Key Insights

Projects performance has improved in 2018

<table>
<thead>
<tr>
<th>Projects started up in 2018</th>
<th>Projects consented in 2018</th>
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</thead>
<tbody>
<tr>
<td>10 projects started up</td>
<td>20 projects consented</td>
</tr>
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</table>

- **10 projects started up**
- **20 projects consented**
- **125,000 boepd added**
- **Project UDC has dropped from £19/boe in 2013 to £8/boe in 2018**
- **BP’s Clair Ridge the one major project**
- **490 million boe added to reserves**
- **Total projects spend £6.8 billion**
- **Approved capex of £3.9 billion**
- **60% of projects delivered on time. 2011-2016 historical performance 25% deliver on time**
- **Value of NPV £5 billion (under central price assumptions)**
- **10% overspend on estimated budget historical performance 35% overspend**
- **Breakeven £20/boe**

Project activity is increasing and projects are delivering value

Project UDC has dropped 58% since 2013

For projects consented 2018 average Unit Development Cost (UDC) is £8/boe

- **Average UDC £8/boe**

Surpassed target for 2018 reserves added

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There is over 2 billion additional barrels that industry is targeting for identified projects

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Future WOS projects account for 50% of current potential resources and estimated capex. These technically challenging projects are vital to the industry. Collaborative work, technology and the supply chain are key to unlocking the full potential of this area

- **Future WOS projects account for 50% of current potential resources and estimated capex. These technically challenging projects are vital to the industry. Collaborative work, technology and the supply chain are key to unlocking the full potential of this area**

Industry needs to work collaboratively to unlock the full potential
There are Challenges

Projects need to be efficiently progressed from Discovery to FID

Projects currently in the Assessment and Authorisation Phases

- Discovery to consent
- Consent to production
- Final Investment Decision

The average time from Discovery to FID is 25 years. The average time from FID to first production is three years.

The duration from Discovery to Final Investment Decision needs to be reduced. Industry needs to focus on delivering projects to the correct level of detail for a Final Investment Decision as efficiently and quickly as possible, if UKCS is to make the most use of the existing infrastructure.

Annual projected capex spend is showing a decline from 2021

Expenditure (total by category)

- Decommissioning Costs (£ billion, 2018 prices)
- Exploration & Appraisal Costs (£ billion, 2018 prices)
- OPEX (£ billion, 2018 prices)
- CAPEX (£ billion, 2018 prices)

Currently £5 bn a year in capex spend dropping to £3 bn after 2021

The OGA’s Role

- Updated New Field Development Process – ‘Requirements for the Planning of and Consent of a UKCS Field Development’
- Supply Chain Action Plan (SCAP) helps connect operators and the supply chain
- SE-05: Robust Project Delivery Stewardship Guidance
- Developing a UKCS projects insights database – Big Data
- Engagement with industry on Project Management initiatives and sharing best practice and opportunities for project collaboration with operators and the supply chain
- Develop a consistent approach to benchmarking UKCS projects
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The successful development of new oil and gas fields is a vital part of ensuring the Maximum Economic Recovery (MER) of hydrocarbons from the UK Continental Shelf (UKCS).

To deliver the additional resources to meet the OGA’s latest production projections will require a skilled and technologically enabled workforce with the ability to deliver a significant inventory of oil and gas projects as part of an energy mix in a low carbon future.

The OGA’s Projects Insights Report, provides an overview of capital projects associated with field development plans for Oil and Gas resources in the UKCS.

The objective of this report is to provide an overview of recent projects’ performance and an insight into the project portfolio that is yet to be delivered. It is intended to share information and stimulate the uptake of good practice to deliver the production and value the industry needs to sustain its future.

2018 was a successful year for project delivery in the UKCS with 10 new projects coming onto production and 20 new developments being consented to.

Project performance is improving and the OGA and industry are aware that more can be done to ensure it continues to deliver value.

The OGA will continue to work with industry to support the successful delivery of projects in the UKCS, including working with Oil and Gas UK to implement Robust Project Delivery Guidelines and promoting the widespread use of the Engineering Construction Industry Training Board (ECITB) Collaboration Toolkit on projects.

The OGA will continue to support industry through the regulatory requirements with the updated FDP Guidance published in 2018 and will assess performance through the Stewardship Expectation process. (SE 5 Robust Project Delivery).
Executive Summary

Project delivery performance in 2018 has improved

- 10 projects were brought onto production in 2018
- Schedule and cost overruns have reduced on previous years
- The projects delivered reserves of approximately 800 mmboe and had a Capex spend of £6.8 billion
- At peak production, the additional daily production from these projects is expected to be 125k boepd
- BP Clair Ridge was the one large project that came online in 2018, other projects were subsea and infield projects delivered at pace and on budget and schedule

New projects sanctioned in 2018 deliver high value

- Activity has increased with 20 new projects consented in 2018 (seven in 2017) and are expected to deliver some £5 billion of NPV (under central price assumptions)
- Average Unit Development Cost (UDC) has dropped from £19/boe in 2013 to £8/boe
- The projects are expected to add 490 mmboe of reserves requiring some £3.9 billion in capex and total plateau production of 290,000 boepd

Activity outlook appears robust in the short term but project approval slippage remains a concern

- The OGA is tracking 22 projects in the Execution Phase (consented, and expected to come onto production within the next three years)
- Total spend for these projects is estimated at £12 billion
- Associated reserves of one billion boe and peak production of 440,000 boepd
- Two large projects, Mariner and Culzean, started production in 2019
- There is a healthy inventory of over 60 projects yet to be consented in the Assessment and Authorisation Phases. These projects deliver estimated resources over 2 billion boe and require an estimated total capex of £20 billion

Challenges

- Slippage of the planned project approval dates is a concern (44 consents estimated for 2018 slipping to 28 actual consents issued)
- Stewardship Survey 2018 shows annual projected capex dropping from £5 billion to £3 billion in 2021

Operator and industry landscape changing

- There remains significant projects to be developed in resource size and funding requirements
- A large part of the pre consent project portfolio is made up of smaller subsea and infield projects
- Pace is an issue as the window to use existing infrastructure reduces as more fields cease production (reach COP)
- As smaller operators become more prominent, funding can be a challenge
- The supply chain is taking a more active role in concept select and also providing innovative approaches to project funding
- The use of Pathfinder and Supply Chain Action Plans (SCAP) by operators through the project lifecycle is ensuring early engagement of the supply chain to support successful project delivery

Operators must work to maintain front end schedules and ensure projects are consistently delivered on time and on budget
Projects Completed in 2018

(Projects that started production in 2018)
Projects completed in 2018

Ten projects were completed and successfully started up in 2018. Four of the projects were consented between 2011 and 2014, however the remaining six projects were consented and developed in 2017 and 2018. In 2018 a number of fast track projects were delivered successfully within a two-year window.

For the 10 projects delivered in 2018 the duration from consent to first production varied from one to five years and averaged at two years. This highlights that the industry is capable of delivering projects with predictability and pace.

However, the duration from discovery to consent varied from 30 years to less than one year with an average duration of 15 years. A focus area for industry and the OGA is to support the Front End Loading (FEL) process and reduce discovery well to consent period to improve cycle time and return on investment.

Overall these projects contributed:

- Reserves of approximately 800 mmboe
- At peak production, the additional daily production from these projects is expected to be c.125k boepd
- A capex invested of some £6.8 billion

<table>
<thead>
<tr>
<th>2018</th>
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<tbody>
<tr>
<td>Number of projects</td>
</tr>
<tr>
<td>CAPEX (£ billion)</td>
</tr>
<tr>
<td>Reserves (mmboe)</td>
</tr>
</tbody>
</table>

These projects started up in 2018 and will add an additional peak daily production of 125,000 boepd
Projects Delivered 2018: Schedule/Capex

Project performance 2018

2018 – 60% of projects delivered on time

2011-2017 – 25% of projects delivered on time

Projects completed in 2018 have seen far greater cost control and a much tighter range of schedule slippage

Clair Ridge was a dominant project in terms of scale, with a series of smaller projects delivered at pace and on cost and schedule

There are still some significant improvements required to ensure all projects are successfully delivered on schedule and to budget
Subsea Project Delivered at Pace: Garten

Discovery to first oil in less than 12 months

Apache’s Garten Project

- Fast track success story
- Subsea tie-back to the Beryl Alpha
- Exploration well drilled in March 2018
- Start up in November 2018

Keys to success

- Established project team
- Existing alliance contracts
- Fully integrated the supply chain
- Early engagement with OGA support

CULTURE AND LEADERSHIP

- Set clear expectations
- Facilitate approvals
- Empower the team

CHALLENGE THE NORM

- Identify critical path
- Challenge history
- Ask what can be done to accelerate

EARLY STAKEHOLDER ENGAGEMENT

- Identify stakeholders that can influence schedule
- Explain challenge and work together to deliver

FIT FOR PURPOSE DESIGN/COLLABORATION

- Utilise existing design
- Don’t optimise the unknown
- Trust the supply chain

Apache’s Garten Project

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Keys to success

- Established project team
- Existing alliance contracts
- Fully integrated the supply chain
- Early engagement with OGA support
There were significant reserves and production added from the 10 projects brought online in 2018.

- Reserves of approximately 800 mmboe
- At peak production, the additional daily production from these projects is expected to be c.125k boepd
- The Clair Ridge project dominated UKCS reserve adds and production volumes
- A number of smaller projects represents an important inventory of projects contributing to the sustainability of the UKCS

Projects Online by Area

Case Study: BP Clair Ridge

BP’s Clair Ridge was the largest field to start up in 2018. Situated West of Shetland North of the Clair platform, BP is targeting 640 million barrels of recoverable reserves. The multi-billion-pound investment includes two new bridge-linked platforms. The project was consented in 2011 with installation of the two platforms in 2016. It is a significant project for the UKCS and adds much needed reserves. BP has taken the learnings from Clair Ridge into its approach to Clair South, the potential next phase in the development.
Projects Delivered 2018: Types

Most projects that started up in 2018 were smaller subsea tie-back scopes that were on time and on budget.

- Subsea tie-back and brownfield projects tended to be more predictable in outcome
- Larger FPSO projects were delivered under budget with some schedule slippage
- Larger scope projects with major platform scope incurred cost overrun and schedule slippage

Project Types

- Platform 10%
- Drilling 10%
- Brownfield 10%
- Subsea 50%
- FPSO 20%

Case Study:
Premier’s Greater Catcher Area – Burgman and Varadero

Burgman and Varadero, part of the Catcher project including a new FPSO and three drill centres. This project took three years from consent to first production for a new build FPSO and subsea scope. The project was considered a major success by Premier delivered on schedule and 30% under budget.

Premier’s Catcher FPSO was installed and operational in Dec 2017. There was a phased start up: Catcher started in December 2017 followed by Varadero in Jan 2018 and Burgman in May 2018.
Projects in Execute 2018
Projects in Execute 2018

There is currently significant investment in UKCS projects with some £12 billion being invested in over 20 projects still under construction. These projects were consented between 2013 and 2018 are expected to come onto production over the next three years.

- Shell, BP, Total and Equinor have active projects along with a range of mid and small caps
- There were 26 projects in the Execute Phase and under construction in 2018
- Six of these projects were consented between 2013 to 2017 and represent a significant portion of that investment
- 20 projects consented in 2018 represent a significant upturn in activity
- Four projects consented in 2018 were successful fast track projects that were brought online in 2018

The future for the UKCS is a large portfolio of medium and small projects adding value and barrels

<table>
<thead>
<tr>
<th>Years of sanction</th>
<th>2013-17</th>
<th>2018</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of projects</td>
<td>6</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>CAPEX (£ billion)</td>
<td>8.4</td>
<td>3.9</td>
<td>12</td>
</tr>
<tr>
<td>Reserves (mmboe)</td>
<td>620</td>
<td>490</td>
<td>1110</td>
</tr>
</tbody>
</table>
Projects in the Execute Phase at the end of 2018 are expected to deliver:

• 1.1 billion boe of reserve added
• 400,000 boepd at peak production, which represents 20% of the UKCS daily production
• The total capex spend for these projects is £12 billion
• The majority of this spend is Mariner and Culzean and these projects start up in 2019

Case Study: Total – Culzean Project

Operated by Total, with co-venturers BP and JX Nippon, the Culzean High-Pressure/High-Temperature (HP/HT) gas condensate project in the Central North Sea came online in 2019. Following sanction in 2015, first gas was achieved with a good safety record, significantly under budget and ahead of schedule in June 2019. The project includes a series of three bridge-linked platforms comprising a 12-slot wellhead platform, a central processing facility and living quarters capable of accommodating 120 people. A dedicated floating storage and offload (FSO) vessel, Ailsa, is moored some 4km away.

The operator worked effectively to provide an execution model with a balanced risk profile for all parties, supporting positive development in investment costs. Those efforts have been extremely successful and the capital costs of the project have been reduced by 10% from the estimated total at sanction. This is a result of robust upfront design, first-class project planning and execution, drilling efficiency and supply chain deflation.

First gas from Culzean was achieved on 7 June 2019 and the field is projected to deliver up to 5% of total UK gas consumption when production is at plateau in 2020.
Projects in Execute 2018: Project Type

The following indicates the time taken from project consent to first productions or projects in Execute:

- FPSO 2-4 years
- Subsea 2-3 years
- Platform 2-4 years
- The majority of projects in the Execute Phase are subsea tie-backs
- There are three new platform projects – Mariner, Culzean (online 2019) and Tolmount (NUI)
- There are two FPSOs – Lancaster (online 2019) and Penguin:
  - Penguin is a new build Sevan FPSO built in China
  - Hurricane energy is leasing FPSO as part of a phased development concept for Lancaster
The majority of the projects currently in execution are in the CNS and NNS areas. This is reflected in the reserves with 85% of the additional volumes coming from these two areas.
Value Insights

Projects Consented 2018
Highly encouraging turnaround in investment outlook

### Projects Consented 2018

- **Number of projects**: 20
- **CAPEX (£ billion)**: 3.9
- **Reserves (mmboe)**: 490
- **NPV10 (£ billion)**: 5.0
- **UDC (£/boe) (median average)**: 7
- **Breakeven (£/boe) (median average)**: 20
- **Actual consents FDPS**: 8
  - **FDPA**: 20

**Actual 6 FDPA's associated with the Dunlin Bypass Project**

- West Brae FDPA
- Ballindalloch
- Garten
- Penguins FDPA
- Dunlin Bypass

**Tolmount**

- Received letter of approval.
- No consent as environment statement still to be approved by BEIS.
Projects Consented 2018: Activity

There was a significant increase in project activity in 2018 with 20 projects consented. This represented a major step in Maximising Economic Recovery in the UKCS and reflected the confidence in the UKCS:

- These projects are expected to generate some £5 billion of value (under central price assumptions)
- Require capex funding of approximately £3.9 billion
- Deliver estimated reserves of 490 mmboe
- Have an average unit development cost of £8/boe

This reflects a major increase in activity from 2017, when seven projects were consented with a total capex of £700 million and reserves of 100 mmboe.

There is significant value generation in UK projects. Through a combination of larger more material projects and smaller infrastructure led projects.

Consistently delivering to the consented FDP is a major value enabler.

In 2018 there were a total of 28 FDPs/FDPAs consented. This translated to 20 active production adding projects.

Operators investing in high quality projects in 2018 were dominated by the major oil companies, however increasing presence of mid and smaller cap companies have been active in the UKCS.

In 2019 and 2020 the OGA expects to see a similar level of activity
Projects Consented 2018: Activity

Operators sanctioning projects in 2018

- Majors 10
- 6 Small
- 4 Mid Cap

The chart shows the number of projects consented by operator

Case Study: Shell’s Penguins, Sevan Circular FPSO

- Deployment of ‘standardised’ Sevan Marine technology
- The Penguin FPSO will be the twelfth circular Sevan and the second of the Sevan 400 design
- Verified lowest cost solution. Turret absence, compact design
- Less downtime with more favourable motions compared to ship-shaped FPSOs
- New technology adopted
  - VR technology in design and engineering
  - Technologies embedded in EPC scope
  - 4D construction
  - Creating a digital twin

21st century asset for Shell in the North Sea
A wide range of projects were consented to in 2018, from small subsea tie-backs to large new build projects.

- The largest project represented some 100 mmboe and the smallest 5 mmboe of reserve adds
- Materiality NPV is generated through scale and size of resources
- In all projects value is generated and rates of return (IRR) are competitive across the global fiscal arena

Projects Consented 2018

The quality of the projects consented and the opportunities that still exist in the UKCS represent a considerable opportunity for further activity and value generation.

- Projects approved in 2018 had an average Unit Development Cost (Real) of £8/boe
- 58% reduction in UDC from 2013, from £19/boe to £8/boe
- There has been a significant year on year reduction in average UDC for consented projects from 2013 to 2018

Unit Development Cost (£/boe)

As an indicator for future investment, value is being generated at UDC up to £13/boe
Projects Consented 2018

The figures highlight the range in unit operating costs and how they are related to overall opex and production levels. There has been significant improvement in reducing unit operating costs for projects consented in 2018.

- UOC for consented projects in 2018 is £9/boe
- UOC of the 2018 projects is 26% lower than that consented in 2017 UKCS
- Project operating costs indicate a healthy portfolio where 50% of projects have UOC less than 10 £/boe
- The subsea projects that tie back to existing infrastructure will also reduce the opex of the existing producing asset, creating additional value

Breakeven Price Range by Area (£/boe)

<table>
<thead>
<tr>
<th>Area</th>
<th>Low</th>
<th>Median</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS</td>
<td>13.2</td>
<td>20.6</td>
<td>32.3</td>
</tr>
<tr>
<td>NNS &amp; WOS</td>
<td>7.1</td>
<td>29.2</td>
<td>40.4</td>
</tr>
</tbody>
</table>

Breakeven Price Range by project type (£/boe)

<table>
<thead>
<tr>
<th>Type</th>
<th>Low</th>
<th>Median</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDPA</td>
<td>11.5</td>
<td>24.1</td>
<td>40.4</td>
</tr>
<tr>
<td>FDP</td>
<td>7.1</td>
<td>19.9</td>
<td>32.3</td>
</tr>
</tbody>
</table>

Breakeven Price = total capex + total opex + total decom/total economic reserves (discounted @10% real)

UOC Range by Area (£/boe)

<table>
<thead>
<tr>
<th>Area</th>
<th>Low</th>
<th>Median</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS</td>
<td>1.4</td>
<td>9.4</td>
<td>20.7</td>
</tr>
<tr>
<td>NNS &amp; WOS</td>
<td>3.1</td>
<td>6.8</td>
<td>9.4</td>
</tr>
</tbody>
</table>

Note: SNS data not included due to size of data set
Project Portfolio

All Projects in the Assessment and Authorisation Phases
The OGA is tracking over 60 projects in the Assessment and Authorisation Phases (Pre Final Investment Decision). These projects may be consented over the next three years with new projects added as exploration and resource maturation opportunities arise.

- The full projects under review contain an estimated resource over two billion boe
- Requires an estimated total capex of £20 billion
- The OGA estimates approving 20 to 30 FDPs/FDPAs per year over the next two years
- Annual capex requirements of two to five billion with associated resources in the range of 200 to 500 million boe per year
- These projects represent a subset of the full contingent resource inventory in the UKCS

FDP Process and the Project Cycle

Projects in the Assessment and Authorisation Phases are pre Final Investment Decision (FID) and Field Development Plan (FDP) consent.

The Assessment Phase refers to the Concept Select stage where an operator will screen different options to assess the most feasible method of developing the field. Once a concept is selected and approved, the project moves to the Authorisation Phase.

The Authorisation Phase follows selection of a concept, refining the solution and proving value ahead of a final investment decision. This is defined as the FEED stage (Front End Engineering Design) or Optimise Define stage.
Projects in the Assessment and Authorisation Phases

There is a healthy portfolio of discovered undeveloped resources that are both licensed and under active consideration by the operators. It is expected these projects will be developed in accordance with the licence obligations. The portfolio is more mature in the Authorisation stage where project activities are leading up to FDP consent by the OGA.

In 2020 and beyond plans are less mature and uncertainty as to the consent date is higher.

- The current estimate for consented projects in 2019 is between 15 and 25
- With estimated associated reserves of 200 to 400 mmboe
- Requiring capex of £1 billion to £2 billion

Number of FDP/FDPA consents by year

Resources mmboe by consent year

Capex £ billion by consent year

Note: All data as per OGA view Q1 2019
Cumulative Resources and Capex

The reserves and capex requirements show cumulative amounts for the full portfolio of projects in the Assessment and Authorisation Phases.

Approximately 50% of the capex and resources are associated with West of Shetland developments.

The West of Shetland holds the largest potential developments.

There is a large inventory of smaller projects that will contribute to meeting resource maturation goals for the UKCS.

However the annual Stewardship Survey 2018 data shows total projected capex spend is showing a decline from 2021.
Risks to delivery: Slippage of Final Investment Decision

In 2018 a significant number of projects delayed their Final Investment Decision. The reasons for schedule slippage include:

- Funding
- Well data
- Assets sold or licence transferred
- Operator takes longer to finish FEED

Operators need to ensure that the Front End Engineering is thorough and robust but they must also drive to maintain the timeline that they have committed to achieving.

The OGA is tracking Second Term Licence milestones as part of its drive for continuous improvement to support MERUK, and will require operators to demonstrate how they are working to maintain their schedule to Final Investment Decision.

This graph represents the projects being tracked by the OGA (in the Assessment and Authorisation Phases, excluding FDPAs).

- There is a wide variation in duration from exploration well discovery to consent
- Project delivery duration is much less variable and indicates a positive UKCS delivery capability

Projects currently in the Assessment and Authorisation Phases

25 years average duration from discovery to FID

Industry and the OGA need to focus on reducing the duration from drilling the discovery well to making a Final Investment Decision
Projects in the Authorisation Phase
Projects in the Authorisation Phase

The Authorisation Phase is important for the OGA and industry as this stage indicates a concept has been selected and the project is moving to a Final Investment Decision and development consent.

- The OGA is tracking over 20 projects in the Authorisation Phase
- Estimated capex for these projects is almost £3.5 billion
- Resource adds for these projects are estimated at 430 mmboe

As an indicator to a final approved investment decision, UDC (undiscounted) are below £20/boe and would appear to have an optimistic outlook.

- As a benchmark for competitive investment, in 2018 all projects consented had a UDC below £13/boe

The Authorisation Phase projects UDC £/boe

Operator size in the Authorisation Phase – number of projects

The landscape of operators requiring funding for projects is shifting to mid and smaller cap organisations who hold significant resources.

Creaming curves

Project Capex (£3.5 billion)

Project Resources (430 mmboe)
Projects in the Authorisation Phase: By Area

New Field FDP activity remains positive and FDPA activity indicates further development of existing fields is being progressed.

There remains a significant reliance of existing infrastructure to support these projects.

Project Types by area

Project Resources by area

Project Capex by area
Projects in the Assessment Phase
Projects in the Assessment Phase

Projects in the Assessment Phase are under appraisal prior to Concept Select and represent a longer term outlook. These projects are less mature and the schedules less predictable than projects in the Authorisation Phase.

- The OGA is tracking approximately 40 projects in the Assessment Phase
- Estimated capex for these projects is almost £17 billion
- Resource adds for these projects are estimated at 1.6 billion boe

The outlook to final approved investment decision is much less certain at this stage of project life cycle.

- Most of the projects show a UDC below £20/boe
- The range of uncertainty around the capex and reserves is much greater at the Assessment Phase
- Operators are working to develop concepts that meet MER and corporate funding thresholds

Operator size in the Assessment Phase – number of projects

At the Assessment Phase, a significant portion of resources are held with the majors who are well funded. However the small and mid cap operators may require funding to ensure projects progress.

Creaming curves

Total estimated capex spend for the projects under review are £17 billion

Total estimated resources for the projects under review are 1.6 billion boe
The OGA is tracking almost 40 projects in the Assessment Phase with operators adding more projects as new exploration discoveries are added.

- WOS projects dominate in terms of scale
- The majority of the Assessment Phase projects are subsea tie-backs where a significant potential remains in a large number of smaller projects

### Project Types by area

![Project Types by area chart]

### Project Resources by area

![Project Resources by area chart]

### Project Capex by area

![Project Capex by area chart]
Projects Lessons Update
The OGA completed a lessons learned study in 2017 and issued a report, Lessons Learned from UKCS Oil and Gas Projects 2011-2016.

The lessons in the report were categorised under the five focus areas: Behaviours, Organisation, Project Management, Front End Loading, Execution.

Under these categories the main lessons from the OGA’s 2017 report have been summarised in the following section of the report. Key updates have been added to show industry has taken on board the lessons since the report was published.

The OGA has updated the FDP Guidance (Requirements for the Planning and Consent of a UKCS Field Development) taking into account some of the key findings of the study.
### Projects Lessons – Behaviours

#### 2011-2016 Findings

1. Some operators employ more staff to find problems with contractors; so contractors employ more people to counteract this ‘attention’.

2. Often notable difference between the ‘aspiration of the client’ and realism of what can be done.

3. Better integration and alignment with client – with focus on ‘softer’ areas.

#### Industry Adoption

1. The operators’ senior management, project teams and the supply chain understand and agree the project drivers. There is open and honest dialogue on challenges and the teams are working together to find solutions.

2. The use of the ECITB collaboration toolkit is common throughout the industry and is delivering benefits to the industry by reducing inefficiency and creating dynamic working teams aligned to shared goals.

### Project Collaboration Toolkit

The ECITB’s Project Collaboration Toolkit (PCT) was created to help the UK’s oil and gas industry improve its efficiency in a competitive global market by sharing skills and expertise to keep costs down. The toolkit offers advice and guidance to companies looking to work together more efficiently. The toolkit shares industry best practice and guides clients and contractors on joint working. The PCT is now used across the industry and is a check during the OGA’s Tier 1 meeting with operators. Projects teams are seeing the benefits where collaborative working has improved efficiency and kept costs down.
Projects Lessons – Organisation

2011-2016 Findings

1. There is a strong relationship between Project execution efficiency and the people employed to deliver it.

2. Delivery organisations are not always provided sufficient delegated authority to manage their Project effectively.

3. Time spent investing in aligning project team, partners, supply chain and regulators at the beginning is time well spent.

4. Continuity of Project teams

5. Involve the supply chain early, develop co-operation and strive to work as one team. Building a single Project-wide culture helps deliver successful projects.

6. There has been a trend of increasing owner’s team costs over the last 10 years and an increasing reliance on temporary agency staff in both operator and engineering contractor workforce.

Industry Adoption

1. Early engagement of the supply chain, and a focus on continuity and alignment of project teams. There has been a drive to reduce owner costs and spend time to create a ‘one’ team culture at each stage of the project.

2. There is now a focus on the experience and project specific training for the project team and an understanding that it is the people who deliver a successful project supported by a robust process.
Project Lessons Update – Project Management

2011-2016 Findings

1. Incomplete Front End Loading (FEL) at consent e.g. use probabilistic costs/schedules rather than deterministic.

2. Create a robust, resourced cascading Project schedule by competent planners. Apply strict Management of Change – for schedule as well as scope.

3. Project team is ultimately responsible for interface management so don’t delegate it.

4. Whilst there has been an increase in processes, tools, project controls, supervision and engineering man-hours there is no obvious improvement in the ability to predict outcomes than in the past.

Industry Adoption

1. Operators have reviewed their project delivery process and procedures and have created streamlined processes aligned to efficient agile project delivery.

1. Operators are now using industry standards and supply chain led solutions, ensuring the project captures the best practices and optimal solutions for successful project delivery.
Project Management Case Study

ECITB Project Collaboration Toolkit Case Study

Brent Bravo case study – Shell

Outcomes

Through the principles of collaboration, the project team size was reduced by 20% and significant improvements were achieved in non-productive activities, productive day and in productivity. As a consequence, the project was delivered within a very tight 11-month period and the base workscope delivered significantly under budget, allowing additional workscopes to be included without any additional funds required. Overall, the application of lessons learned combined with the implementation of a highly collaborative approach to delivery of the work, resulted in a reduction in like for like removal preparation costs vs Delta of circa 70%.

Conclusion

While lessons were learned from the previous Brent Delta topsides project that helped simplify the Bravo workscopes, a significant contribution to the success of this Bravo achievement was the effective implementation of the **Project Collaboration Toolkit**, resulting in the creation of a highly collaborative, effective and robust project team delivering improvements in work efficiencies, with significant accompanying cost savings.

The structure and value of the **Project Collaboration Toolkit** has been validated by the performance of the Shell Brent Bravo decommissioning project team. The project was achieved ahead of schedule with significant cost savings.
# Project Lessons Update – Front End loading

## 2011-2016 Findings

1. Many ‘schedule’ driven (not cost driven) Projects started with incomplete scope and unclear objectives/priorities. A number of Projects clearly ‘limbo’d under the bar’ and subsequently delivered late and over budget.

2. There is a high risk to achieving outcomes if key resources (e.g. rigs, DSVs, long leads etc.) are not tied down at consent (something exacerbated in a heated market).

3. If you choose new/unfamiliar contractors/vendors, build a new project team, have significant first of a kind elements then build in sufficient cost/schedule contingencies at Project Sanction.

## Industry Adoption

1. For Final Investment Decision (FID) project teams have created risked, deterministic schedules which have been benchmarked.

2. Scopes are tied down at the end of FEED and risk registers highlight uncertainties to manage through detailed design.

3. Some projects are delayed due to financing issues which could then force the project team to rush to recover the schedule driving poor behaviours.

4. Some FEED scopes and schedules may be streamlined to meet milestones dates.
Project Lessons Update – Execution

2011-2016 Findings

Finish FEED before starting detailed design; finish detailed design before starting construction OR aggressively manage the cost/schedule/organisational risk; and include appropriate contingencies. An alternative view is that fast tracking can be effective if the risks and uncertainties are understood and accounted for in the estimates and managed accordingly.

Risk management must consider commercial/organisational risk in addition to technical.

Scope growth from vendor packages and specifically weight control from FEED to detailed design is a recurring challenge (insufficient allowances included at consent).

Transition Management: most projects underestimate offshore hook-up and commissioning effort. Fabrication is rarely complete when facilities are sent offshore.

Industry Adoption

1. Issues are being identified early in detail and teams and the supply chain are working together to find effective solutions.

2. The teams that worked on the FEED are transitioning into detailed design and this ensures ownership and understanding on the scope.

3. Change Management is being instigated in a robust and thorough method leading to good decision making based on the correct information and impact.
The OGA Role
The OGA’s role to Support Successful Project Delivery

Even though project approvals have increased in 2018, further investment at pace is required to deliver additional resources.

To ensure all projects deliver MERUK they need to have been tested rigorously during the Assessment and Authorisation Phases and delivered predictably through the Execution Phase.

If industry can consistently deliver projects successfully, on time and on budget with the predicted outcome, further investment and more projects will be approved.

To support the industry to deliver projects successfully the OGA will focus in the following areas:

1. Continued Stewardship utilising the SE5 Robust Project Delivery Stewardship expectation
2. Clarity of requirements to Field development consents through the guidance ‘Requirements for the Planning of and Consent of a UKCS Field Development’
3. Developing a UKCS projects insights database to leverage knowledge and promote best practices
4. Develop a consistent approach to benchmarking UKCS projects and setting industry targets
5. Support and engage with industry on Project Management initiatives and sharing best practice and opportunities for project collaboration with operators and the supply chain
Robust Project Delivery

The OGA expects that operators will efficiently manage a project portfolio and deliver projects to the schedule, cost and production performance as per the consented Field Development Plan (or addendum).

The OGA will continue to assess that expectation through the Asset Stewardship processes. The Stewardship Expectation SE 5 Robust Project Delivery was recently updated to better support successful project delivery.

This Expectation looks to help deliver a consistent approach to project delivery across the UKCS.

To support this operators should:

1. Demonstrate how the project portfolio is managed
2. Demonstrate the use of an effective organisation with Governance and Project Management systems supported by accountable and competent leadership to successfully deliver projects
3. Demonstrate sufficient front-end preparation and benchmarking has been completed prior to project sanction
4. Demonstrate a clear focus in maintaining value in the execution phase of the project
Guidance Planning and Consent to Field Development Plan

Requirements for the Planning of and Consent of a UKCS Field Development.

The OGA updated the FDP Guidance which generally reflects operators’ project delivery gate process.

A key focus is on earlier engagement with the OGA during the Assessment Phase (concept select stage). This ensures the OGA is well placed to support the operators to meet the requirements of MERUK.

The guidance update included the requirements for the Supply Chain Action Plan. Earlier engagement of the supply chain has been a key area of improvement in project delivery. Operators are updating Pathfinder to connect with the supply chain to highlight workscopes and activity from exploration through to decommissioning.

The OGA will continue to support and input during new field development planning and implementation as per the FDP Roadmap.
The OGA and the OGTC are working with industry to transform how project experience and data can be leveraged to improve performance.

- Moving from a world where valuable data is archived leaving lists of lessons learned
- Towards an environment where Project Managers are provided with real time insights that are highly relevant to their project and can identify potential problems and mitigate them in advance

The OGA and OGTC will look to work with industry to:

1. Engage with industry on the idea and investigate the appetite to develop the concept
2. Create a data trust
3. Gather data to populate a graph database
4. Enable users to use the graph database to support projects to identify lessons, risks, issues, change, QA observations, and better define cost and schedule. Ultimately moving towards machine learning capabilities
5. Provide a secure and scalable foundation for AI to begin to identify early warnings and the predisposition of certain projects to variance
Industry Project Initiatives

The OGA will continue to work with industry to develop a consistent approach to project delivery.

This will involve:

• Engagement with industry on Project Management initiatives and sharing best practice and opportunities for project collaboration with operators and the supply chain

• The OGA will continue to use the Supply Chain Action Plan (SCAP) which supports the collaborative early engagement of the supply chain in project development

• The OGA will also work within industry to enhance the use of the Pathfinder online tool for operators to highlight their project requirements to the supply chain to further support a collaborative and pro-active approach

The OGA will support the operators and the supply chain to connect and collaborate to help deliver value

The OGTC is working with industry to develop technologies to support and improve project delivery

The ECITB has developed the collaboration toolkit and will work to develop training for Project Managers

The OGUK will issue industry guidance on robust project delivery
All projects should be benchmarked ahead of final investment decision. Benchmarking can provide insights into the robustness of the FEED work and key areas of focus as the project moves into the execution phase.

Across industry there is a varied approach to benchmarking, including a range of external providers. Some projects rely on internal independent benchmarking assessments and peer reviews. The OGA will look to work with industry to harness this data to support consistent project delivery.

The OGA will look to work with industry to develop a consistent approach to benchmarking UKCS projects.

- Determine what to benchmark
- Feedback into new projects best practices, insights and lessons
- Set targets for project performance
- Support action plan
- Define metrics
- Collect data
- Identify strengths and weaknesses and provide feedback
- Identify reasons for weakness
- Develop action plan
- Complete project close out benchmarking

Determine data collection methodology
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