Oil & Gas Authority

Lessons Learnt: UKCS Oil and Gas Projects 2011-2016

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History

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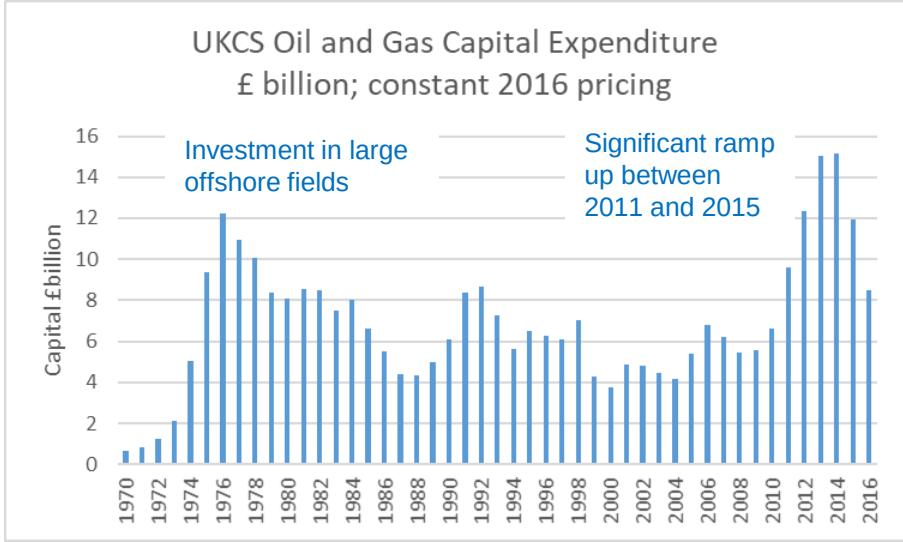
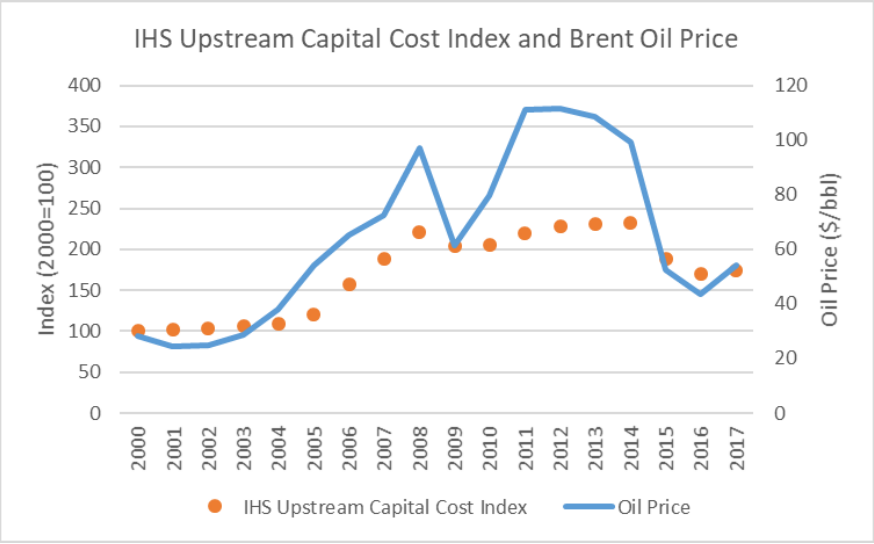
Capital expenditure in UKCS averaged over £12 billion a year between 2011 and 2015

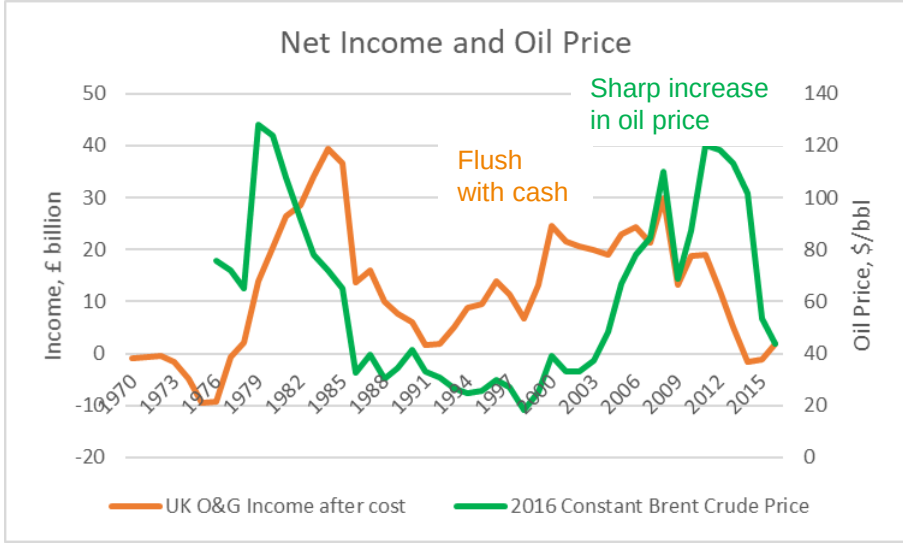
Highest real term spend in the UKCS history

Driven by cash rich operators compelled to act by a sharp increase in oil price

Escalating Cost







Ongoing Investment in a Challenging Environment

The outlook for oil has fundamentally changed from peak supply to peak demand

- Abundance of supply; shale oil
- Demand growth constrained by electrification, climate change, pollution

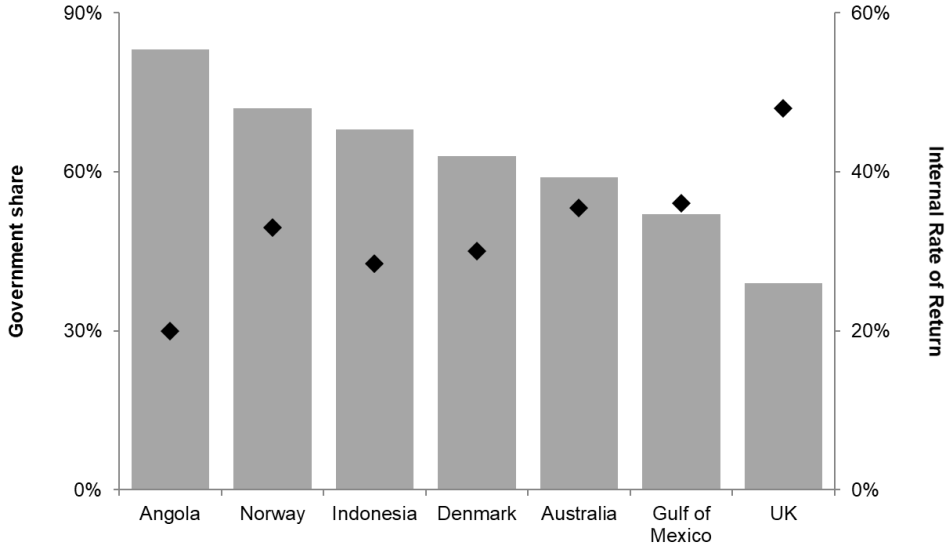
UK offers a very competitive tax regime

A new lease of life for the North Sea:

- Over £14 billion of project under construction including Mariner, Culzean, Clair Ridge and Penguins
- 30 FDPs or FDPAs expected this year

But we need to improve:

- Project margins critical when faced with abundance of supply
- Successful project delivery more important than ever



Study Scope

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Carried out by William Lindsay; seconded from Shell and currently Brent Decom Manager

Conducted in 2016 with contribution from 11 Operators and 3 major Tier-1 contractors

- Greenfield and Brownfield
- Types: Subsea, Platform, FPSO
- All Regions: WoS, NNS, CNS & SNS

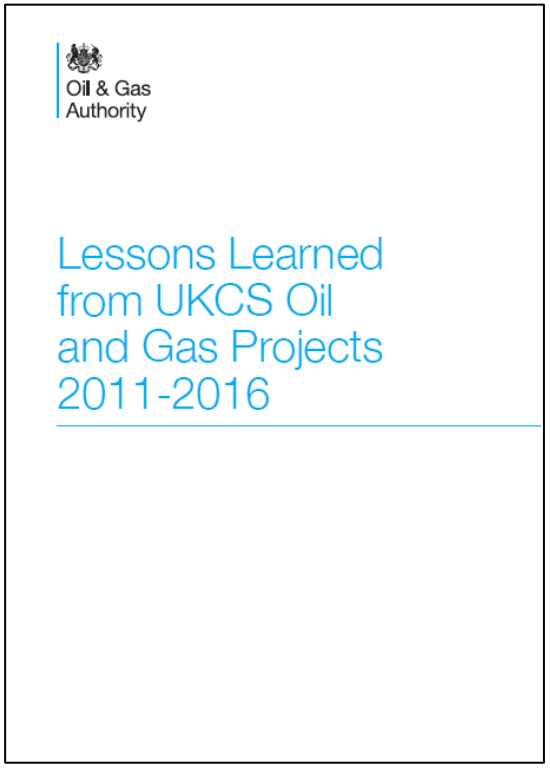
58 Projects; 38 post production start-up and 20 under execution at the time

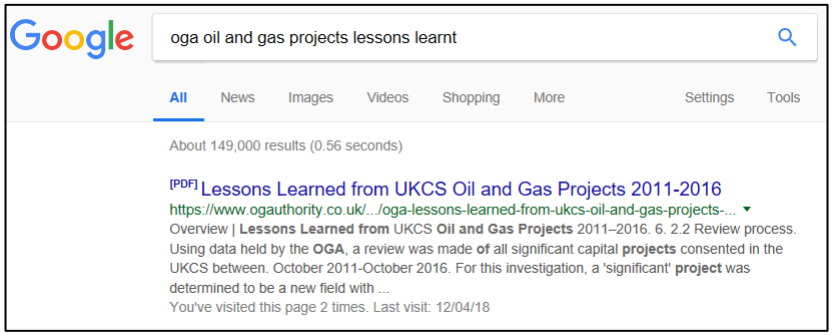
Compare FDP vs actual performance

Lessons learnt sessions held with 11 Operators and 3 Tier-1 Contractors covering successful and underdelivered projects

Summarised in a full report;
Web Search: “OGA”, “Oil and Gas Projects”, “Lessons Learnt”

This presentation highlights key findings and insights from the study





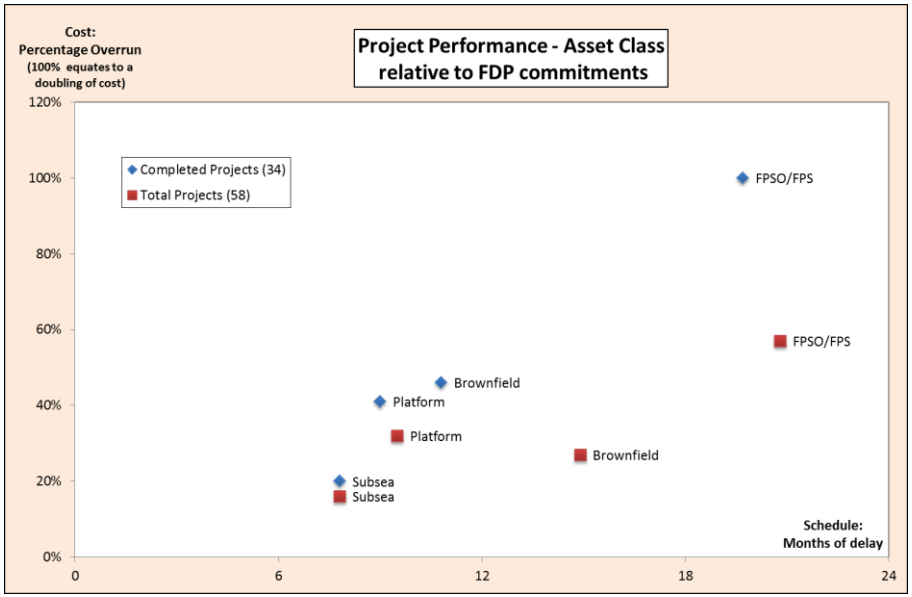
Key Findings

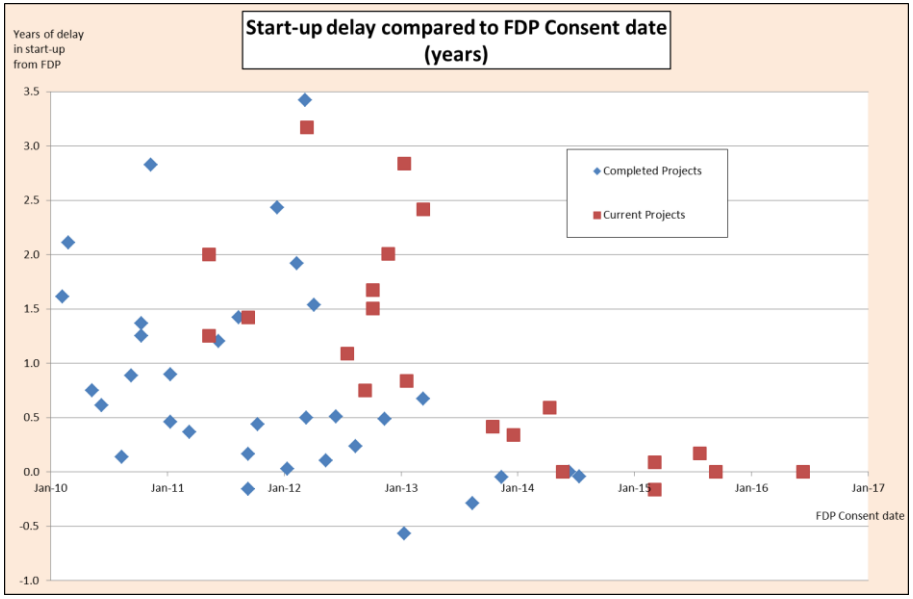
All FPSO projects experienced cost over-run, schedule delay

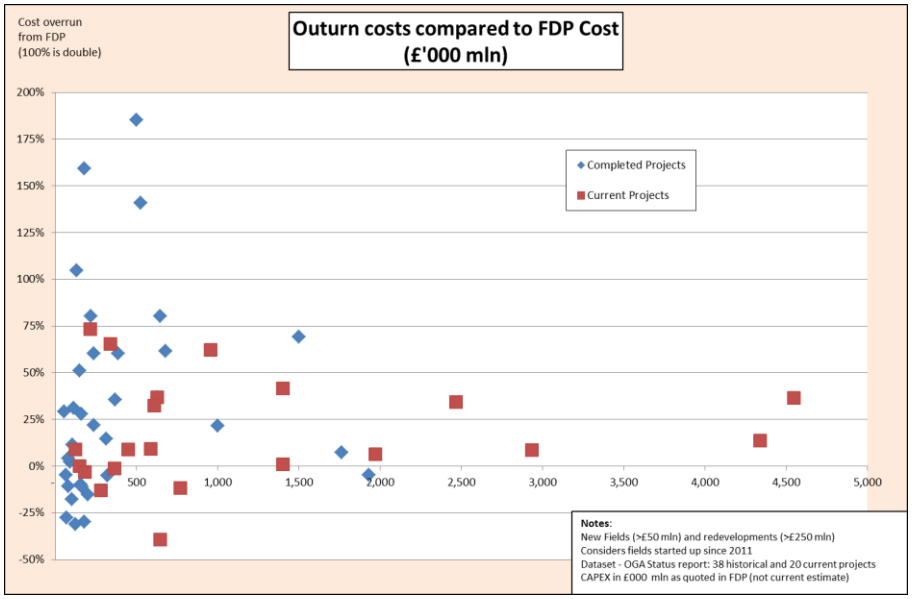
No simple correlation between size, complexity and delay/over-run

- Outcome determined by “how” the project was executed and less by “what” was executed
- Many of the reasons are non-technical in nature

Spread of projects with an average delay of 10 months and 35% cost over-run.







Case Study 1

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FPSO based greenfield development

Operator seeking to fast track development

Focus on early cash flow, FDP approved in less than a year

Operator had strong in-house subsea and wells capability but relied heavily on Contractor for FPSO scope

FPSO scope grew considerably

180% cost overrun, 80% schedule overrun, 2 year delay in first production

Delayed delivery impacted remaining life of FPSO; life extension work introduced late requiring massive additional work

Front End Loading

Limited clarity on marine & facility scope
Insufficient cost/scheduling prior to sanction

Behaviours

Substantial increase in Operator staff as delays mounted; lacked accountability, everyone involved in everything

Project Management

Inadequate management of change between Contractor and Operator

Key Recommendations

1. Ring fenced and dedicated project team
2. Understand full scope prior to sanction even if contracted out. Complete FEED
3. Well defined contract strategy
4. Robust decisions at each Stage Gate

Case Study 2

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Platform based greenfield development

Significant subsurface complexity and uncertainty

Project team under tremendous pressure to fast track post acquisition; cashflow from development key to unlocking further development

Under estimated project complexity and execution risk

Delays to onshore fabrication meant large carry over to hostile offshore environment

Well delivery proved far more demanding than anticipated

140% cost over run, 60% schedule overrun, 2 year delay in first production

Front End Loading

1. Insufficient front end work
2. Topside FEED was poor

Behaviours

1. Tense relationship with JV Partner
2. Poor commercial behaviours with and by supply chain

Key Recommendations

1. Do not rush project sanction
2. Better due diligence of supply chain; HSEQ, experience & productivity
3. Ensure detailed design sufficient prior to construction
4. Involve contractors in project management; “one team” culture
5. Retain Team

Case Study 3

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Greenfield development using a bridge linked platform and subsea tiebacks

Utilised strategy used and refined from previous major projects

Benchmarked Front End Loading, including independent FEL assessment by the IPA

Contractor Strategy:

- Great lengths to communicate objective, behaviours and common goals
- Strong emphasis on paying contractors on time; achieved close to 100% on time payment

Two offshore installation seasons used; move associated activities off critical path

Cost: 95% of FDP, Schedule: 96% of FDP, Reserves: 97% of FDP

Organisation

Experienced and motivated team well equipped to manage complex risks, technical and interface challenges

Front End Loading

Strong focus on FEL based on experience FEED 100% complete, subsurface well understood; no changes during execution

Execution

1. Hands-on execution control; keep project on track
2. Communication seen as key; objectives, KPI, behaviours
3. Integration of Operations Team into construction and commissioning phase
4. Ensure supply chain is paid on time
5. Optionality in installation; move as much off the critical path as possible

A view from the Supply Chain

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Behaviours

1. Some operators employ to many staff who spend time finding problems with contractors; so contractors employ many 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

Project Management

1. Reduce scope creep by being disciplined in locking down options
2. Stricter change management
3. Have a commonly agreed list of items which much be landed during FEED
4. Critically check basis of design to highlight major issues ahead of project sanction

Front End Loading

Number of significant areas not tied down at Project Sanction, pushing decisions from FEED to Detailed Design

Execution

1. Standardisation not used enough – one major operator had 8 different standards for subsea modules from the same contractor
2. Critically check basis of design and highlight major issues to client

Organisation

1. Continuity of key resources from FEED into Execution; Project, Engineering and Business Managers
2. Having a clear and consistent strategy, with processes to drive strong alignment

Drivers of Project Success

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OGA's Role

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"to regulate, influence and promote the UK oil and gas industry in order to **maximise economic recovery** of the UK's oil and gas resources"

Asset Stewardship – Developed with Industry:

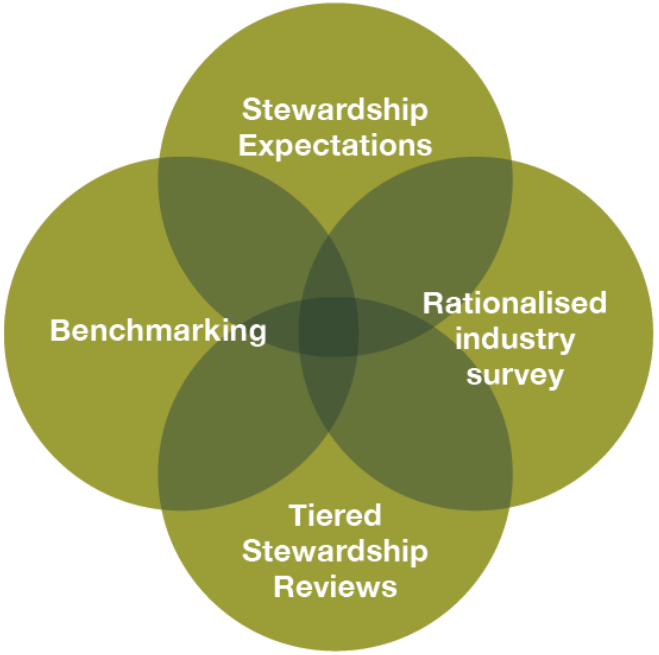
- Asset owners consistently do the right things to identify and then exploit opportunities
- Assets are in the hands of those with the collective will, behaviours and capabilities to achieve this

OGA's support with Field Development Planning:

1. Lessons learnt and sharing best practices
2. SE-05: Robust Project Delivery
3. SCAPs
4. PEP

OGA's Key Control Points:

1. Consent to Field Development
2. Stewardship Expectations
3. Licencing



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Thank you