Oil & Gas Authority

Investor Overview 2018

Contents

Front cover: Courtesy of Ping Petroleum

Executive summary

Since 2014 the UKCS has undergone a transformational change. The UKCS, like other basins, was hit hard by the downturn in oil price in 2016. However, the last two years have demonstrated the resilience of this basin and the skill and determination of the companies and people working in it. Instead of decline, the UKCS has seen production and production efficiency increase year-on-year whilst operating costs almost halved.

HM Treasury have played their part, creating a globally competitive fiscal regime, and the capital markets have been active with record levels of M&A activity; including the first sustained move by private equity into the UKCS and the change in midstream ownership away from E&P companies to specialist infrastructure funds.

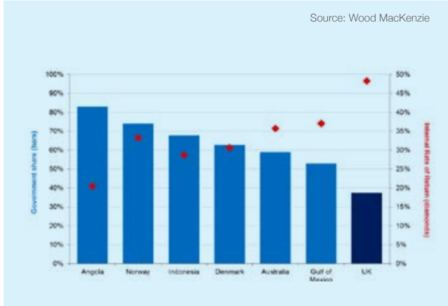
Since its inception in 2015, the OGA has been at the centre of all this activity, working with government, operators, the supply chain and investors to drive and coordinate much needed change and remove barriers to investment.

Two years after the oil price downturn, the UKCS has turned a corner. The OGA has had two successful licensing rounds, demonstrating both the continuing exploration potential in the basin and the value of over 3 billion barrels of oil equivalent (boe) of discovered resources. Vision 2035 aims to deliver an additional £140 billion of gross revenues from the UKCS with an additional 3.7 billion boe already added to 2015 projections.

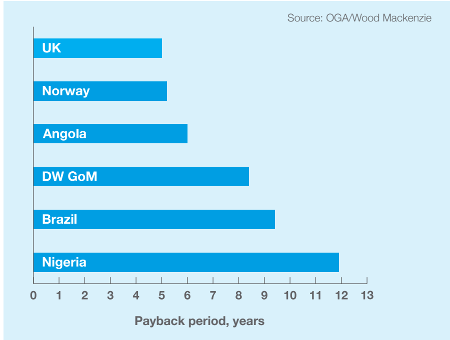
The UKCS has also seen innovation from new and established companies, finding ways to finance developments, and increase production and sustainably reduce costs of operating and decommissioning old fields and infrastructure. New innovative business models and the better use of new and existing technology have played their part in reducing costs.

The OGA stands ready to support companies with plans to maximise the value of the UK's remaining reserves, and encourages all investors to take a second look at the UKCS.

Global fiscal comparison



Payback periods



Source: OGA Data The OGA does not provide endorsements or investment recommendations

The UKCS is an attractive investment proposition

Substantial potential:

UKCS offers significant value for investors

West of Shetland

- Deepwater, subsea development hub, least developed region
- High number of exploration licences awarded in 30th Round with 75% increase in licensed acreage
- Potential to unlock large oil resource volumes by making gas export available.
- Significant gas potential with over 10TCF* of resource base (*Trillion cubic feet)

Northern North Sea

- Mature area with well established fields and infrastructure
- Recent field redevelopments e.g. Penguins (Shell)
- Incremental gas resource opportunities (Quad 9 Gas)
- Opportunities for decommissioning specialists

Central North Sea

- Significant number of marginal discoveries
- Mature, near field infrastructure and export capacity available
- Number of recent exploration successes

Southern North Sea/East Irish Sea

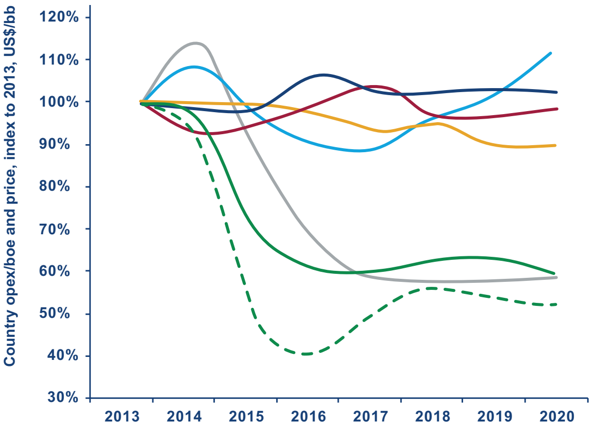
- Opportunity to deliver new developments and leverage existing field developments
- Potential to deploy new technology to unlock tight gas
- Collaborative relationship with renewables sector
- Significant decommissioning projects in near to mid term

Diverse opportunities for diverse investors

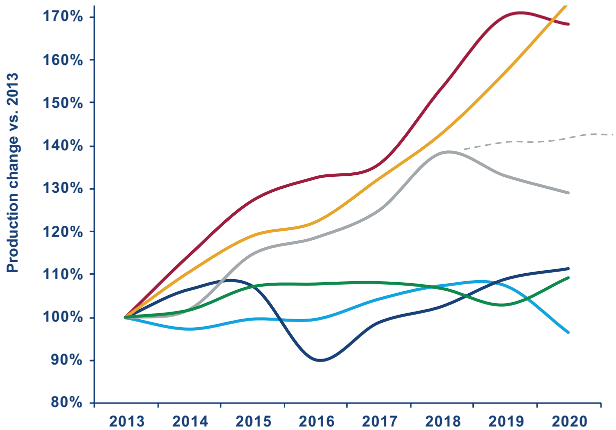
The UK is globally competitive, generating value for investors

UK lifting and development costs have reduced on a per barrel basis since 2012 making the UK globally competitive

Angola | Nigeria | UK | US(GoM Deepwater) | Brazil | Norway | Brent Price



Source: OGA/Wood Mackenzie



Source: OGA/Wood Mackenzie

Cumulative UK production from 2016-2050 is now projected to be 3.7 billion boe more than the 2015 projection due to:

- Sustained Production Efficiency
- Cost efficiencies to extend asset life
- Improved asset stewardship, standards and behaviours
- Exploration successes
- Start up of 33 new fields since 2014

Basin Improvements delivering high value opportunities

Fiscal measures

Package of measures worth £1.3 billion and £1 billion introduced 2015 and 2016 in line with the UK Government's *Driving Investment* principles

2 x £20 million for new geophysical surveys in 2015 & 2016 and £5m for exploration data in 2017*

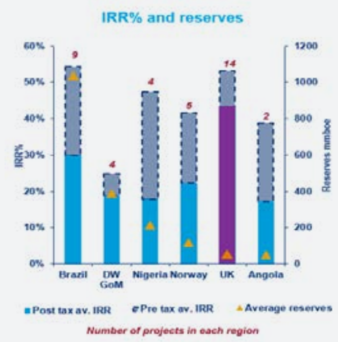
Introduction of new basin-wide Investment Allowance

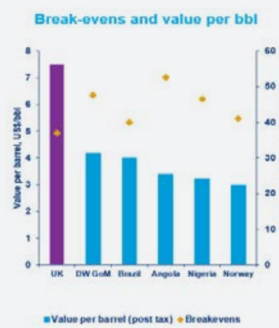
Supplementary Charge reduced from 32% to 10%

Petroleum Revenue Tax permanently reduced from 50% to 0%

Introduction of transferable tax history from 1 November 2018 to give buyers increased certainty they can get tax relief for their decommissioning costs

Recent UK Developments are internationally competitive





Source: OGA/Wood Mackenzie

UK post tax IRR is 13% higher than the next highest basin

MER UK Forum and Task Forces: the OGA and industry jointly committed to maintaining current cost disciplines

Recent investments in UK projects have delivered world-class returns in terms of breakeven and value per barrel

OGA's marginal discoveries initiative illustrates the continuing potential of the UK

* (contracts awarded in 2018)

Fiscal regime that delivers significant value for investors

Mitigating barriers to investment

The OGA continues work to deliver value for investors

Basin maturity

The UKCS has significant undeveloped discovered resource and exploration potential

Oil and gas is competing with renewables for capital

OGA considering the opportunities that the energy transition will present for the UKCS

UKCS operating costs

Lifting and development costs substantially reduced

Access to infrastructure

A voluntary code of practice exists to help negotiations and the OGA has powers to resolve disputes

Decom

The OGA is working with industry to develop strategic decommissioning plans to reduce cost

UKCS exploration

The OGA provides flexible licensing terms and no-cost data to industry offshore

UKCS operating environment

Asset stewardship is driving improvements and highlighting opportunities

Access to capital

$8bn of M&A completed in 2017 with an innovative approach to securing capital

2017 UKCS Deal activity – bubbles represent size of deal

Estimated $8bn* worth of UKCS transactions announced.

>150 MMboe

50-150 MMboe

<50 MMboe

The OGA does not provide endorsements or investment recommendations. Some transactions are still subject to OGA and other regulatory consideration, their inclusion on this slide is not an indication of the outcome of that consideration.

* Source: Wood Mackenzie

Systematically removing barriers to deliver value for investors

UKCS commercial landscape

The OGA supports and encourages innovation in new models to finance UKCS operations

Vendor Finance

Chrysaor and Baker Hughes commercial partnership

Baker Hughes to fund a portion of CAPEX, for a potential higher return

Risk and reward sharing drilling programme

Operator and service provider working together to realise value

Private Equity

Siccar Point acquisition of OMV UK

$1 billion transaction backed by Blackstone and Blue Water Energy

Siccar Point becomes a full lifecycle oil and gas company

Example of an asset portfolio which is now a company priority

Late life specialists

BP/EnQuest SVT and Magnus transactions

No cash upfront from EnQuest; transaction funded by deferred consideration

Operator incentivised to bring down costs and extend life

BP has stated this transaction highlights right assets right hands

Innovative development models

Tolmount development

Antin Infrastructure Partners to part own platform and pipeline and pay for terminal upgrade

Development expected to produce 500bcf of gas with peak production of 300 mmscf/d

First gas target Q4 2020 as per licence commitment

Decommissioning

BP and Serica Erskine transaction

BP responsible for costs up to a gross £174 million; with £31.32 million net to Serica

BP will meet Serica's estimate of decom costs at the point of sale

Innovative approach to facilitate right assets right hands

For further examples of the OGA and Industry working together to achieve MER UK, please refer to our website **www.ogauthority.co.uk**

The OGA does not provide endorsements or investment recommendations.

Changing commercial environment to deliver right assets right hands

Exploration on the UKCS

The UKCS has considerable discovered resource base (more than 3bnboe) and Yet To Find (6bnboe)*

31st round (Frontier)	Opened July 2018, resulted expected H1 2019	**1779 blocks** (370,000 km2)	Nominations for **13** additional blocks and acreage added	New, openly available government-funded seismic
30th round (Mature areas)	**123** licenses awarded	**8** firm E&A well commitments	**9** firm new-shoot seismic surveys	**14** straight to second term licenses
29th round (Frontier)	**25** licenses awarded	**3** firm E&A well commitments	**3** new entrants to the UKCS	Seismic open data package available

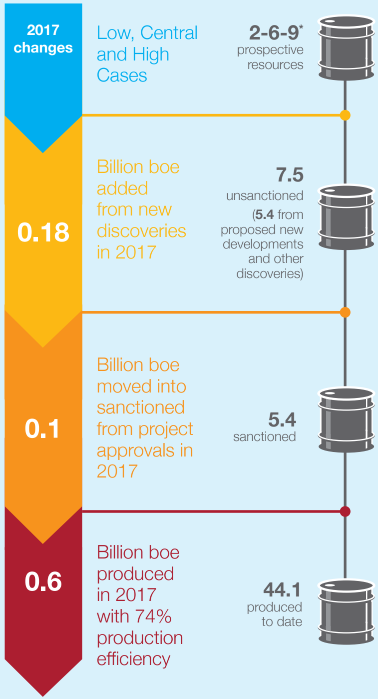
- Summer 2016 — **Second Government Funded Seismic Shoot**
- End 2016 — **Introduction of New Flexible Innovative Licences**
- 19th June 2017 — **Release of Marginal Discovery Data Packs**
- 19th July 2017 — **Release of Regional Maps and Exploration Datasets**
- 22nd August 2017 — **30th Round Technology Event with OGTC**
- End November 2017 — **Launch of Seismic Data to Support the 31st Licensing Round**
- Q2 2018 — **30th Round Licence Awards & Announcement of 31st Round**
- Ongoing — **OGA management of Exploration Portfolio**
- **Yet to find update** available end 2018

* Source: OGA data

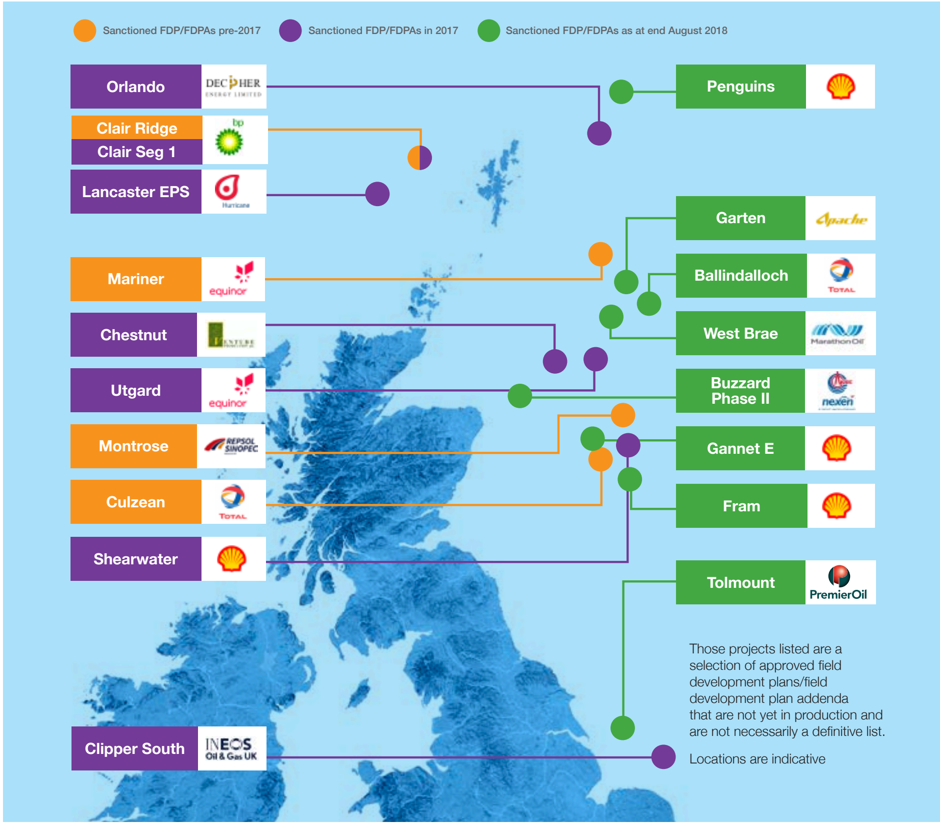
New and flexible licencing regime delivering quicker paybacks and expediting projects

Development on the UKCS

UKCS resource progression



(numbers in billion boe as at end 2017)



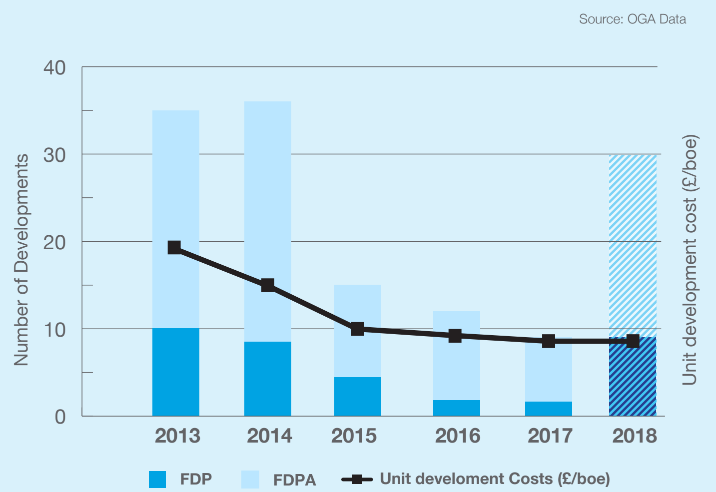
Source: OGA Data

New developments are vital for replacing production and realising value

UKCS value proposition

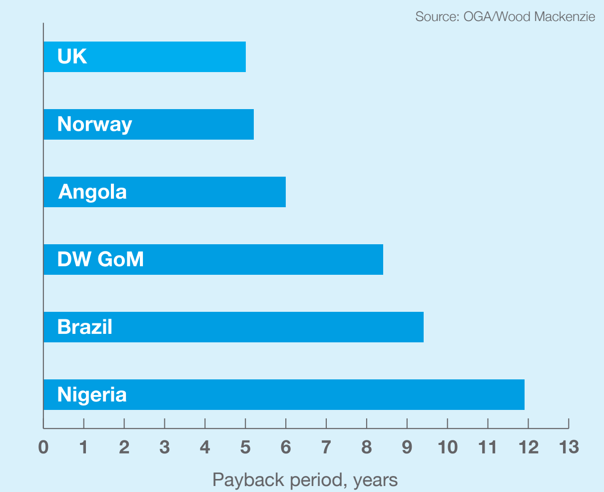
The UKCS presents investors with an opportunity to develop assets at historically low costs with internationally competitive payback periods

Field development plans and Unit Development Costs



- Per barrel development costs less than half the 2013 level
- Significant increases in projects expected in 2018 and 2019
- Unit costs stable

Payback periods



- UKCS still has diverse portfolio of opportunities, from large, complex developments to small, low cost tie-backs
- Opportunities and dramatically lower unit costs mean UKCS boasts world class payback periods

*Unit development costs are at the point of sanction. Projected figures at August 2018

Vision 2035: an additional 3.7 billion boe added to 2015 projections

Marginal discoveries

Potential solutions to unlock this prize:

Clustering

Cluster development could lead to significantly improved CAPEX efficiencies

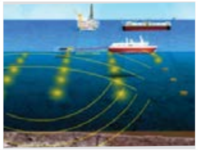
- Potential clusters of marginal discoveries in CNS and Moray Firth
- Clustering opportunities to exploit synergies in economies of scale

Technology

Available and potential future innovations can unlock marginal developments, such as:

- State-of-the-art inversion
- Advanced structural models
- High-angle, ERD
- Improved drilling technique
- Subsurface scope simplification

- Low cost NUI
- Efficient topsides modifications
- Multilateral wells
- Tie-backs of the future
- Standalone facilities

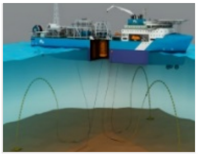


Contracting strategy

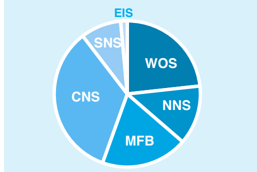
Novel contracting strategies including:

- Appropriate risk/reward sharing and greater collaboration between operators and supply chain
- Transactions funded by deferred consideration

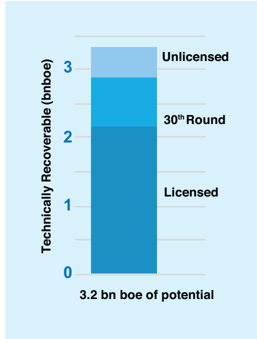
- Tariff payments once production commences based on minimum rate
- Functional tender rather than price tender
- Collaborative Contractor Club

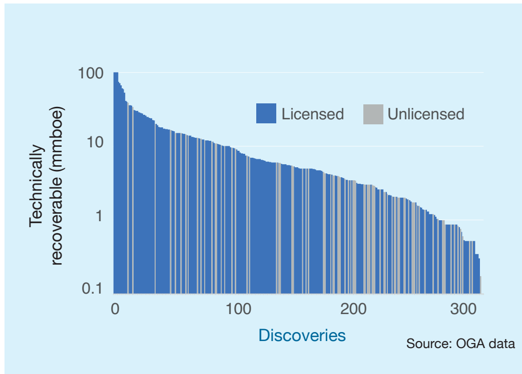


Breakdowns of discovery volumes – 3.2 bn boe of potential



- WOS: West of Shetland
- NNS: Northern North Sea
- MFB: Moray Firth Basin
- CNS: Central North Sea
- SNS: Southern North Sea
- EIS: East Irish Sea





Over 300 marginal discoveries offer significant additional opportunities

Marginal discoveries and access to infrastructure

Widespread existing infrastructure
Comprehensive export systems and hubs with significant spare capacity

Proximity to infrastructure
Most marginal discoveries within 20km of existing installations

Infrastructure access framework
Infrastructure Code of Practice enables access issues to be regularly raised with the OGA

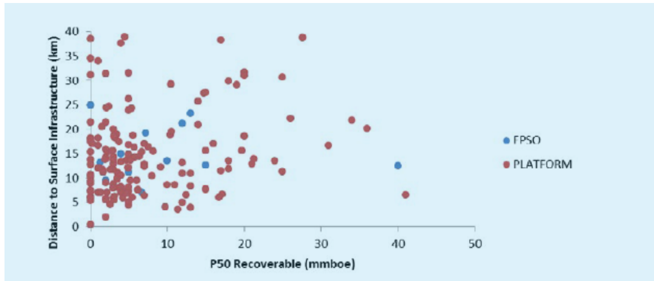
OGA powers to grant access
OGA has powers and people to enforce infrastructure access, and is actively doing so

Improving commercial culture
Commercial Code of Practice tackles poor collaboration

Infrastructure Access

OGA powers offer a potential solution to realise value

Oil discoveries to surface infrastructure



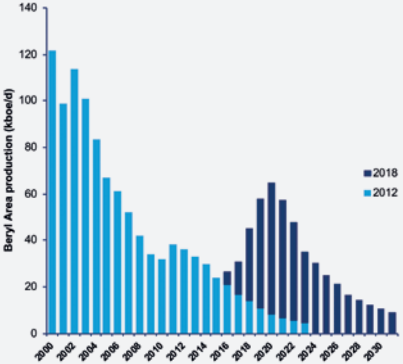
Sum of pools: 167 (1257mmboe)

Source: OGA data

OGA powers and existing infrastructure key to unlocking value from marginal discoveries

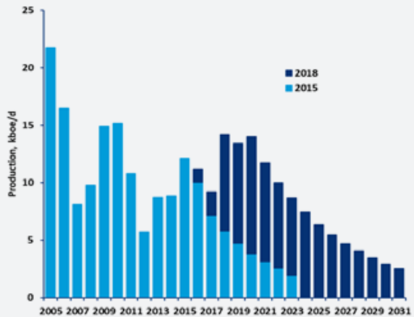
Success from late life assets

Beryl Area (NNS) production change



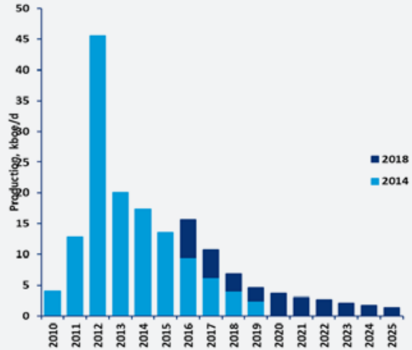
- High quality seismic acquisition and processing
- Successful near field infrastructure-led exploration: Garten discovered in 2018 (the UK's 2500th well)
- Fast tracked nearby discoveries to add value

Anasuria cluster (CNS) production change



- Reducing costs by re-using subsea equipment
- High quality technical work enabling effective well interventions
- Opex reduced, production uptime stabilised, with further upside to be achieved through building on the successful investment on the vessel and wells to date

Sean Area (SNS) production change



- Increasing uptime by re-wheeling the compressor and installing a new booster compressor
- Potential for further infill drilling
- Other opportunities in satellite discoveries such as Sean South West technical reserves; further appraisal needed

Source: OGA/Wood Mackenzie

The OGA does not provide endorsements or investment recommendations

Asset prioritisation increases production and value

The OGA is creating value for UKCS investors

Asset stewardship ensures Operators consistently do the right thing to maximise value for all.

Key focus is resource progression and production optimisation

Benchmarking drives industry wide performance improvement

Tiered strategic engagement ensures asset owners are delivering

Robust data highlights value enhancing opportunities

Area plans create development and operational value efficiencies unlocking incremental value for multiple parties with similar aims

OGA and industry can initiate, but area plans are led and delivered by industry

OGA holds industry to account for delivery of plans to ensure commitments are satisfied and value is realised

Hub Strategies should ensure a MER UK outcome.

Strategies will facilitate an integrated hub view and foster long term JV alignment

This will increase value and highlight future potential to neighbouring assets and potential third parties

OGA encouraging the shooting of new seismic to realise resource progression and redevelopment opportunities.

Example of new area plan:

Buchan Area Plan

Unlicensed acreage with value creation potential

OGA identifying vision for multi asset, integrated, area development (prospects, discoveries, and mature fields)

Area plan includes promotion of unlicensed discoveries and prospectivity

An Area Plan approach could efficiently develop 200 – 300 mmboe

The OGA is using Asset Stewardship, Hub Strategies and Area Plans to deliver value for investors

Full life cycle decommissioning opportunities

>400

fields with remaining decommissioning activity

>320

platforms to be removed

£1.7–2bn

Estimated annual cost for next five years

>4,000

wells to be Plugged and Abandoned

>2,000,000

tonnes topside removals

>1,000,000

tonnes substructure removals

~75,000

tonnes subsea infrastructure removal

>20,000

km of pipelines to be decommissioned

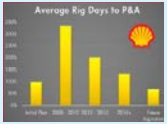
Where otherwise indicated the time period refers to life of basin

Source: OGA Data

Various opportunities to realise value from decommissioning on the UKCS

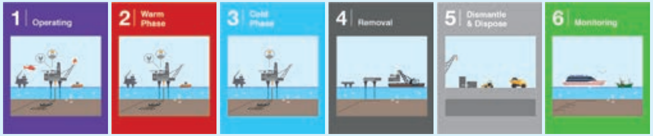
UKCS decommissioning

Evidence of real progress

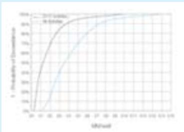


Increased competence and cost effectiveness is delivering savings

Sharing lessons learned



Benchmarking, cost and distribution



Minimum target of reducing UKCS decommissioning costs by 35%

On track for major cost reductions

2017: **£59.7 bn**	2018**: £55.7 bn**	**7% reduction**

CNR International | Murchison

2 years ahead of schedule estimated final cost 88% of sanction cost

Lessons learned to help halve cost of future projects

Early engagement with contractors to ensure flexibility of schedule

Sharing/engagement with regulators, peers and industry

*(P50) like for like: 2017 inventory & 2016 prices

Source: OGA Data

Decommissioning is an opportunity, not a barrier for UKCS investment

UKCS infrastructure

Specialist infrastructure investors are seeing, and realising the value, of investing in UKCS infrastructure. The OGA is supportive of this diversity of infrastructure players

UKCS offers a diverse range of infrastructure

Pipelines platforms and terminals all offer opportunities for stable returns

Opportunities for long-term returns from old and new infrastructure

UKCS is mix of mature and frontier basins with significant volumes in the pipeline

Opportunities for value creation

Reducing costs and securing new third-party business for existing infrastructure

New business opportunities

Working with licensees to develop financing structures and fund new developments

OGA Area Plans

Area plans driving new activity and business which will rely on existing and new infrastructure

Marginal discoveries

Over 300 marginal discoveries within 20km of existing infrastructure

Infrastructure investors funding offshore development

Tolmount development sanctioned by the joint venture and infrastructure partners in August 2018

The development will comprise a minimal facilities platform and new gas export pipeline owned and paid for by CATS and Dana

Innovative financing structure where Premier pays a tariff for the transportation and processing of Tolmount gas

Demonstrates the value of upstream and midstream operators collaborating to stimulate future investment

PremierOil dana PETROLEUM CATS | Tolmount

UKCS offers a variety of infrastructure investment opportunities; not just traditional midstream assets

Energy transition and vision 2035

The OGA, Government and industry are considering the opportunities that the energy transition will present for UKCS fields and infrastructure

MER UK and the Energy Transition

Emissions

Lowering emissions offshore, emissions trading scheme in place

Technology

To maximise economic recovery, lower emissions and unlock CCUS

CCUS

OGA screening for potential capture use prior to decom

Gas

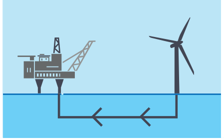
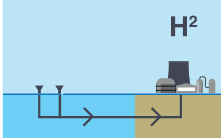
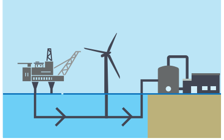
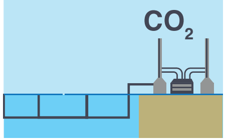
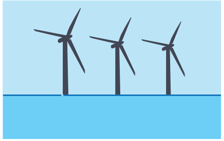
Gas could play prominent role in energy transition, replacing coal. 3.8tcf tight gas opportunity in SNS

Synergy with renewables

Oil and gas and renewables actively partnering

Gas to Wire

Mutual benefits from linking gas production to wind power

Activity	Schematic	Potential Applications
Platform Electrification • Connect offshore platforms to an electrical power source to reduce costs and emissions		• SNS: power existing gas hubs from nearby windfarms • WoS: use floating offshore wind to create ring main
Power-to-Gas • Use offshore windfarm power to produce hydrogen by water electrolysis • Use offshore platforms and pipelines to produce/store hydrogen		• SNS and EIS: use redundant infrastructure
Gas-to-Wire • Generate power from gas offshore and transmit to shore using windfarm infrastructure		• SNS and EIS: convert late-life infrastructure into offshore power generation
CO_2 transport and storage • Re-use of oil and gas infrastructure and spent fields		• SNS and EIS: use redundant infrastructure
North Sea Wind Power Hub • New, artificial 'energy islands' for very large scale hydrogen production from wind		• Integrate UK offshore power and gas (including hydrogen) activities

The energy transition offers value creation opportunities for the UK oil and gas sector

Contact us at:

oga.correspondence@ogauthority.co.uk

OGA Headquarters
AB1 Building
48 Huntly Street
Aberdeen
AB10 1SH

OGA London Office
4th Floor
21 Bloomsbury Street
London
WC1B 3HF

www.linkedin.com/company/oil-and-gas-authority
twitter.com/ogauthority

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