Re-inventing the UKCS to Maximise Economic Recovery

Dr Andy Samuel
Chief Executive

September 2017
### Reflections: 2014 ‘Crisis looming’

**Oil price**

<table>
<thead>
<tr>
<th>Jan</th>
<th>120</th>
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<tbody>
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<td>60</td>
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<td>0</td>
<td>Dec</td>
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**Government response**

- Wood Review
- Scotland’s Expert Commission
- HMT Driving Investment

**Industry outcomes**

- **2014**
  - E&A wells: 31
  - Production (million boepd): 1.4
  - Production efficiency (%): 65
  - Unit operating costs ($): 30
2015 ‘Emergency Response’

### Oil price

**2014 Crisis**

- 2015 Emergency response

### Government response

- **£1.3bn fiscal package**
- **£20m for seismic**
- **Wood Review**
- **Scotland’s Expert Commission**
- **HMT Driving Investment**

### Industry outcomes

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
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<tbody>
<tr>
<td>E&amp;A wells</td>
<td>26</td>
<td>31</td>
</tr>
<tr>
<td>Production (million boepd)</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Production efficiency (%)</td>
<td>71</td>
<td>65</td>
</tr>
<tr>
<td>Unit operating costs ($)</td>
<td>21</td>
<td>30</td>
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2016 ‘Fightback’

Oil price

2014 Crisis
2016 Fightback
2015 Emergency response

Government response

- £1.3bn fiscal package
- PRT reduced to 0%, SCT reduced to 10%, further £20m for seismic, £180m for OGTC

Industry outcomes

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### Government response

- **PRT** reduced to 0%,
- **SCT** reduced to 10%,
- Further £20m for seismic,
- £180m for OGTC

**Wood Review**  
Scotland’s Expert Commission  
HMT Driving Investment

- £1.3bn fiscal package
- £20m for seismic

### Industry outcomes

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### Timeline
- **2014 Crisis**
- **2015 Emergency response**
- **2016 Fightback**

**2017**
OGA in action

189 success stories to end July 2017 recorded across the OGA, in partnership with industry and government

| Tripartite barrels mmboe | 1193 |
| New barrels added mmboe | 738 |
| Protect existing barrels mmboe | 455 |
| Costs mitigated £m | 292 |
| Value of investments £bn | 1.75 |
| Time saved to industry (fast-tracked consents) | 2614 Days |

Strategies
- Decom
- Asset Stewardship
- IM
- Technology
- MER UK
- Exploration
- EOR
- Supply Chain
- Tight Gas

Guidance
- TPA
- Sanctions
- Financial penalty
- Meetings
- Competition

New stewardship regime
- Stewardship Expectations
- Tiered reviews
- Behaviours

Sector wide data
- Wells & Decom Hackathons
- Projects lessons learned
- PE
- Unsanctioned discoveries pack
Enabling assets to change hands

- **Right Assets Right Hands**
  - OGA flexible and enforcing MER UK Strategy
- **Access to Infrastructure**
  - Infrastructure Code of Practice underpinned by powers
- **Cost Reduction**
  - Contracting strategies, standardise and simplify
- **Lack of Capital**
  - Working with finance and investment community
- **JOA Misalignment**
  - Facilitation and standardised agreements and processes
- **Divestment Packages**
  - Area hubs and strategy synergies to help optimise asset packages
- **Decom**
  - OGA issued cost norms and benchmarking
- **Fiscal Regime**
  - Improvements to fiscal terms, including late-life assets

**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.**
Current forecasts

Oil and gas in the UKCS (mmboe/d)

2.1 bnboe added

Annual Development Capital Expenditure

UKCS Field Consents

Pre Wood 2016+ Estimate

OBR Forecast
Revitalising exploration

Remaining potential

- CNS
- NNS
- WoS
- SNS
- Other

YTF 6bnboe

OGA action

- Exploration Strategy
  - Seismic surveys
  - Seismic reprocessing
  - Data release
  - Reports
  - New licensing regime

2016 E&A successes

- Success rate >50%
- <$2/bbl exploration finding cost

Locations:
- Lancaster
- Loanan
- Storr W/E
- Skipper
- Bagpuss
- Finlaggan
- Eagle
- Belinda
- Laverda
- Winchelsea
- Lincoln
29th Licensing Round

- New innovate licence
- Developed in collaboration with industry
- Variable and flexible durations
- Lower rental rates
- Strong and diverse applications
2017/18: Licensing rounds

30th Round
Mature/producing areas of the UKCS
Over 800 blocks on offer some not available since 1965
Open for applications until 21 November 2017

31st Round
Opens in 2018 with further free seismic
Focusing on frontier, less explored areas
Making data and insights available

New and reprocessed government seismic

Regional maps

Undeveloped discoveries data portal

Technical montages and data packages

Over 5000 downloads

250,000 GIS requests in one day

Potential “clusters” of discoveries

43 discoveries may form 11 potential clusters

64 discoveries may form 18 potential clusters

Technically rec volumes (mmboe)

Moray Firth

Central North Sea
Unlocking undeveloped discoveries

Remaining reserves

- Producing fields
- Ongoing developments
- Currently locked discoveries

350 undeveloped discoveries currently not being pursued across the UKCS with over 3bn boe potential

Examples of technology

- Unmanned buoy
- Subsea storage
- Versatile Production Unit
- Spooled pipeline

Over 350 undeveloped discoveries and a key focus area of 30th Round

Remaining reserves chart:
- 100,000 mmboe
- 100 mmboe
- 10 mmboe
- 1 mmboe
Unlocking undeveloped discoveries

Remaining reserves

- Producing fields
- Ongoing developments
- Currently locked discoveries

350 undeveloped discoveries currently **not being pursued** across the UKCS with over **3bn boe potential**

Over **300** delegates and **36** exhibitors
- Seismic & subsurface
- Subsea Tie-Back of the Future
- Wells
- Standalone Hubs and Clusters

Need to solve the rush to be second
Case study: Alpha Petroleum

Unlocking Cheviot

Different operator mindset and way of working

- SURF/SPS functional tender rather than price
- Collaborative Contractor Club
  - no bespoke solutions
  - all price competitive
- Baker Hughes/GE fully integrated solution
- Redeploy FPSO – best fit solution
- Investment giving senior banks confidence
Benchmarking recovery factor

Inputs: range of data, from FDPs and other sources

Regression analysis

Field Quality Index (FQI)

Considered in FQI
- Reservoir quality
  - Porosity
  - Permeability
  - Net to gross
  - Faulting/
    compartmentalisation
  - Oil / water
    saturations
  - Fluid properties

Factors outwith FQI
- Development
  - Number of wells
    Injector / producer ratio
  - Processing
    facility size
  - Development
    concept

- Operation
  - Water injection
    efficiency
  - Well
    interventions
  - Plant
    optimisation
  - Operational
    uptime
  - Reservoir
    management

Remaining reserves

Fields in same geological unit

Percentage of shut-in wells

Voidage replacement ratio

80
80
80
80
Improving through stewardship

Decade of first oil

- Average of Field Quality Index
- Average Recovery Factor

80s
90s
2000s
2010s

Initial recovery factor
Recovery factor after "good stewardship"

RF Increases to producing fields, with large remaining reserves, could yield an additional 900MMBbl

+900 million barrels
Area Plans

Guidance published July 2017

Need to be industry owned - OGA can initiate

Integrate area scopes

High value creating

West of Shetland Gas
1.6bn boe incremental

East of Shetland
0.4bn boe incremental

Quad 9 Gas
Maximise oil whilst progress to blowdown

FPS Stewardship

Central Graben Area (CGA)
1bn boe incremental

Theddlethorpe Catchment Area (TCA)
0.15bn boe incremental

SNS Tight Gas
0.65bn boe remaining gas accessible

West Sole
0.08bn boe incremental
West Sole Catchment Area

Potential

81mm boe (risked) incremental
NPV_{10} $510MM

The need for operators to work together

Standalone undeveloped discoveries marginal
Potential to unlock incremental value through collaborative effort

Forward plan

1. OGA study completed 2016 - fully transitioned to industry
2. Industry led work group - engineering studies initiated
3. Economic and commercial forum initiated
4. Technology and supply chain forum commencing Q4 2017
5. Three appraisal wells planned for 2018

Participating fields:
Centrica Olympus
Dana Platypus
Hansa Pharos
Premier Cobra
Glein (unlicensed)
Southern North Sea (SNS) Tight Gas

Potential

655mm boe of gas (risked)
inclusive of infill, undeveloped discoveries and prospects

The need for operators to work together

Discrete opportunities distributed across the SNS
Resources restricted by high cost and uncertainty

Forward plan

1. Support existing tight gas projects (pre and post well reviews)
2. Reduce risks by sharing knowledge and expertise (EEG tight gas group)
3. Promote opportunities to campaign activities across operators
4. Develop and deploy appropriate technology (Hackathon June 2017 / OGTC)

SNS projected tight gas drilling activities (sanctioned and unsanctioned)

- Includes infill and development wells, appraisals and exploration wells
Greater Fulmar discussions underway

Greater J Ridge commence Q1 2018

East Central Graben commence Q4 2017

Potential

1bn boe incremental recoverable resources

NPV$_{10}$ $6bn

The need for operators to work together

Declining production and over capacity in infrastructure

Exploration potential - but focused on individual hubs rather than area solutions

Forward plan

1. Conclude OGA area plan review
2. Convene MD meetings to hand over to industry
3. On-going OGA governance of industry led area plans

Greater Fulmar discussions underway
East Central Graben commence Q4 2017
Greater J Ridge commence Q1 2018
West of Shetland (Gas)

Potential

6.3bn boe incremental (unrisked)
NPV\textsubscript{10} $43bn (total including base)

The need for operators to work together

- Discoveries currently not being sanctioned
- Resources restricted by current infrastructure

Forward plan

1. Review how current infrastructure can be optimised
2. Review potential for licence consolidation
3. Form groups with relevant JVs

- Northern Hub commence Q4 2017
- WOSPS Q1/Q2 2018
- Greater Laggan promotion
- Rosebank stewardship
What needs to change?

Against a brick wall

Recent industry quotes...

‘At the core of the protracted negotiations has been a desire by certain owners to seek excessive levels of financial security to eliminate risk, contractual modifications designed to secure additional control over operations and an attempt to opportunistically seek closure on a range of long standing issues’

‘They are now explicitly and unashamedly linking the two unrelated issues, despite the fact that they involve separate JVs and we are not in a position to bargain one issue off against the other’
### Commercial solutions

#### Use of Powers - Successes register

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<tr>
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<th>Facilitation</th>
<th>Enhanced facilitation</th>
<th>Formal intervention</th>
<th>OGA Powers</th>
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<tbody>
<tr>
<td>Successes to date</td>
<td>33</td>
<td>5</td>
<td>17</td>
<td>10</td>
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#### Successes to date as at 31 July 2017

<table>
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<tr>
<th>Category</th>
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<td>Asset Transfer</td>
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<td>Intra JV</td>
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<td>Area Solution</td>
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#### Cultural Change

**OGA led**
- Stewardship expectations, and Tier 1 collaboration reviews

**Industry led**
- Refresh Commercial and Infrastructure Codes of Practice (CCoP and ICoP)
- Develop/extend/(simplify) Standard Agreements
- Benchmark industry commercial delivery
- Cultural Change Champion
Supply Chain Action Plans (SCAPs)

SCAP process facilitates and demonstrates that operators are:

- MER UK Strategy
- Field Development Plan / Decommissioning Programme
- Stewardship Expectations
- SE-05 Robust project delivery
- SE-10 Planning for decommissioning

Legally binding obligations

All projects requiring an FDP/DP should produce a SCAP

Tier 1 contractors should complete SCAPs for projects >£25m

Evaluation Criteria:

Engagement  Trust

Innovation  Quality
Decommissioning Cost Estimate

OGA base cost estimate is £59.7bn.

Five companies’ assets amount to 50% of total decom costs.

Target £39bn

Source: OGA Stewardship Survey 2016
Cost reduction focus

Total estimated decommissioning cost by category

- Owners Cost
- Well P&A
- Topside removal
- Subsea Infrastructure
- Substructure removal
- Onshore recycling

Total estimated decommissioning cost by area

- NNS
- WoS
- CNS
- SNS
- IS

Cost certainty and reduction
- Benchmarking
- Metrics on high cost elements
- Standardisation
- Sharing best practices

Delivery capability
- Learning from other industries
- Innovative contracting & commercial approach
- New centre of excellence

Regulatory guidance
- Early conversations with regulators
- Evidence based

Well abandonment
- Campaign approach
- Suspended well stewardship
- Pilot and upscale
- Technology

Potential savings (not additive)

10%-15%
35%-45%
15%-20%
25%-35%
Benchmarking example

Dashboards benchmark industry estimates

Encouraging industry to share lessons learned

Promoting innovation and collaboration

Update report on annual progress
Industry examples

**Brent**
- Cost decrease over £1bn
- Supply chain cost reductions: topsides & substructure removal
- Reduced well P&A costs: contracting & execution strategy, efficiency improvements
- Learnings transferable: Shell willing to share

**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, flexibility of schedule
- Sharing/engagement with regulators, peers and industry

**SNS**
- Internal well P&A campaigns delivering 50% cost reductions
- Optimisation of schedule and market flexibility
- Multi-operator well P&A to further reduce costs and share experiences
- Engaging with SNS peers/industry
Edradour/Glenlivet

The OGA does not provide endorsements or investment recommendations. Those projects listed are not necessarily a definitive list.

Conclusions

MER UK: further great potential
Good progress already made
Clear way forward
Embrace and sustain change
Thank you