Restoring Economic Health to the North Sea

DEVEX 2015
Underpinning the future: Discovery, Development, Recovery

21 May 2015
Aberdeen
The cost challenge in the UKCS

Annual inflation rates, 2000–14

Percent

Big Mac  2.5

SOURCE: McKinsey’s Energy Insight Offshore Operations Benchmarking Database; Oil & Gas UK Activity Surveys

1 Unweighted average of total lifting cost for 17 UKCS North Sea platforms (total cost, not cost per barrel) 2 Weighted average
The cost challenge in the UKCS

Annual inflation rates, 2000–14
Percent

<table>
<thead>
<tr>
<th>Big Mac</th>
<th>2.5</th>
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<td>North Sea platform lifting costs$^1$</td>
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<th>Big Mac</th>
<th>North Sea platform lifting costs¹</th>
<th>UK lifting cost per barrel of oil equivalent (2004–14)²</th>
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<tr>
<td>2.5</td>
<td>12</td>
<td>18</td>
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1 Unweighted average of total lifting cost for 17 UKCS North Sea platforms (total cost, not cost per barrel)
2 Weighted average

SOURCE: McKinsey’s Energy Insight Offshore Operations Benchmarking Database; Oil & Gas UK Activity Surveys
The cost challenge in the UKCS

Annual inflation rates, 2000–14
Percent

- Big Mac: 2.5%
- North Sea platform lifting costs\(^1\): 12%
- UK lifting cost per barrel of oil equivalent (2004–14)\(^2\): 18%
- UK development cost per barrel of oil equivalent (2004–13)\(^2\): 21%

1 Unweighted average of total lifting cost for 17 UKCS North Sea platforms (total cost, not cost per barrel)
2 Weighted average

SOURCE: McKinsey’s Energy Insight Offshore Operations Benchmarking Database; Oil & Gas UK Activity Surveys
GBP 13!
The increase was largely unforeseen

Growth in operating cost forecast from UKCS operators

GBP billions

2014 actual (9.6)
2013 actual (8.9)

SOURCE: Oil & Gas UK 2012 Economic Reports and 2015 Activity Survey
The fall in oil price has made the North Sea a lot less profitable

Oil price

USD 99 bbl

Share of UKCS production that breaks even

88

1 Price below which NPV of the remaining reserves of the field will be zero based on end 2014 cost and production forecast.

SOURCE: WoodMac GEM (2015); McKinsey analysis
The fall in oil price has made the North Sea a lot less profitable

**Oil price**

USD 99 bbl

USD 55 bbl

**Share of UKCS production that breaks even**

88

54

1 Price below which NPV of the remaining reserves of the field will be zero based on end 2014 cost and production forecast.

SOURCE: WoodMac GEM (2015); McKinsey analysis
The number of UKCS wells plugged and abandoned per year now exceeds those drilled for exploration and appraisal.

**Well activity in the UKCS**

Number of wells drilled

![Graph showing the number of wells drilled from 2008 to 2015F. Plotted points indicate a decline in the number of exploration and appraisal wells and an increase in the number of plugged and abandoned wells. The graph includes data from DECC; Oil & Gas UK, Annual Activity Surveys and Decommissioning Insights.]
Cost increase not due to increased activity …

Deck cargo shipped
Tonnes

+1.5%

SOURCE: McKinsey Energy Insights
Cost increase not due to increased activity …

- **Deck cargo shipped**
  - Tonnes
  - +1.5%

- **Helicopter hours**
  - Hours
  - +2.0%

- **Wells drilled**
  - Number
  - -4.0%

SOURCE: McKinsey Energy Insights
... or higher supplier margins

EBITDA margin\(^1\) of OFSE companies

<table>
<thead>
<tr>
<th></th>
<th>2009-2011</th>
<th>2012-2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>39</td>
<td>36</td>
</tr>
<tr>
<td>Services</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Equipment</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>EPC</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
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1 Margin as announced - adjusted for different accounting/disclosure policy. Sample includes 18 equipment, 13 EPC, 38 assets and 9 services companies

SOURCE: McKinsey Energy Insights
So what has been behind the large cost increase?

Increased activity 20%
So what has been behind the large cost increase?

- Increased unit cost: 40-50%
- Increased activity: 20%

SOURCE: McKinsey Energy Insights; “Meeting the challenge of increasing North Sea costs” McKinsey article
So what has been behind the large cost increase?

- Greater inefficiency: 30-40%
- Increased unit cost: 40-50%
- Increased activity: 20%

SOURCE: McKinsey Energy Insights; “Meeting the challenge of increasing North Sea costs” McKinsey article
Opex example: integrity inspections cost

Comparison of topsides integrity inspection costs per asset
GBP thousands per installation, gross

Year 1  Increased activity  Rate increase  Greater inefficiency  Year 4

x 2.9  30%  20%  50%
Capex example: new greenfield developments

Development cost
index; 100 equal to full cost in year 2000

- Actual costs 2000
- Increased activity
- Rate Increase
- Greater Inefficiency
- Actual costs 2014 replica

x 2.5
n/a (functional equivalent)

70%
30%

SOURCE: Sanitised client example
This is something other highly technical industries appear to have avoided

Nominal price inflation for a new commercial airliner

+ 0.2 – 1.5%

Nominal price inflation for a new 5-door hatchback in Western Europe

+ 1.0%

SOURCE: A2Mac1; manufacturer’s public data; Airline Monitor: McKinsey analysis
Step up activity where it makes sense: e.g., well interventions

Incremental production from well interventions
% of total production

- Intervene every 15th well
- Range of intervention types = 1-2
- Intervene every 3rd well
- Range of intervention types = 7-8

Operator A

Operator B

2

9-10

SOURCE: Energy Insights Well Intervention Benchmark
Get core practices and approaches in place: e.g., offshore reliability

2010-2014 McKinsey offshore reliability survey results

Production efficiency
% of MPP

North Sea Offshore Operators

Reliability practices score

Practices covered

- Asset bottleneck management
- Equipment operations
- Optimise care regime
- Repair in appropriate timeframe
- Performance management
- Reliability organisation
- Continuous improvement
- Equipment history
- Operator mindsets
- Organisational capability

SOURCE: McKinsey’s Global Offshore Asset Efficiency Database
Address gaps in capability and expertise: e.g., operating standards
Tackle inefficiency: e.g., well delivery

Improvement levers

1. Drive learning curves across the well delivery process
2. Standardize and simplify specifications, designs and processes
3. Lean drilling execution
4. Procurement and supply chain optimization
5. Rigorous performance management

Well delivery process

Portfolio and rig strategy
Prospect maturation and high-grading
Wells engineering
Logistics and supply chain management
Drilling and completion execution
Hook-up and post-mortem learning

Tackle inefficiency: e.g., well delivery

| Improvement levers | Well delivery process | Potentials
|--------------------|-----------------------|-------------|
| Drive learning curves across the well delivery process | | 20-25%
| Standardize and simplify specifications, designs and processes | | 10-15%
| Lean drilling execution | | 5-10%
| Procurement and supply chain optimization | | 10-15%
| Rigorous performance management | | 5-10%

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<th>Improvement levers</th>
<th>Portfolio and rig strategy</th>
<th>Prospect maturation and high-grading</th>
<th>Wells engineering</th>
<th>Logistics and supply chain management</th>
<th>Drilling and completion execution</th>
<th>Hook-up and post-mortem learning</th>
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<tr>
<td>Drive learning curves across the well delivery process</td>
<td>▪ Rigs to work on long series of similar jobs</td>
<td>▪ “Perfect well” planning and estimation approach</td>
<td>▪ Planning teams to specialize on type of jobs</td>
<td>▪ Rig teams work on long series of similar jobs</td>
<td>▪ Lean execution principles to drive down NPT</td>
<td></td>
</tr>
<tr>
<td>Standardize and simplify specifications, designs and processes</td>
<td>▪ Long range plans with strategic suppliers</td>
<td>▪ Use of std wells as basis for 80% of portfolio</td>
<td>▪ Defined std well and options, based on drivers of costs</td>
<td>▪ Minimize rotation of crews</td>
<td>▪ Drive actively operational efficiency</td>
<td></td>
</tr>
<tr>
<td>Lean drilling execution</td>
<td>▪ “Perfect well” planning and estimation approach</td>
<td>▪ Defined std well and options, based on drivers of costs</td>
<td>▪ Capitalize on std specs to drive down unit costs of procured services and equipments</td>
<td>▪ Lean execution principles to drive down NPT</td>
<td>▪ Active planning and debottle-necking of hook-up towards asset</td>
<td></td>
</tr>
<tr>
<td>Procurement and supply chain optimization</td>
<td>▪ Contracts incentivize real productivity improvements</td>
<td>▪ Capitalize on std specs to drive down unit costs of procured services and equipments</td>
<td>▪ Execution daily monitored against ‘Perfect well’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rigorous performance management</td>
<td>▪ Use down-turn to reduce unit costs</td>
<td>▪ Active monitoring and target setting for engineering productivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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Potential % of total well cost:

1. Portfolio and rig strategy: 10-15%
2. Prospect maturation and high-grading: 5-10%
3. Wells engineering: 10-15%
4. Logistics and supply chain management: 20-25%
5. Drilling and completion execution: 3-5%
6. Hook-up and post-mortem learning: 50%

The impact can be enormous; e.g., SWN in the Fayetteville Shale

### Days to drill

<table>
<thead>
<tr>
<th>Year</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>18</td>
</tr>
<tr>
<td>2008</td>
<td>14</td>
</tr>
<tr>
<td>2009</td>
<td>12</td>
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<tr>
<td>2010</td>
<td>11</td>
</tr>
<tr>
<td>2011</td>
<td>8</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
</tr>
<tr>
<td>2013</td>
<td>6</td>
</tr>
<tr>
<td>2014</td>
<td>7</td>
</tr>
</tbody>
</table>

### Lateral length

<table>
<thead>
<tr>
<th>Year</th>
<th>Lateral Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>5,440</td>
</tr>
<tr>
<td>2008</td>
<td>5,356</td>
</tr>
<tr>
<td>2009</td>
<td>4,819</td>
</tr>
<tr>
<td>2010</td>
<td>4,836</td>
</tr>
<tr>
<td>2011</td>
<td>4,528</td>
</tr>
<tr>
<td>2012</td>
<td>4,100</td>
</tr>
<tr>
<td>2013</td>
<td>3,619</td>
</tr>
<tr>
<td>2014</td>
<td>2,657</td>
</tr>
</tbody>
</table>

SOURCE: Southwestern Energy Investor Presentation 2015
Recap