

# IBC FPSO Training Course

## Paris 2016

### Market Overview

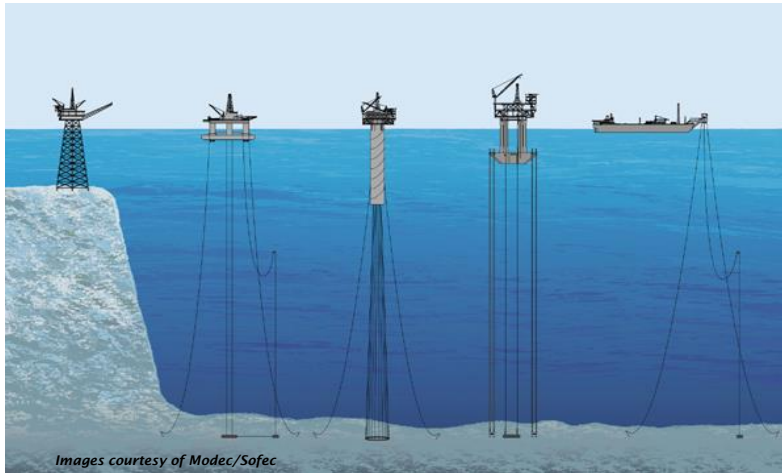
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## Agenda

- ☐ Introduction to floating production systems
- ☐ Market forecasts
- ☐ FPSO strengths and weaknesses
- ☐ FPSO complexity

## Deepwater developments and the evolution of floaters



Images courtesy of Modec/Sofec

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## Floating **P**roduction **S**torage and **O**ffloading Units



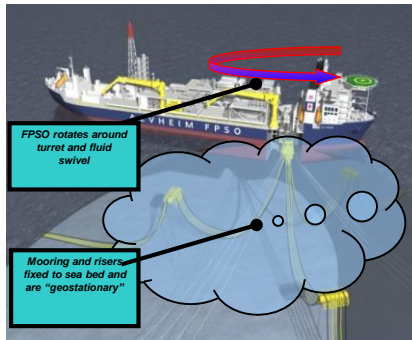
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## Terminology

### Weather vaning



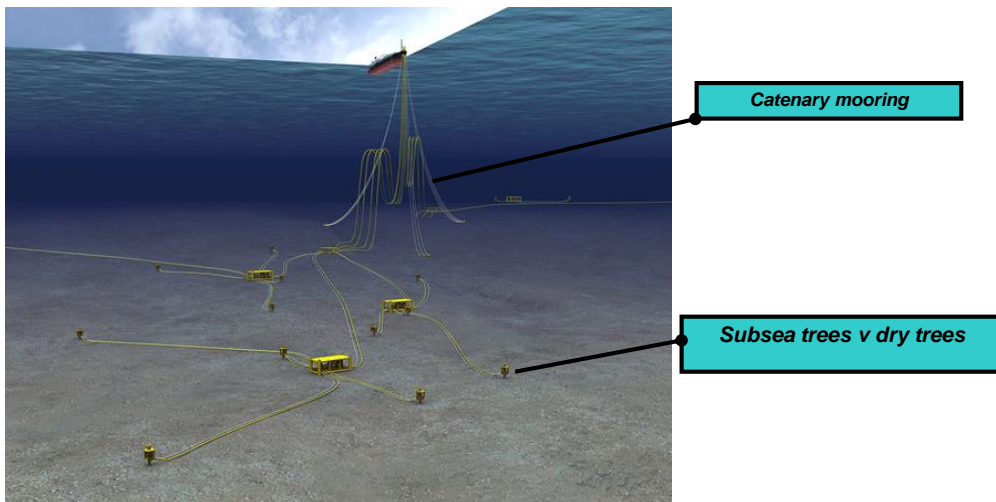
### Spread mooring



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## Terminology - FPSO and subsea development



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## Floating **P**roduction **S**torage and **O**ffloading Units (FPSOs)



Images courtesy of Modec/Sofec

- ☐ Processing oil, gas & water – generally focussed on production of oil;
- ☐ Equipped with production facilities of varying complexity;
- ☐ May be purpose built or tanker conversion;
- ☐ May be weathervaning or spread moored;
- ☐ Generally moored with catenary mooring lines.

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## Floating Storage Units (FSU or FSO)



Images courtesy of Modec/Sofec

- ☐ No production facilities;
- ☐ Used for the storage of stabilised crude oil;
- ☐ May be purpose built or tanker conversion;
- ☐ May be weathervaning or spread moored;
- ☐ Generally moored with catenary mooring lines.

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## Semi submersible production facility



Image courtesy of SBM Atlantia

- ☐ Processing oil, gas & water;
- ☐ No oil storage;
- ☐ Based (generally) on drilling rig design/configuration;
- ☐ Columns supported on submerged pontoon structures;
- ☐ Generally moored with catenary mooring lines;
- ☐ Good (small) motions;
- ☐ Payload sensitive.

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## SPAR production facility



- ☐ Processing oil, gas & water;
- ☐ No oil storage (generally);
- ☐ Single column structure;
- ☐ Very deep draft
- ☐ Payload sensitive;
- ☐ Generally moored with catenary mooring lines;
- ☐ Good (small) motions;
- ☐ Allows dry trees.

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## Tension leg production facility



Images courtesy of Modec/Sofec

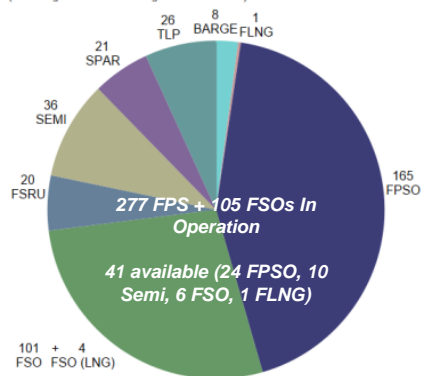
- ☐ Processing oil, gas & water;
- ☐ No oil storage;
- ☐ Payload sensitive;
- ☐ Columns supported on submerged pontoon structures;
- ☐ Moored with vertical tendons;
- ☐ No vertical displacements - (no heave, roll or pitch);
- ☐ Allows dry trees.

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## Floating production and storage facilities

Total Installed Units by FPS Type  
(excluding MOPUs and LNG Regasification vessels)



### Industry backlog (Orderbook):

- 27 FPSOs (52%)
- 13 FSRUs (25%)
- 6 FLNGs (12%)
- 2 Semisubs (4%)
- 2 Barges (4%)
- 1 SPAR (2%)
- 1 TLP (2%)

- 6 MOPUs
- 6 FSOs
  - 5 Oil FSO
  - 1 LNG FSO
- 8 Speculative Units
  - 6 FSRUs
  - 2 FLNGs

**And a further 248 projects are in the appraisal, planning, or bidding/final design stages**

Source : EMA FPS Quarterly Report: Q4 2016

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## The market – difficult 2015 – outlook in 2016 harsher.



### High

- Long run oil price expectation \$70-90/bbl
- Petrobras '14/'18 business plan implemented, order 3-4 FPSOs per year
- Lower financial return from US tight oil
- Drilling activity increases due to reduced rates
- Global energy demand growth 1.5% annually

### Medium (most likely)

- Long run oil price expectation \$50-70/bbl
- Minor delays & cuts to Petrobras '14/'18 business plan: 2-3 FPSOs ordered per year.
- Drilling activity stays flat
- Global energy demand growth ~1.0% annually

### Low

- Long run oil price expectation \$30-50/bbl
- Major delays & cuts to Petrobras '14/'18 business plan: no orders 2016 and 1-2 per year thereafter
- Drilling activity stays flat
- Global energy demand growth ~0.5% annually

Source : EMA FPS Outlook Report 2016-2020: Jan 2016

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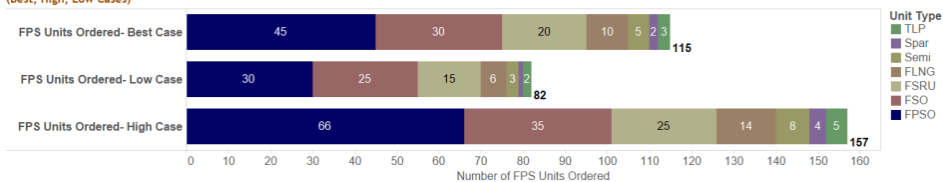
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## The market – difficult 2015 – outlook in 2016 harsher.



All FPS Types 2016-2020 Orders  
(Best, High, Low Cases)



- Lower for longer sentiment means that this year's medium case forecast is similar to last year's low forecast etc.
- Only LNG (I.e. FSRU, FLNG) is experiencing relative growth.

Source : EMA FPS Outlook Report 2016-2020: Jan 2016

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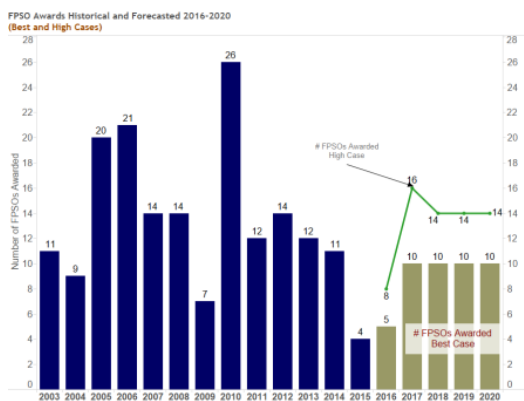
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## Our thoughts on the forecasts



- 2015-2019 numbers expected to be heavily back-end loaded.
- 2016, like 2015 was worse than out-turn in 2009, when total FPSO orders were 7 of which 4 were from Petrobras:
- But 2010 bounced back with a total order of 26, so 2017 could be better.
- Strong possibility that Petrobras numbers will be delayed in the current market.



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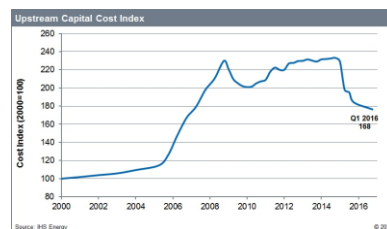
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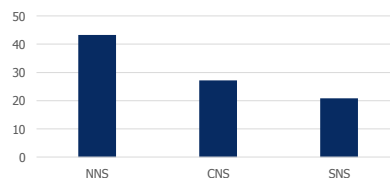
## The challenge of low oil prices?



- Capital costs were a challenge even before the oil price dropped.
- Costs in the supply chain are experiencing significant downward pressure. Opportunities for projects to access lower costs from the supply chain at the bottom of the cycle.
- Expect the deep-water and floater market to look different when all this is over. Further consolidation likely.
- Opex is an increasing challenge in mature areas with declining volumes; Opex reduction requires more focus during design phase to avoid designing in high opex costs (manning levels equipment maintenance cycles etc)



UKCS UOC cost data \$/boe



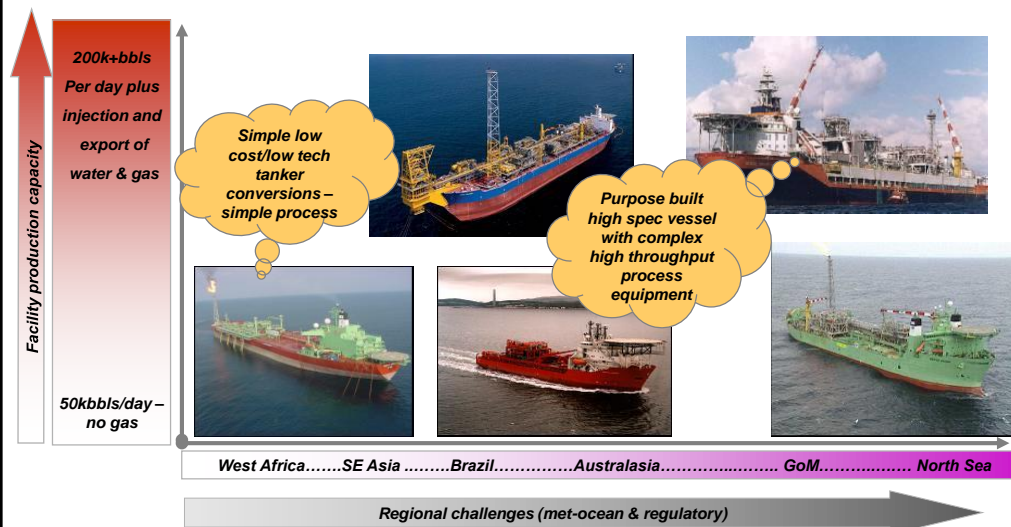
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## FPSO complexity



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## FPSO – Strengths and weaknesses

### Strengths

- ❑ Economics – low hull and conversion cost can provide best (most economic) development solution
- ❑ Mobility – easy to move from construction site to field – easy to relocate from field to field
- ❑ Insensitive to water depth – concept is relatively insensitive to water depth - can operate from ~30metres – 3,000 metres
- ❑ Large deck area and load capacity – mono-hull configuration provides large deck payload capacity and is relatively insensitive to additional payload
- ❑ Storage capacity – allows export of product by shuttle tanker – not pipeline dependent

### Weaknesses

- ❑ Additional marine equipment and crew (relates partly to storage) makes operating costs relatively higher
- ❑ Limited drilling capability – turret moored solutions with drilling not yet operating – although concepts exist (spread mooring + drilling is in operation)
- ❑ Turret systems can act as a constraint on riser numbers and sizes (mainly economic)
- ❑ Need to use sub-sea trees and flexible risers (relatively expensive – compared to dry trees and rigid tensioned risers)

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Thank you

Any Questions?

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