



# PARETO CONFERENCE EMGS UPDATE.

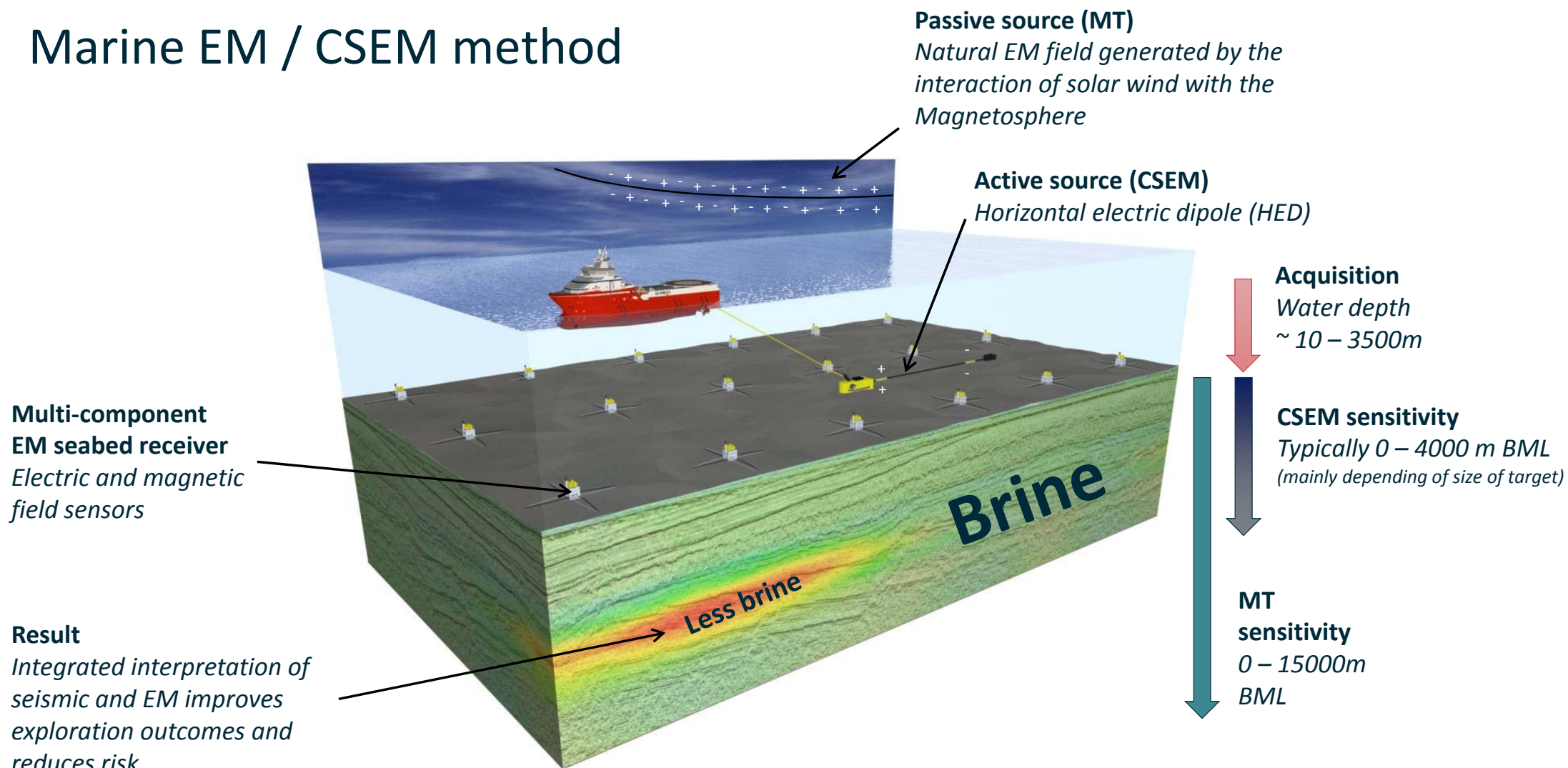
Oslo, 13 September 2017  
CEO Christiaan Vermeijden

Spot the difference.

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# Marine EM / CSEM method



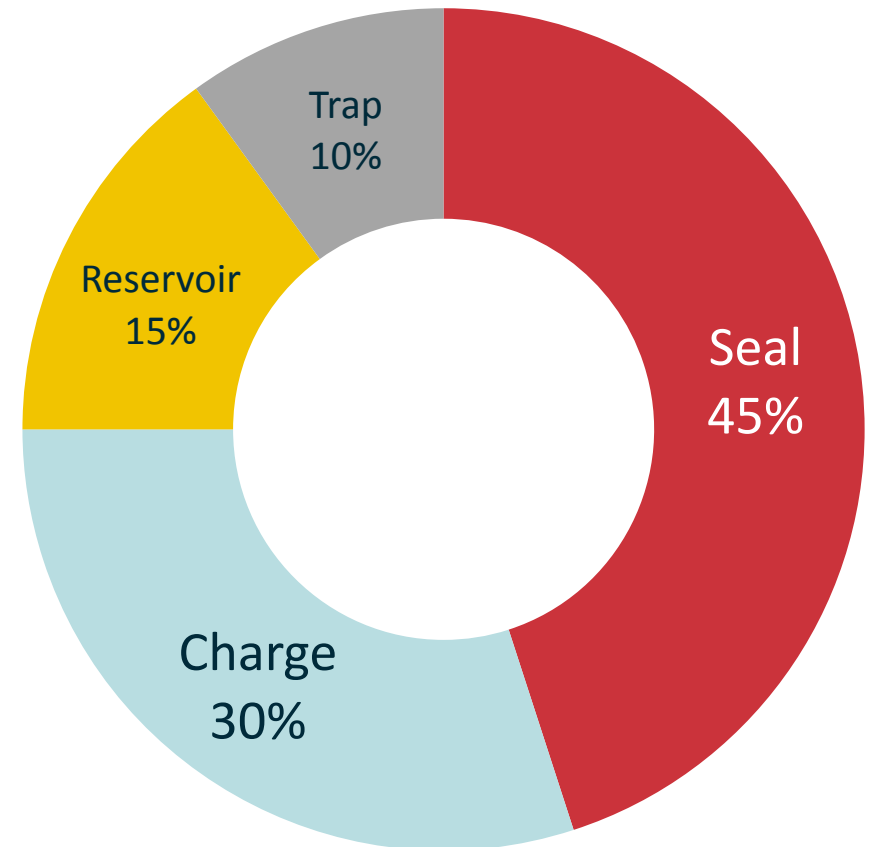
# De-risking offshore exploration

- Most offshore exploration wells fail to find commercial volumes of hydrocarbons
- The primary reason for failure is lack of seal and charge

	Trap		Reservoir	Charge	Seal	Volumes
	Structural	Strat.				
3D Seismic	●		●			
3D CSEM		●		●	●	●

## Post drilling failure analysis from a supermajor

165 wild cat wells, 121 dry, Pg 27%





# Putting CSEM at work....

## THE EXPLORATION CHALLENGE:

Risk  
Costs  
Long term economic value

## SEISMIC SHORTCOMINGS:

Poor understanding of the presence of hydrocarbons and volume  
Limited opportunities to differentiate between AVO prospects

## CSEM VALUE PROPOSITION:

Indicator of the absence of brine  
Indirect indicator of the presence of hydrocarbons  
... or other geological features



**SEISMIC:** poor understanding of the fluid content

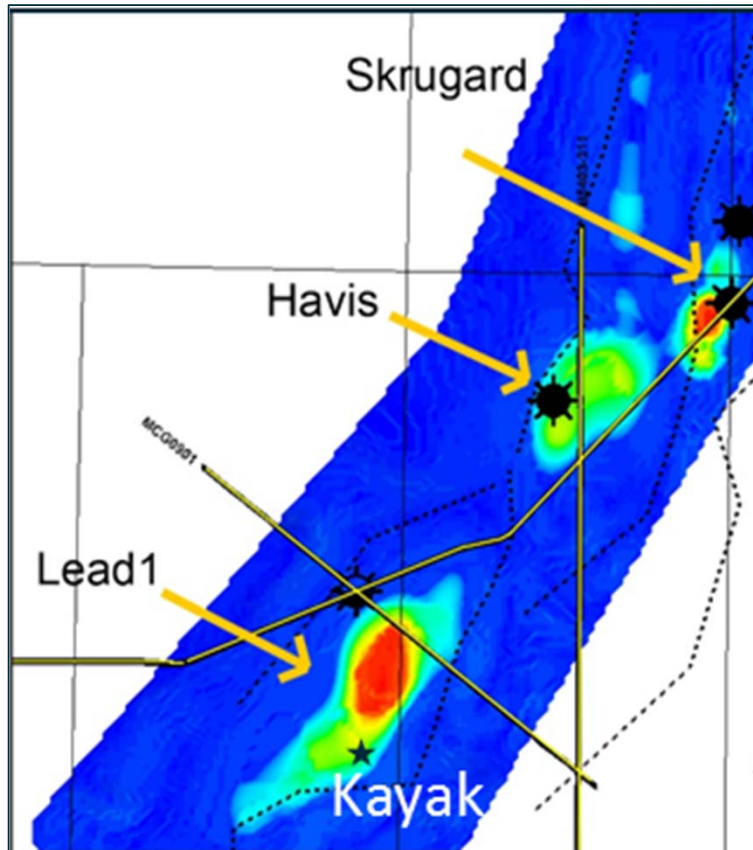
**CSEM:** ability to differentiate hydrocarbons from water in a reservoir



### Pitfalls:

- Tight rock (e.g. salt)
- Mature source rock (oil-shale)
- Fresh water
- Others

# Kayak: Well prediction by EMGS



First Break, 2013

- CSEM supported or driven well
- High risk due to a new / risky play
- Strong and large anomaly observed in data (published in First Break in 2013)



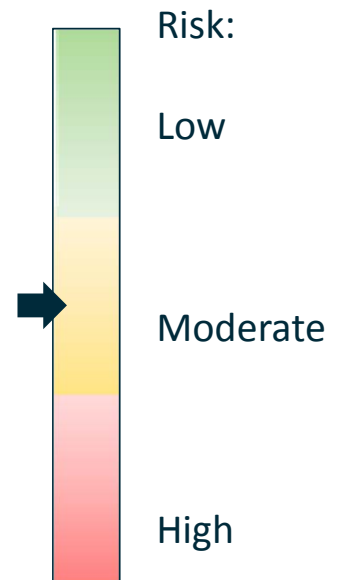
## Prediction by EMGS:

Presence of hydrocarbons  
Potential for high volumes

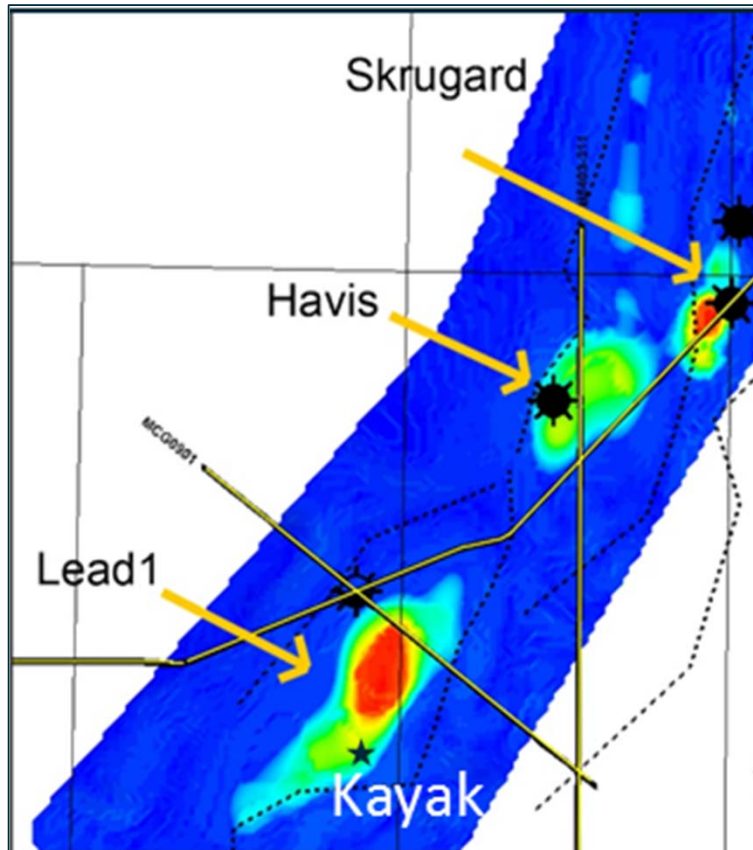


## Possible pitfalls:

Tight rock  
Mature source rock



# Kayak: Well result



*First Break, 2013*

As reported:

- Oil discovery
- Proved a new play
- Minimum volume is 50 MMBL (recoverable oil)
- Discovery needs to be appraised



## Prediction lookback:

Presence of hydrocarbons  
Potential volumes to be appraised

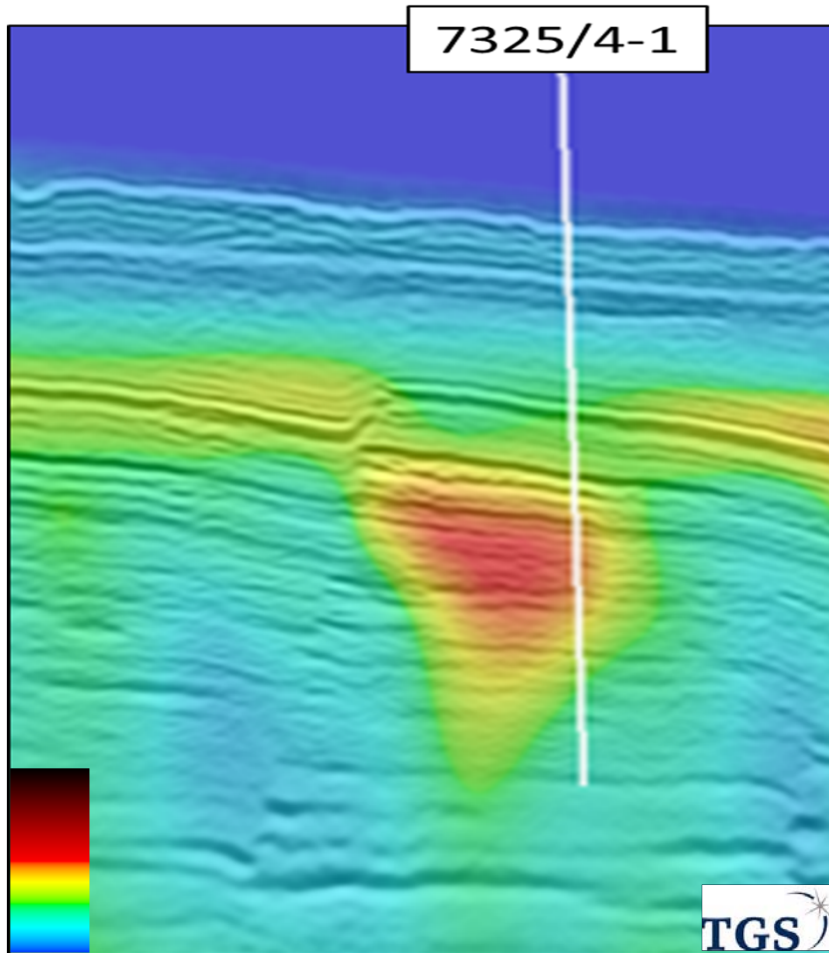


## Possible pitfalls:

Tight rock  
Mature source rock



# Gemini North: Well prediction by EMGS



- CSEM supported well
- Good track record on risking similar plays
- Seismic DHI in combination with a resistive anomaly



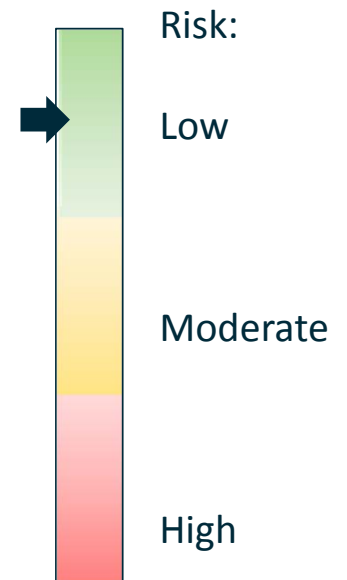
## Prediction by EMGS:

Presence of hydrocarbons  
Low volumes



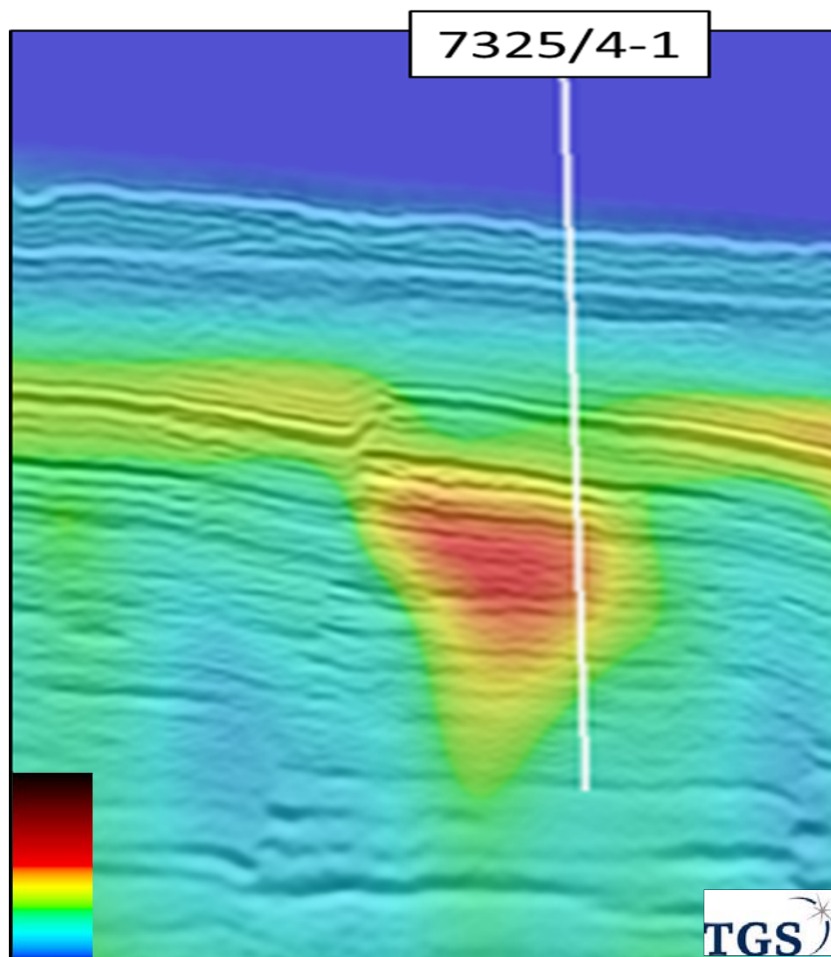
## Possible pitfalls:

Tight rock





# Gemini North: Well result



As reported:

- Gas discovery
- Small non commercial volumes



## Prediction lookback:

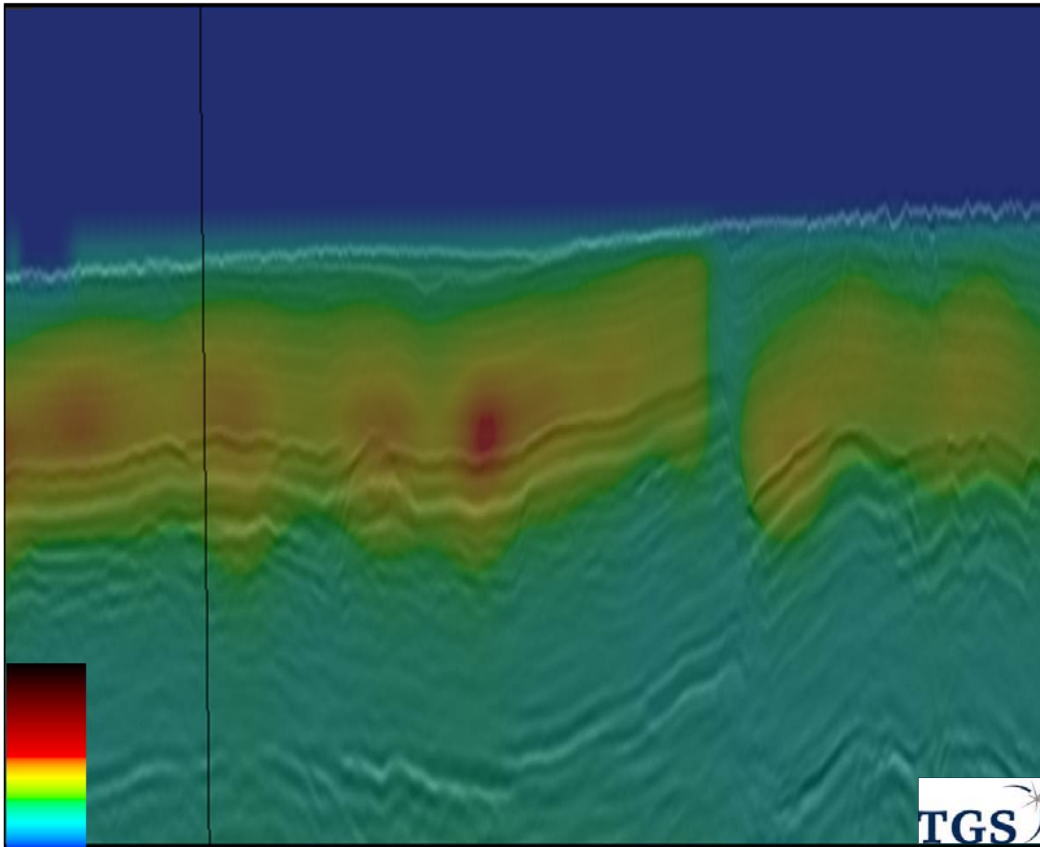
Presence of hydrocarbons  
Low volumes



## Possible pitfalls:

Resolved

# Korpfjell: Well prediction of shallow section by EMGS



- Seismic suggests the presence of a large volume of hydrocarbons
- Large volumes in shallow section not supported by CSEM
- CSEM data could be explained by small oil or gas accumulations



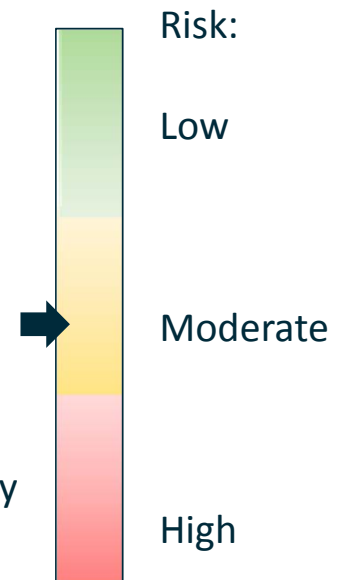
## Prediction by EMGS:

Presence of hydrocarbons  
Low volumes

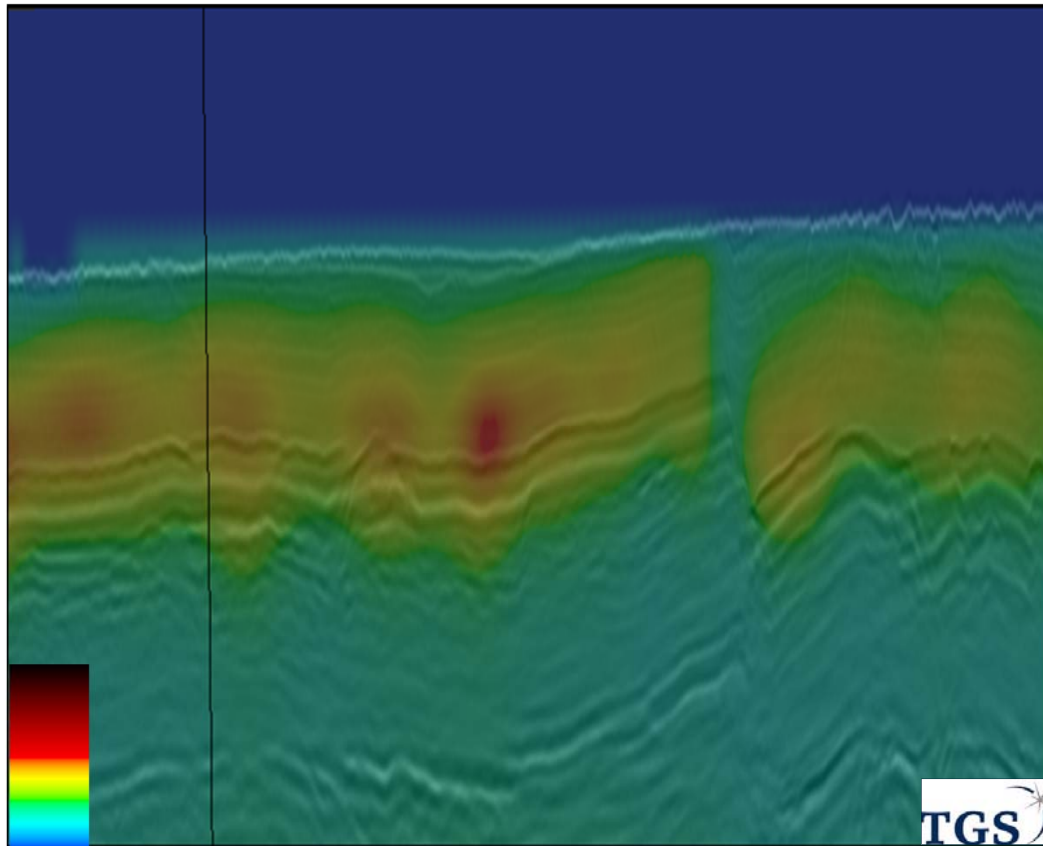


## Possible pitfalls:

High background resistivity



## Korpfjell: Well result (1<sup>st</sup> well / shallow well)



As reported:

- Gas discovery
- Much smaller volumes reported than anticipated by seismic



### Prediction lookback:

Presence of hydrocarbons  
Low volumes

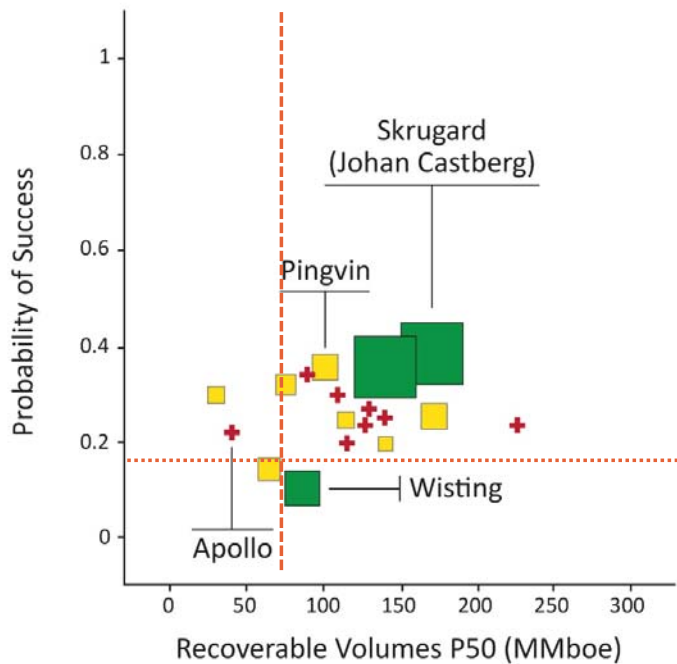


### Possible pitfalls:

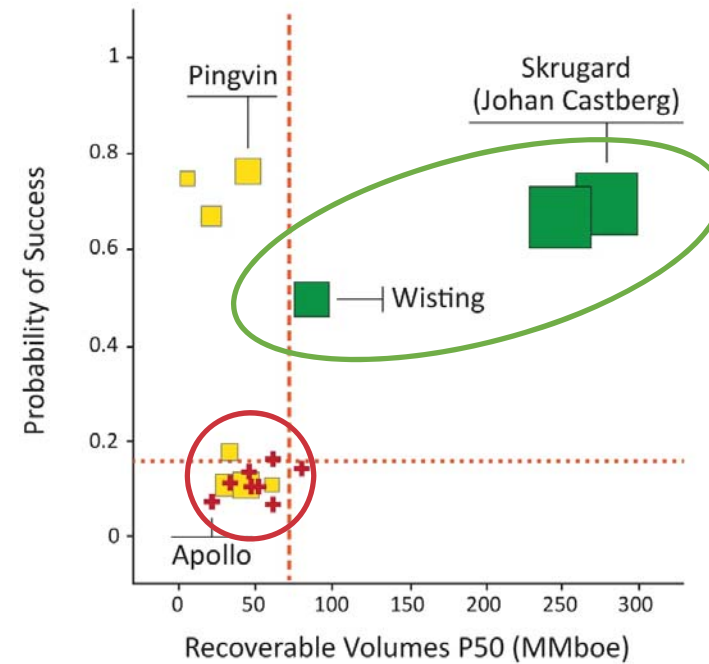
Resolved

# Assisting with portfolio evaluation: Barents example

Opportunity Evaluation  
Based on Seismic



Opportunity Evaluation  
Based on Seismic and CSEM



Discovered Contingent  
Resources P50 (MMboe)

+ 0    5 - 100    > 100

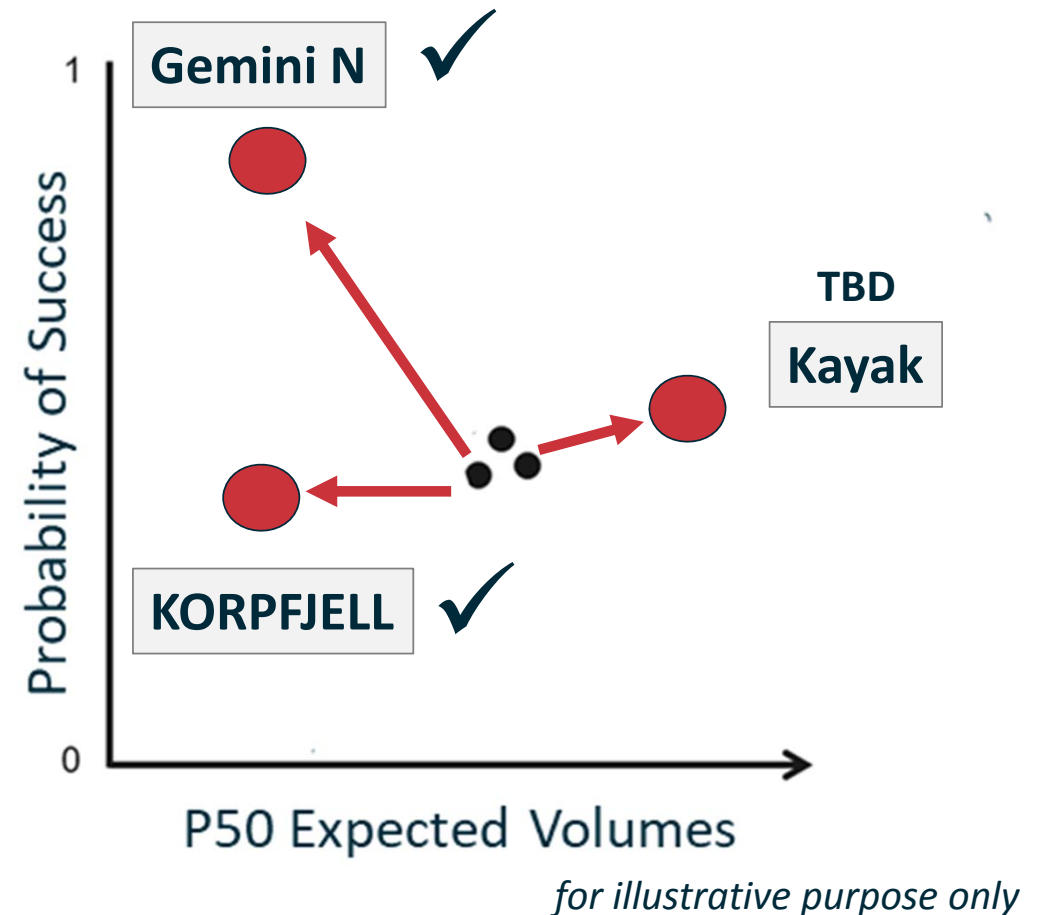
..... Minimum Risk Tolerance  
- - - - - Minimum Economic Field Size

Technical Reference:  
Zweidler, D, D Baltar and N Barker, 2015, Additional  
data helps investment decisions. AAPG Explorer,  
November, 42-43.



# Consistent use of CSEM on a prospect portfolio

- 80% (4x) correct predictions in 2017 so far based on CSEM data: Filicudi, Kayak, Gemini North, Korpjell
- 20% (1x) incorrect prediction in 2017 based on CSEM data: Blåmann (small gas discovery). Limited access to seismic data
- Polarizing an oil company's prospect portfolio provides for improved decision making and the potential to increase the return on investment



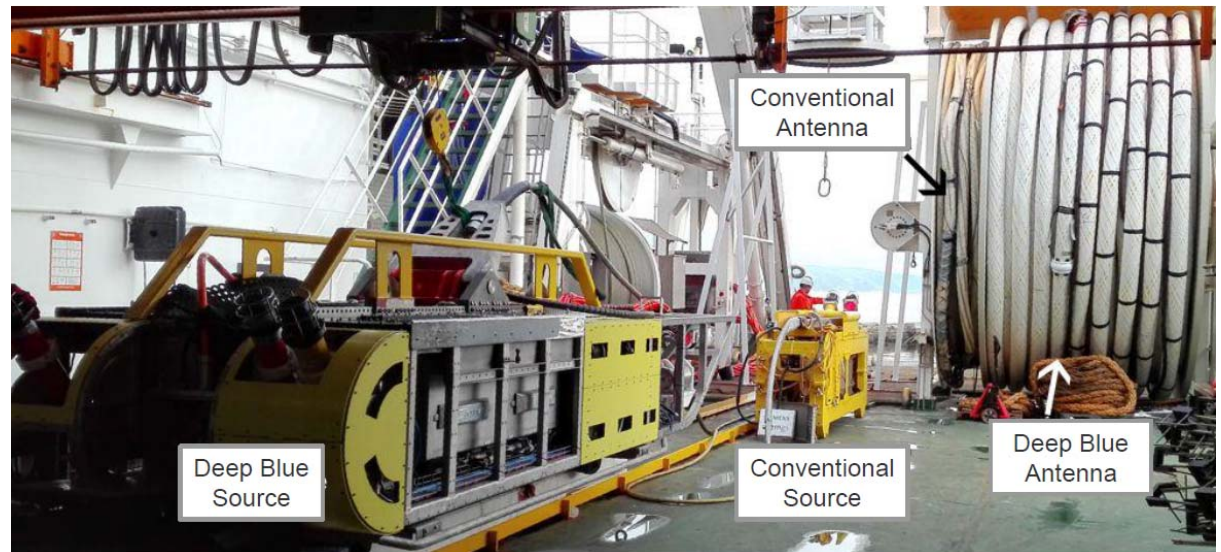
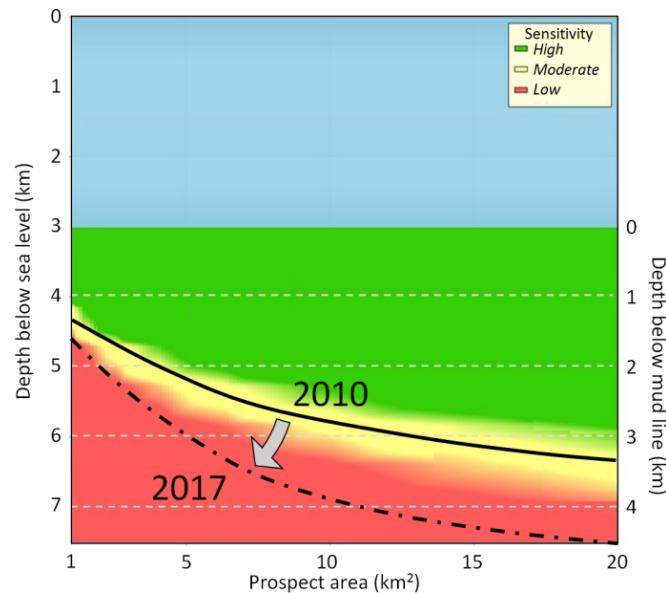
# It get's even better: Deep Blue Source installed and in use

## Commercial source system installed

- First commercial survey started in July
- Survey completed as planned
- Results to be delivered

## Deep Blue enables detection of deeper and smaller targets

- High current output (up to 10,000 A)
- High accuracy of output signal, positioning and timing
- Depth rating for 4km water depth

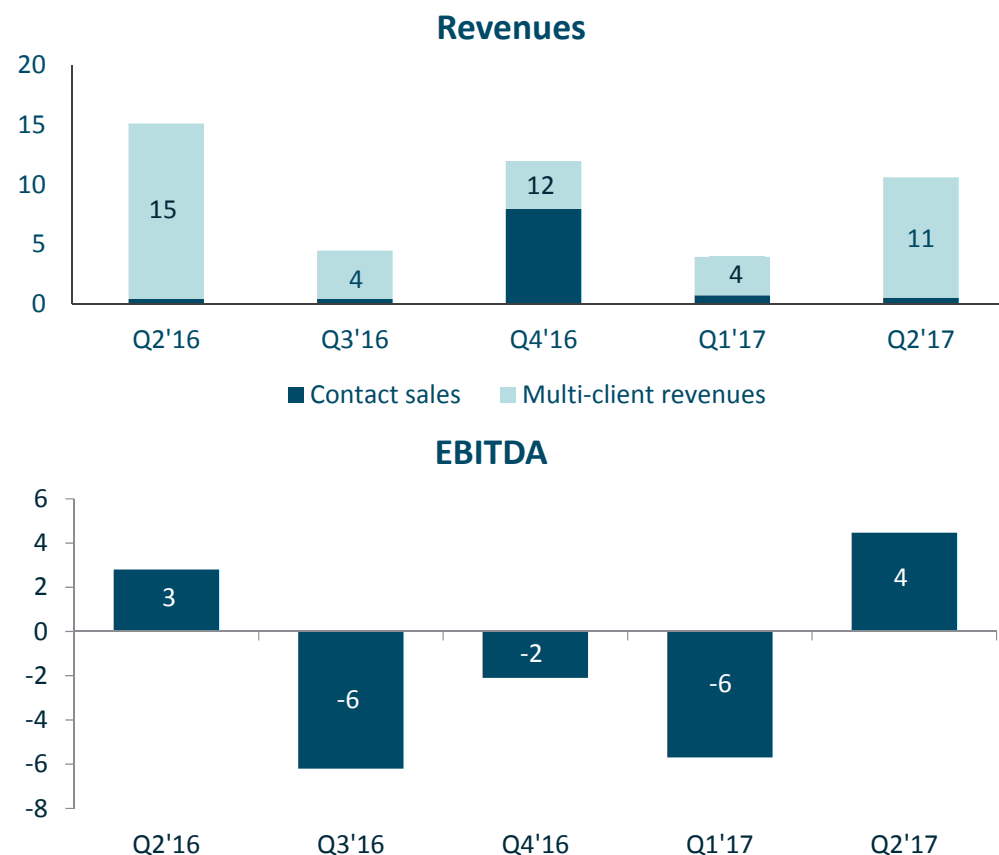


# Q2 Performance | Increase in revenues and EBITDA

## Key financial metrics

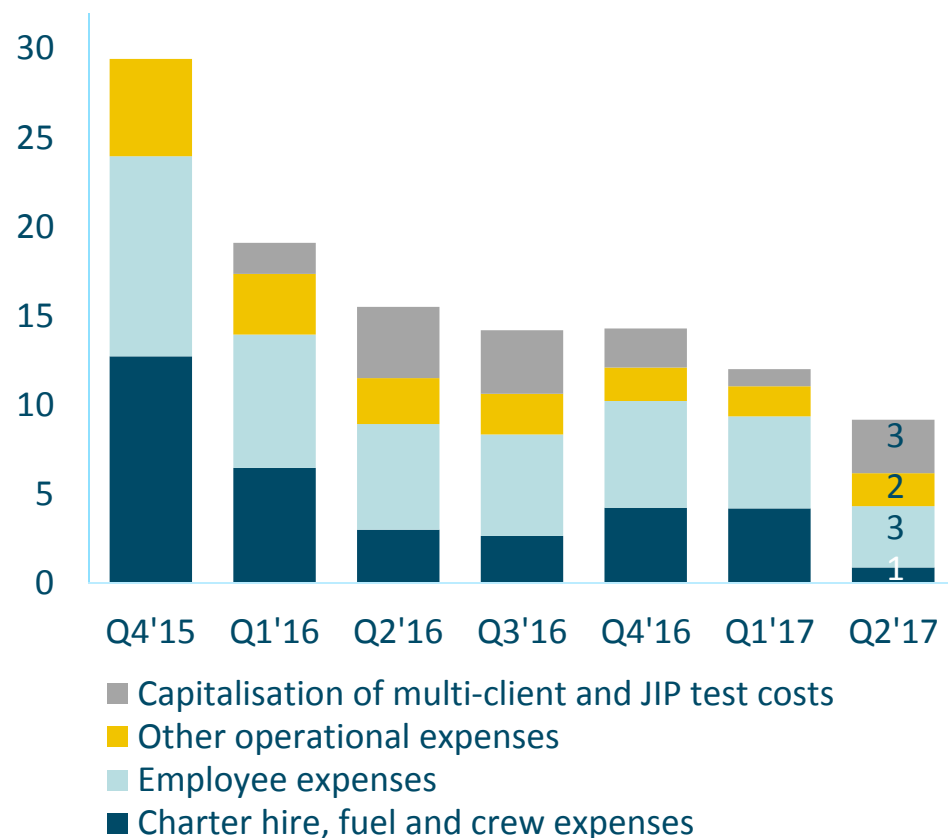
- Revenues
  - USD 10.6 million
  - Mainly multi-client revenues in Norway
- EBITDA
  - USD 4.5 million
  - Positively impacted by increase in revenues and reduced costs
- Vessel utilisation of 85% of one vessel
  - Prefunded multi-client projects in the Barents Sea

## Quarterly development (USD million)



# Q2 Cost Base update | Reduced operational costs

Quarterly operational cost base development\* (USD million)



## Comments

- Operational costs base of USD 9.2 million
  - Capitalised multi-client and JIP test expenses of USD 3.0 million
  - Vessel lease expenses for one vessel (Atlantic Guardian)
- Cost control
  - Cost control continues in 2017
  - Target the 2017 cost base below USD 50 million, subject to operational activity

\*Cost base is defined as Operational costs (charter hire etc, employee expenses, other operating expenses) plus MC investments, less provision for onerous contract, restructuring charges and other extraordinary items

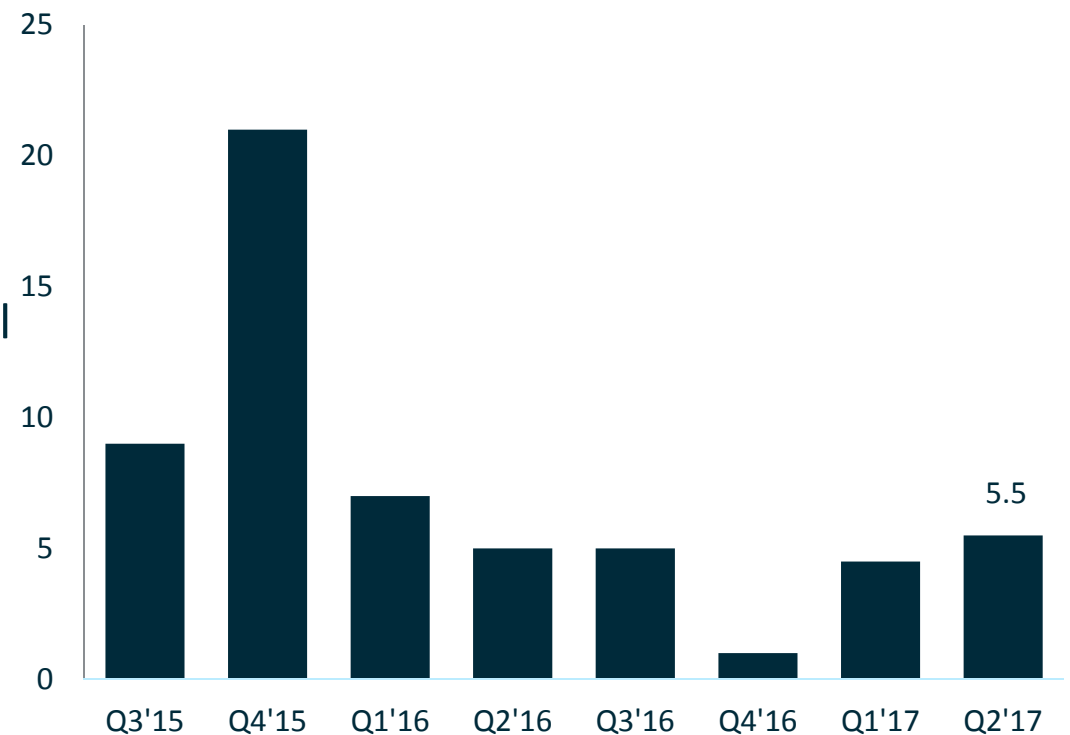


# Market update

## Comments

- Work awarded in Q2 2017 will keep the Guardian busy into Q4 2017
- Prospects are being developed to put Thalassa back at work during Q4 2017
- The market is supported by a relatively stable oil price (around USD 50 per barrel) when compared to 2016
- Initial market analysis reports caution another year of subdued spending in 2018.

## Order backlog - limited earnings visibility





Questions?

Spot the difference.