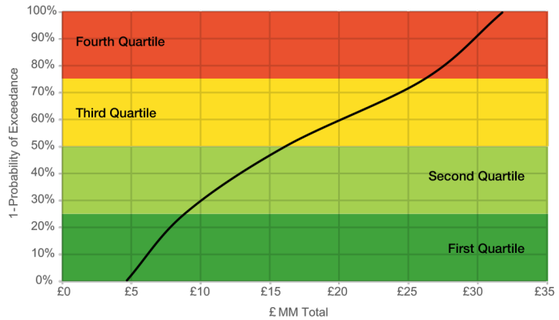
A material change in the metric is reported, however this change is influenced by the small sample size and infrequent nature of the activity across UKCS. Cost is influenced by a number of factors including scope and, or contractual terms e.g. removal of stabilisation features (mattresses); mooring recovery and transfer of FPSO ownership (where appropriate).

Sample Size: 5-10

	Units: MM
P25	£9.1
P50	£16.5
P75	£26.9

Figure 16: FPSO disconnection and tow





Appendix 1: Benchmark representation of cost performance and uncertainty

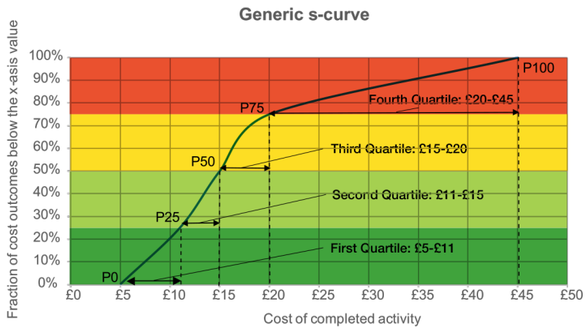
Cost information is collected from all UK decommissioning Operators. Comparable data, such as costs of decommissioning platform wells in the SNS, is screened against a data quality rule-set (see Appendix 2), sorted from large to small, and then graphed as in Figure A1 to characterise the cost variances experienced for that parameter.

Figure A1 illustrates the definition of several key benchmarking terms used. In the generic example:

- **the highest 25% of activity unit costs** were executed for between £20 and £45. Unit costs in this range are referred to as being in the **Fourth Quartile**
- **the second highest 25% of activity unit costs** were executed for between £15 and £20. Unit costs in this range are referred to as being in the **Third Quartile**
- **the second lowest 25% of activity unit costs** were executed for between £11 and £15. Unit costs in this range are referred to as being in the **Second Quartile**
- **the lowest 25% of activity unit costs** were executed for between £5 and £11. Unit costs in this range are referred to as being in the **First (or 'Top') Quartile**

The terms P25, P50 and P75 refer to the unit cost values below which 25%, 50% and 75% of these activities are executed. The simple relation between these values and the quartiles are illustrated in Figure A1.

Figure A1: Example 'S-curve' to illustrate definitions of quartiles and P-values

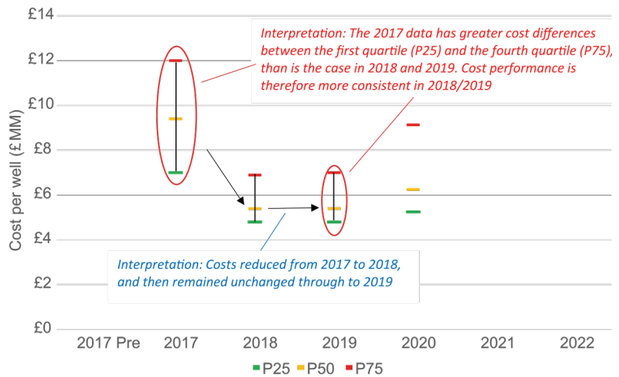


Appendix 1: Benchmark representation of cost performance and uncertainty (cont.)

Other graphs types utilised in this report to illustrate the cost performance data are cost trend graphs.

Cost trend graphs (see Figure A2 exemplar): The graphic illustrates cost and cost uncertainty trends, and includes examples of the types of insights which can be derived.

Figure A2: Example of unit cost trend graphic



Appendix 2: Data screening rule-set

A simple rule-set is utilised when selecting data for inclusion in the benchmark calculation and resulting metrics. The main purposes of the rule-set are to ensure that:

1. data is sufficiently current to be relevant
2. there are sufficient data points to create a meaningful S-curve
3. high certainty is achieved for the few benchmark categories which are not completely based on historic-costs/actuals or fixed-price contracts

The rule-set as of Quarter 2, 2021 is detailed below:

Relevant S-curves	S-curves are done by WBS, unless a subset of data from one WBS can be tracked accurately, e.g. subsea and platform well P&A within the 'Well Decommissioning' WBS.
Data validity criteria (1)	Minimum of five data points to create a benchmark. For Well P&A categories (based on large quantity of data points received): Data points collected from 2017 onwards. Consider removing historic data points after a five-year period or if there has been a significant step change in behavioural, cultural or economic factors that require this criteria to be reviewed. For all other WBS categories: If there are less than 10 data points, include all historic data points. Only after 10 data points has been reached then start considering removing historics or if there has been a significant step change in behavioural, cultural or economic factors that require this criteria to be reviewed. If removing historics do so in a chronological order so that the oldest are removed first.
Data validity criteria (2)	Data points can either be actuals where work has been fully executed by an Operator and the actual cost is known, or costs where there is a high level of certainty e.g. fixed price contract in place or high percentage of work complete. • For Running Costs, we class a high degree of certainty when either the PM spent is > 80% or when the associated platform well P&A is underway and the amount of running cost spent is >30% of the total running costs expected to be spent. • For Project Management, we class a high degree of certainty as when either the PM spent is > 80% or the total decomm estimate is certain (i.e. complete, underway, contracts placed for majority of the activity) and >50% spent. The actual PM is typically considered certain as the Operators core project team won't fluctuate significantly during a decom project. • For Isolation & Cleaning, we class a high degree of certainty when >80% of the spend has occurred. Note: the data points that are not actuals should be shown on the S-curve in grey font and the actuals should be shown in black font.

Oil & Gas Authority

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