The Arctic Initiative

RDC Conference Anchorage, 14th November, 2007

Lars M. Hvalbye
Senior Advisor, Technology

StatoilHydro

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The new company

- 1.7 Mill bbloe/day production
- A world-leader in
  - deepwater technology
  - carbon capture and storage
- 31,000 employees in 40 countries

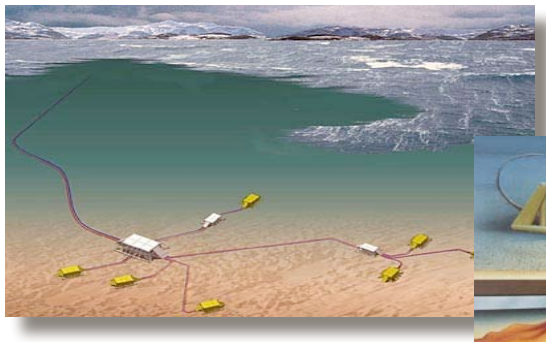
The reference projects as rucksack

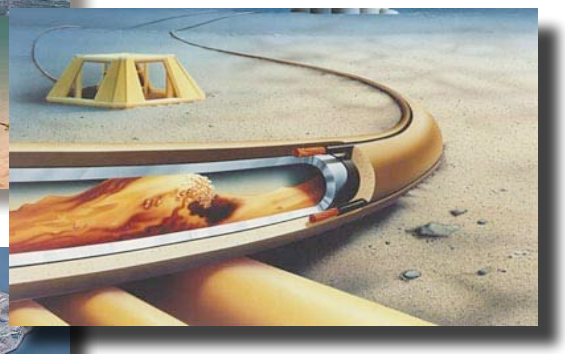
- The Ormen Lange Project – production started October 2007
- The Snøhvit Project – production started October 2007
- The Shtokman Project – in the Pre-sanction phase

Technology for the Arctic

Snøhvit
- consists of

- ✓ **Field developments offshore**
- ✓ **Pipeline to shore**
- ✓ **LNG plant on land for processing and liquefaction**
- ✓ **LNG carriers**
- ✓ **Gas to new markets**





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Ormen Lange
- consists of

- ✓ **Field developments offshore**
- ✓ **Pipeline to shore**
- ✓ **Gas plant on land for processing and export compression**
- ✓ **Pipeline to UK**
- ✓ **Gas to UK markets**

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The Ormen Lange Project

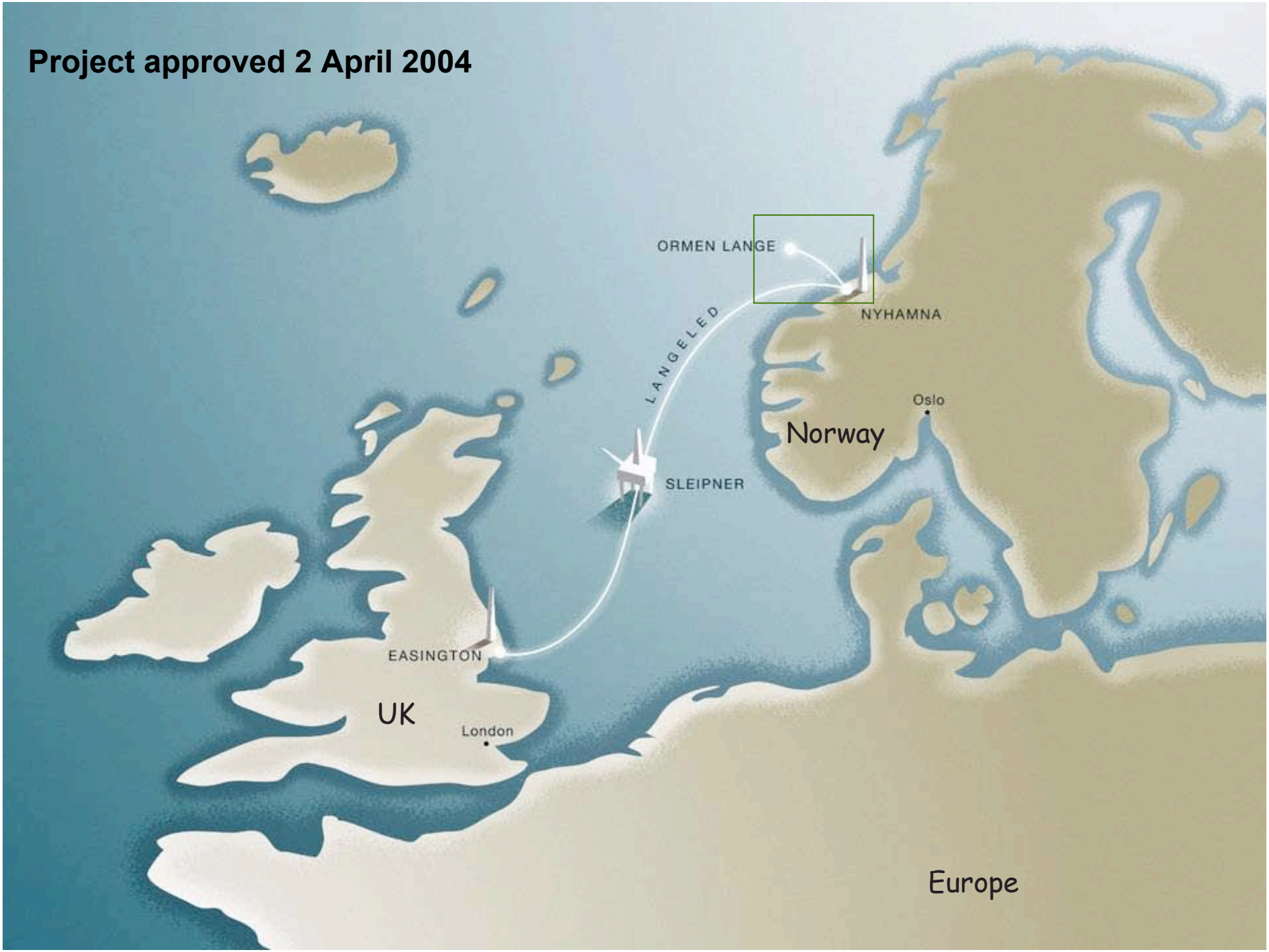
Ormen Lange – a mega gas project

- Norway's largest industrial project
- Total investments (field + pipeline): NOK_{2003} 66 billion (10 billion USD)
- StatoilHydro: Operator with 28 % equity
- Project with 75 % Norwegian content in onshore plant
- 14 TCF reserves/2500 mmcfd

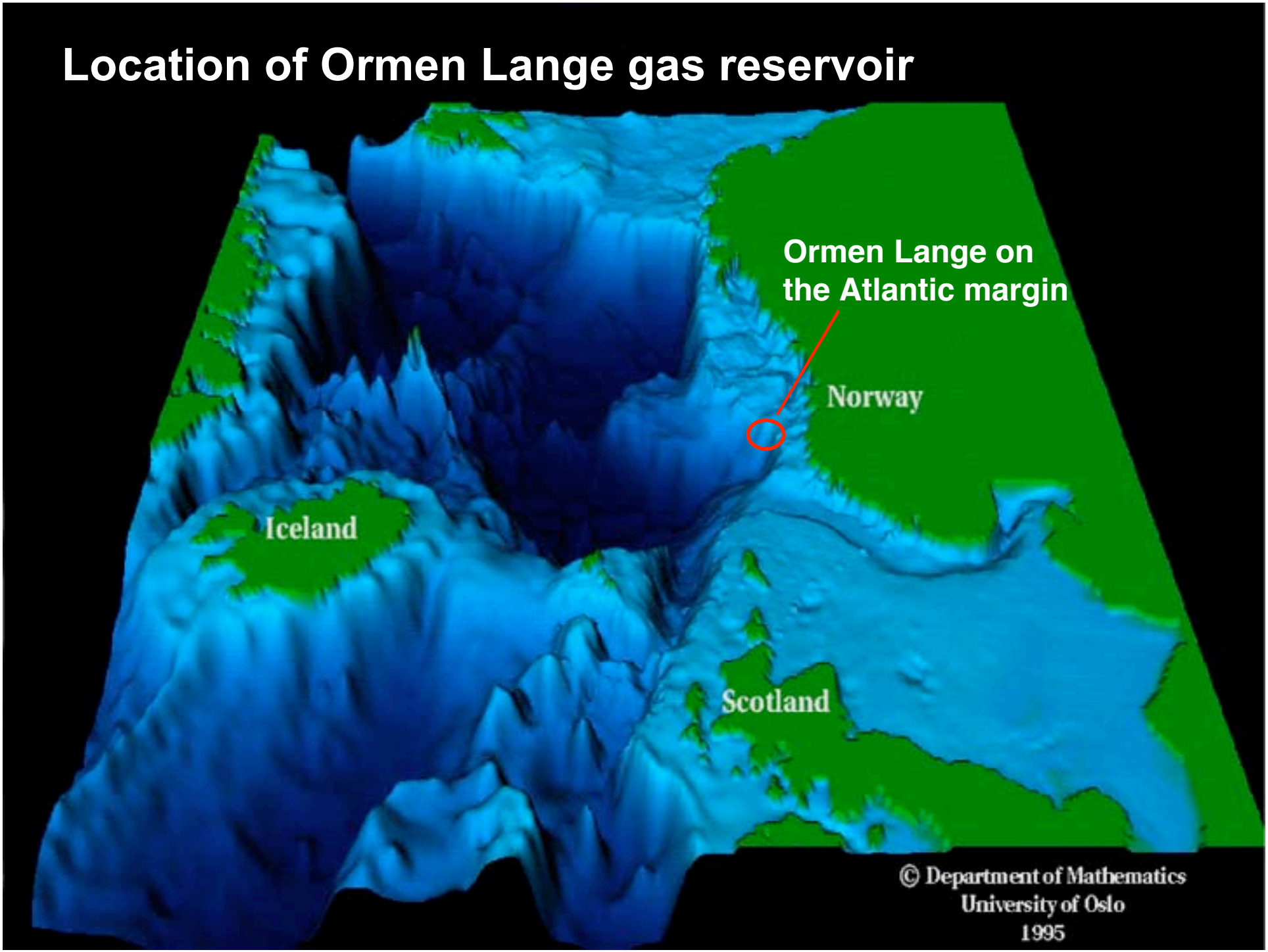
Operator for Production Phase

petoro DONG ExxonMobil StatoilHydro

Project approved 2 April 2004

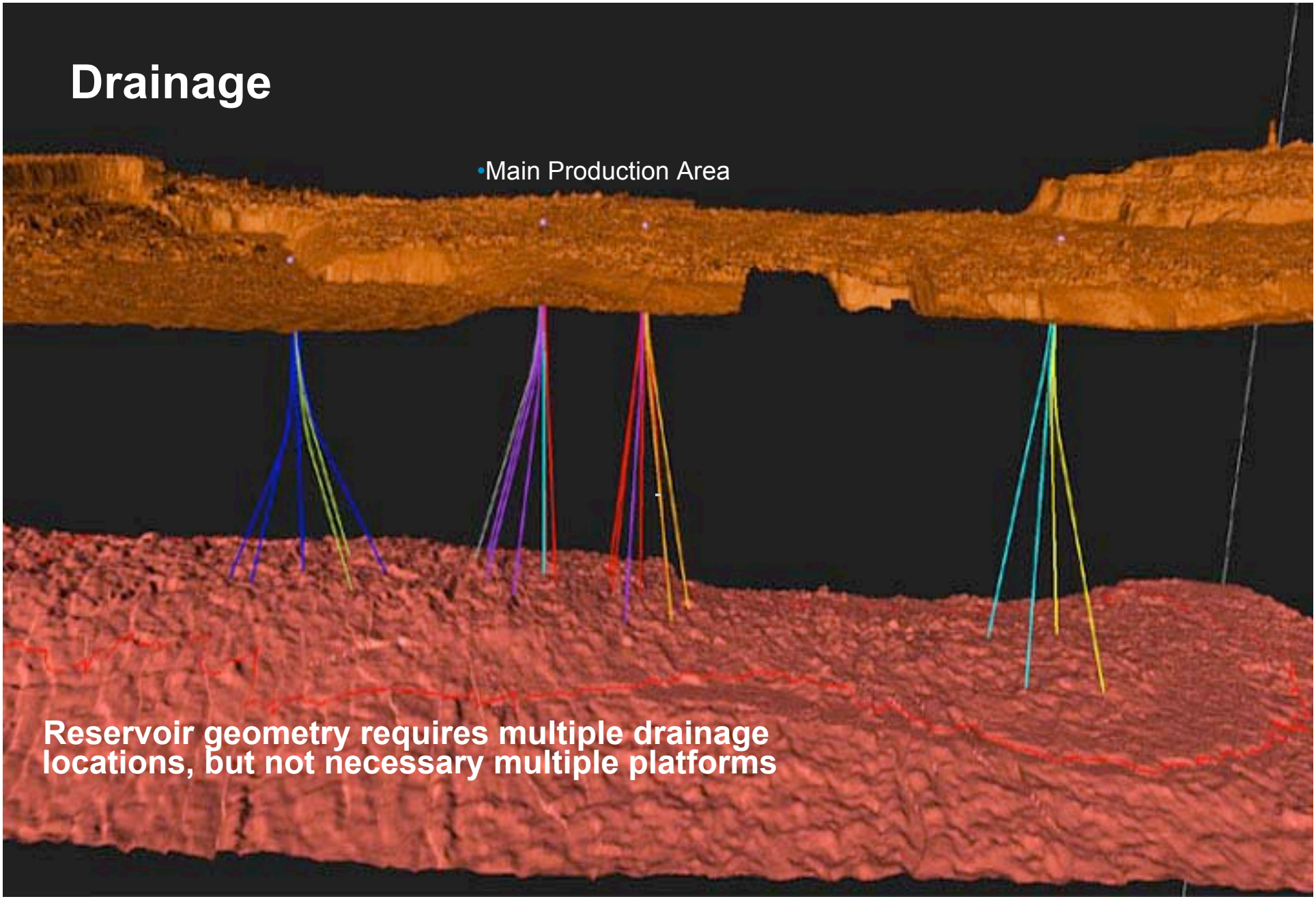


Location of Ormen Lange gas reservoir



Drainage

- Main Production Area



Reservoir geometry requires multiple drainage locations, but not necessary multiple platforms

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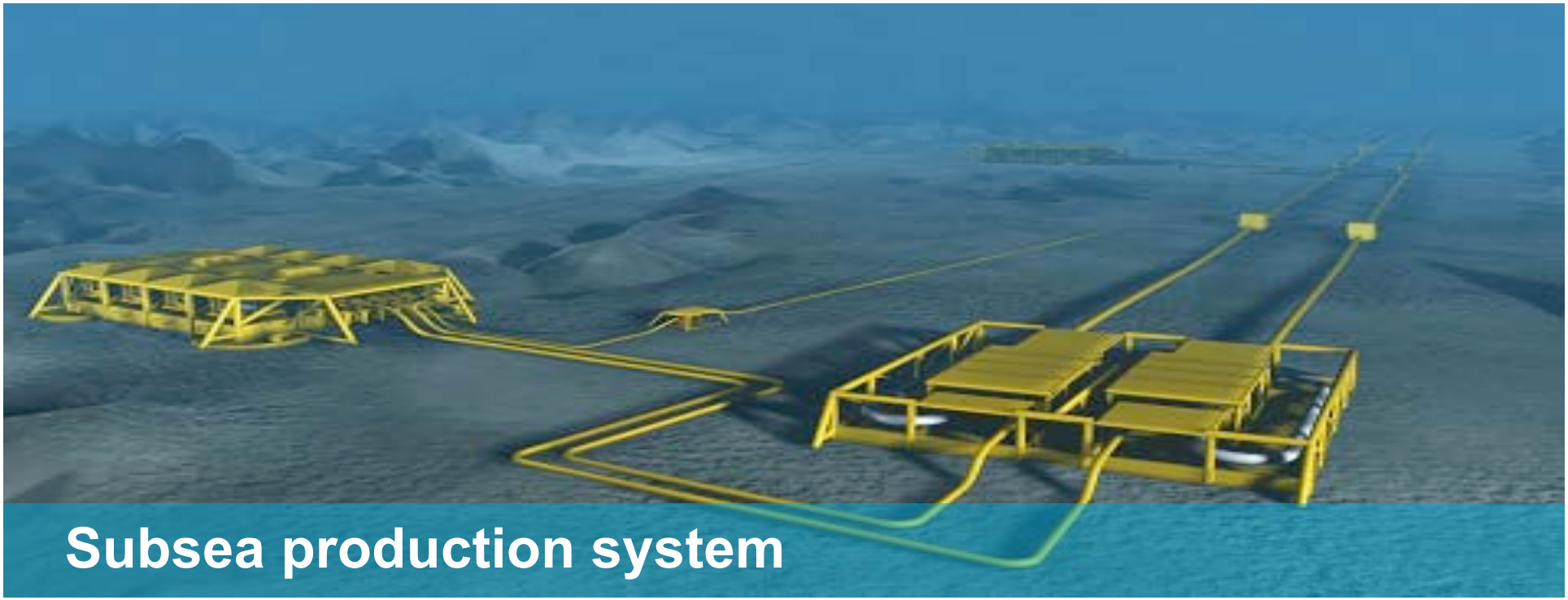

Subsea production system

- **Match the reservoir characteristics and geometry**
  - Pressure and Temperature
  - Production strategy (well rate, location, drilling schedule)
  - Monitoring and intervention requirements
- **In-sensitive to water depth**
- **Tie-back to shore**
- **Phased development based on production experience**

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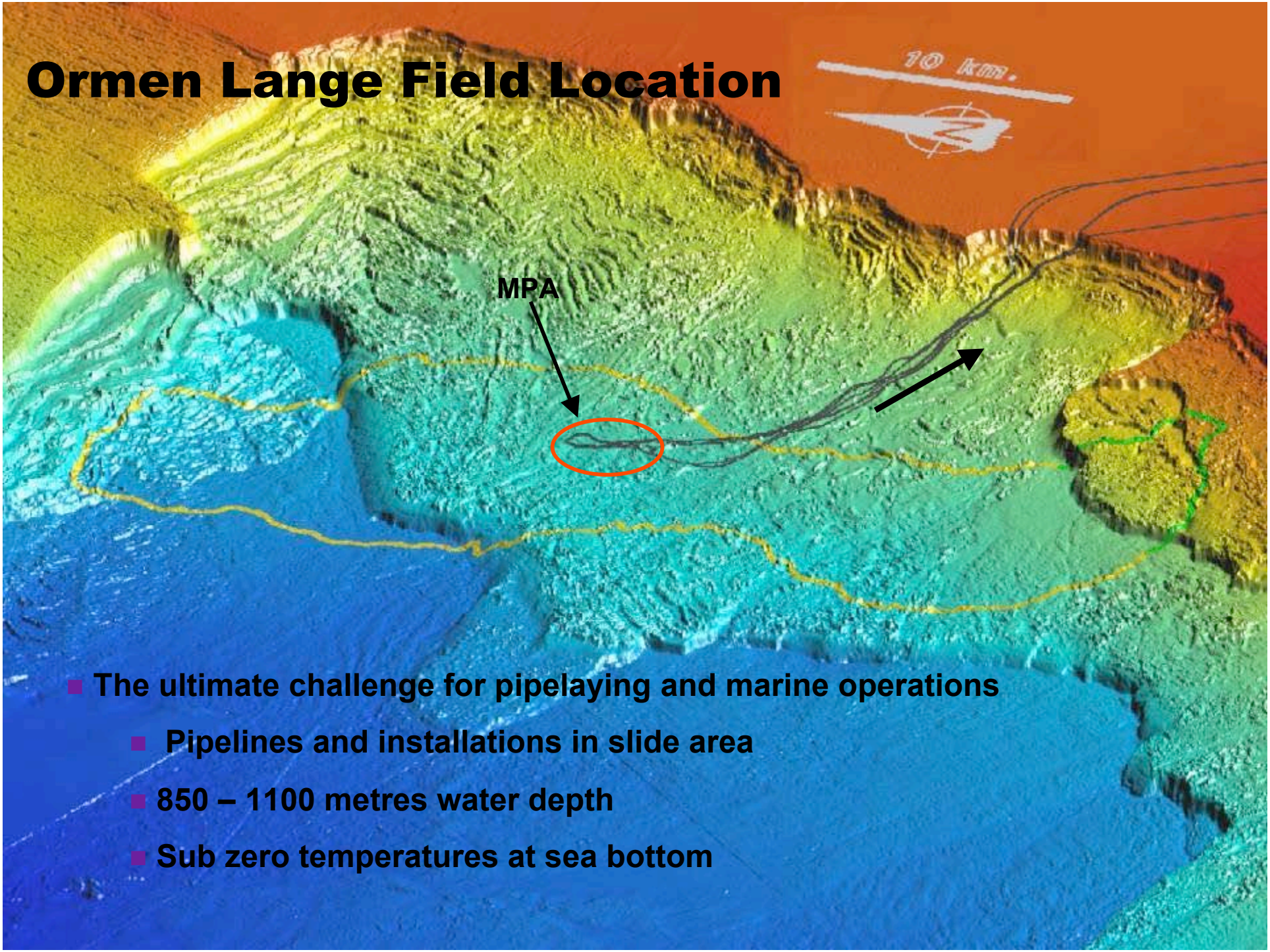
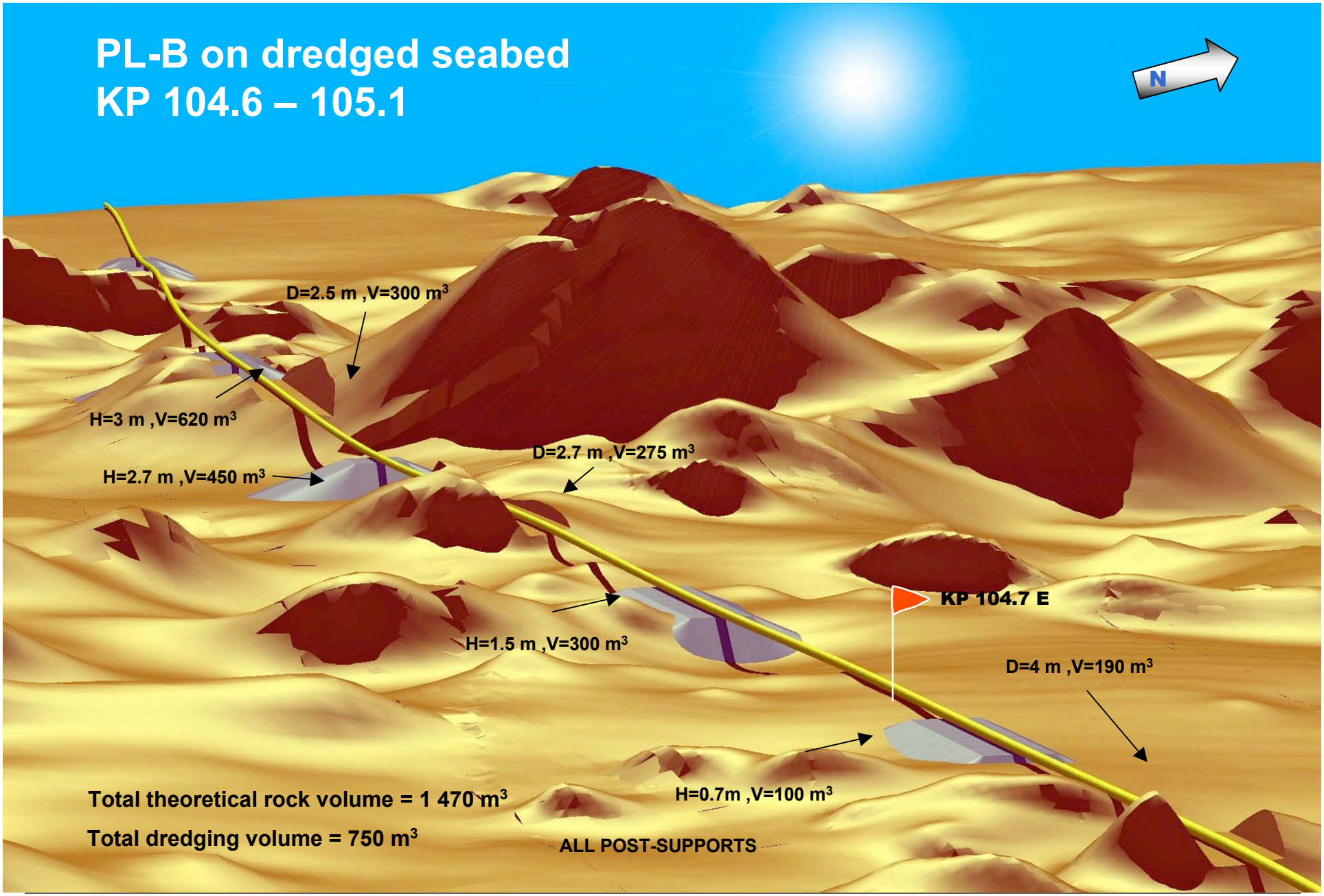
Ormen Lange Field Location



- The ultimate challenge for pipelaying and marine operations
  - Pipelines and installations in slide area
  - 850 – 1100 metres water depth
  - Sub zero temperatures at sea bottom

PL-B on dredged seabed
KP 104.6 – 105.1



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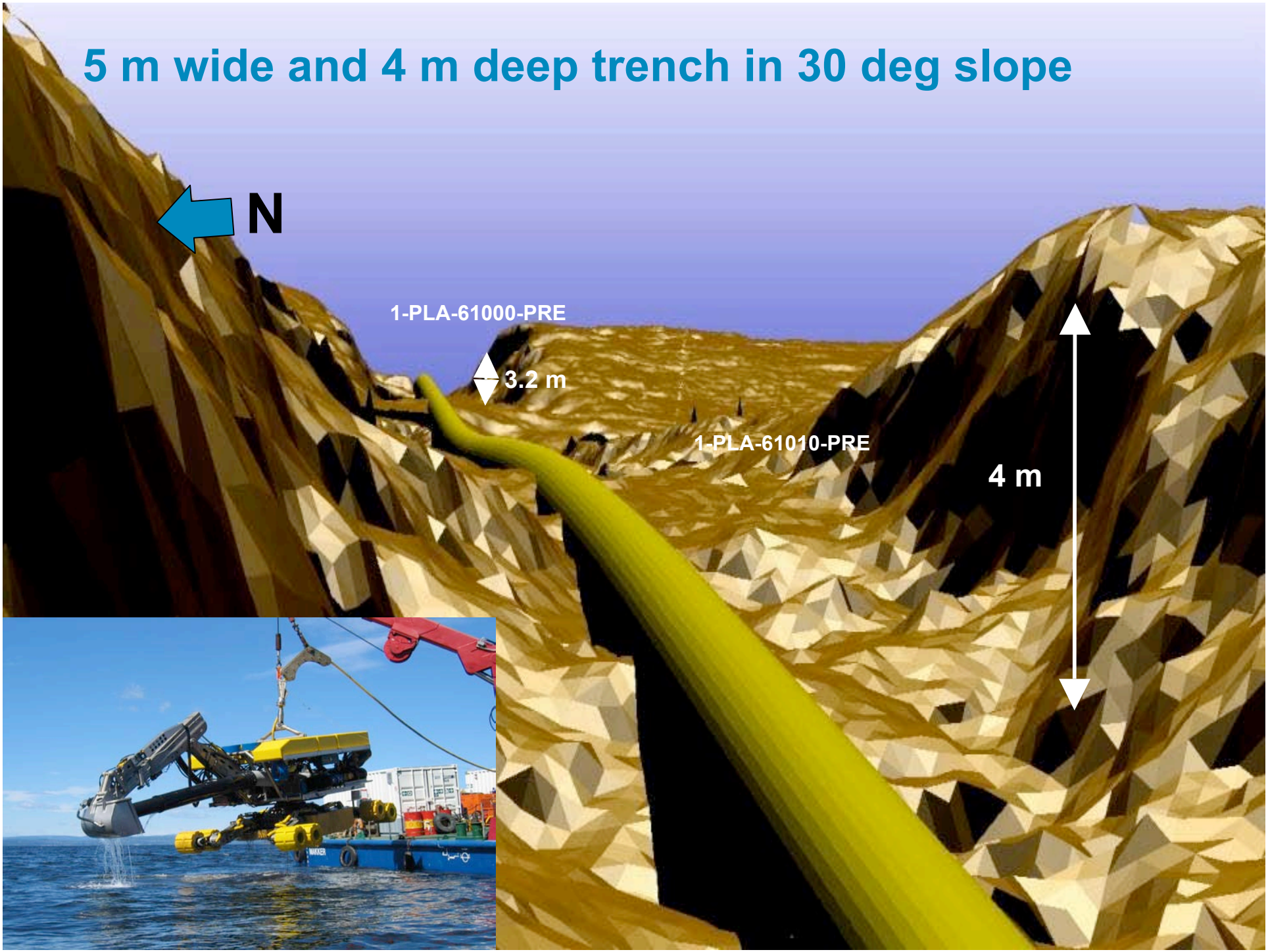
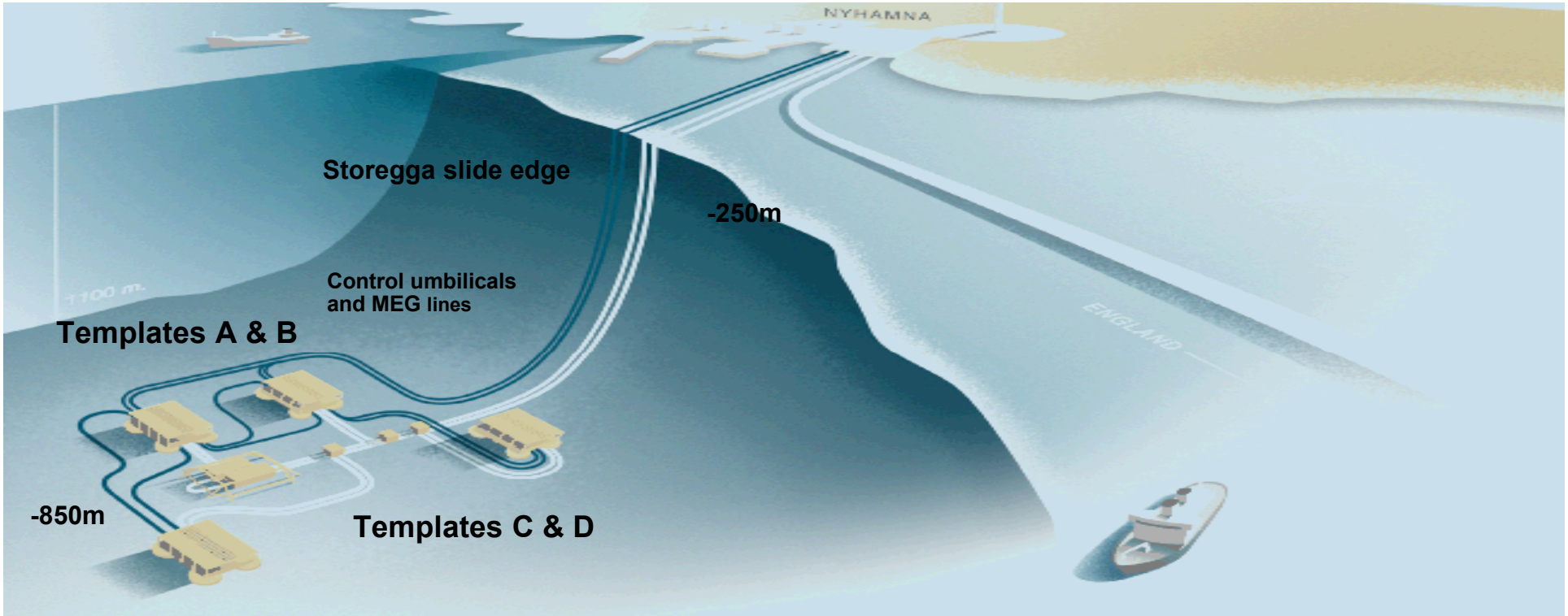
5 m wide and 4 m deep trench in 30 deg slope



Template installation

Ormen Lange - **A** Template & Manifold - August 2005



Ormen Lange

- **120 km from shore**
  - Sub zero temperatures at sea bottom
  - Flow assurance challenges solved
- **Pilot on Future compression**

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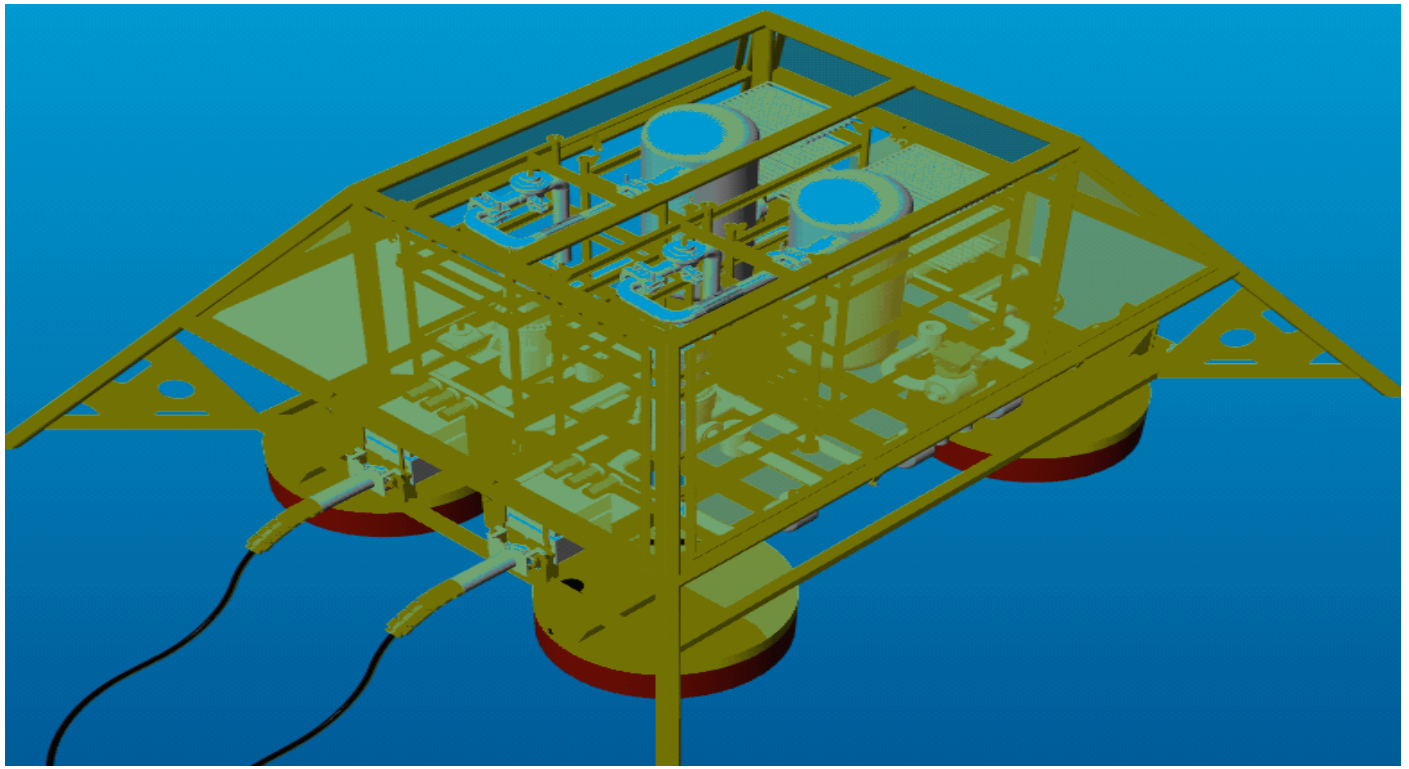
Subsea compression



Future offshore compression is required to maintain production level and recover the production volume

The project is working to mature and qualify a viable subsea gas compression alternative to the base case floating platform required in 2016

The Ormen Lange Onshore Processing Plant

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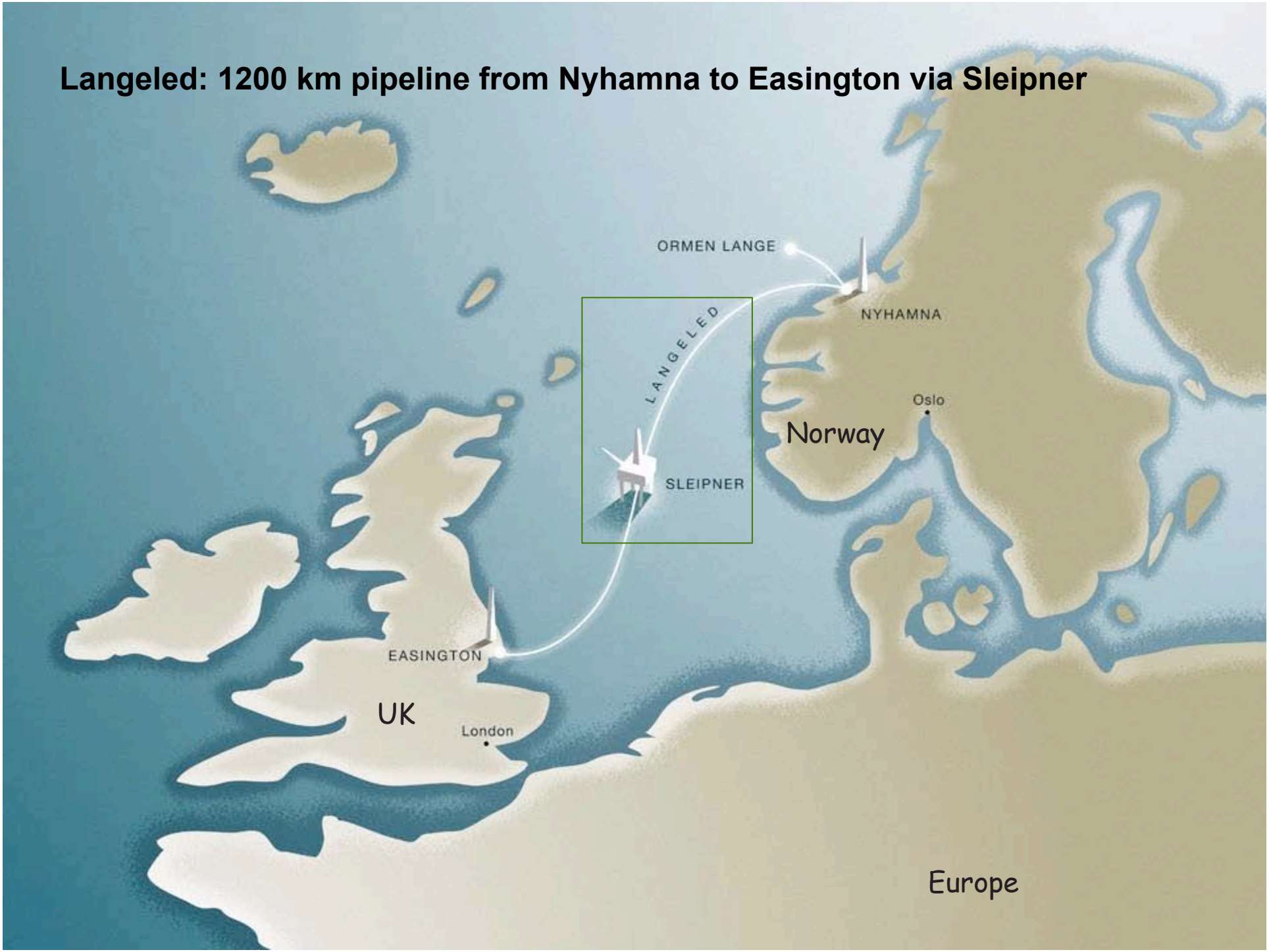
Nyhamna 27.09.2007

Langeled: 1200 km pipeline from Nyhamna to Easington via Sleipner



Langeled Pipeline at Offshore hub Sleipner A

100,000 pipes coated at Bredero in Farsund

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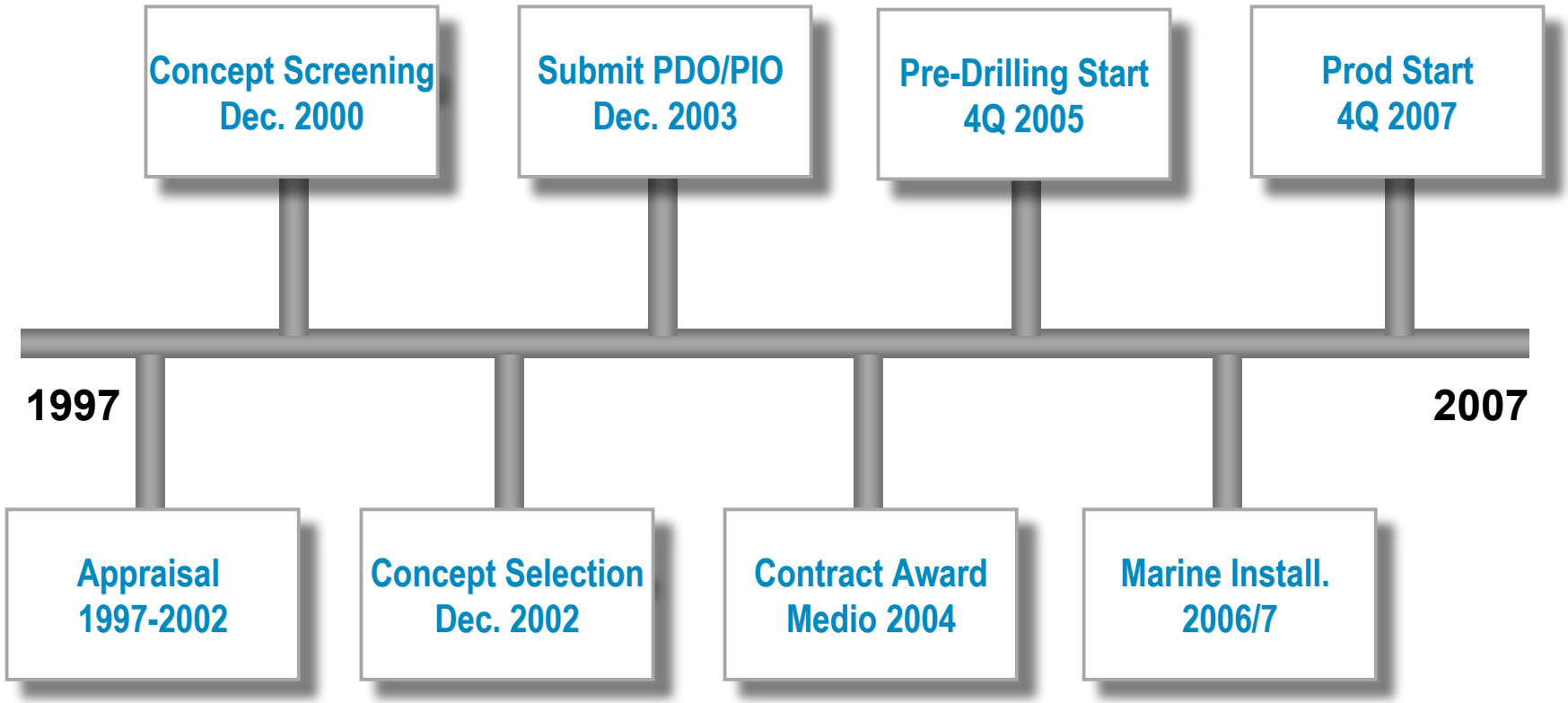
Easington in UK August 2006

Key Project Milestones



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Opening of Ormen Lange Saturday October 6, 2007

The Snøhvit Project

Snøhvit - The first gas development project in the Barents Sea

- The first export facility for LNG in Norway and Europe
- The first offshore project in the Barents Sea
- The largest-ever industrial development in northern Norway
- Total investments (field + pipeline): NOK 50 billion (7.5 billion USD)
- New technology/ new markets

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Snøhvit facts

- ✓ **Discovered: 1981 – 84**
- ✓ **Water depth: 250 – 340 m**
- ✓ **Distance to shore: 140 km**
- ✓ **Reserves 222 GSm³ / 7.8 TCF**
- ✓ **Condensate: 34 MSm³ / 214 mmbbl**
- ✓ **Owners:**

StatoilHydro ASA (Operator) 33.53%

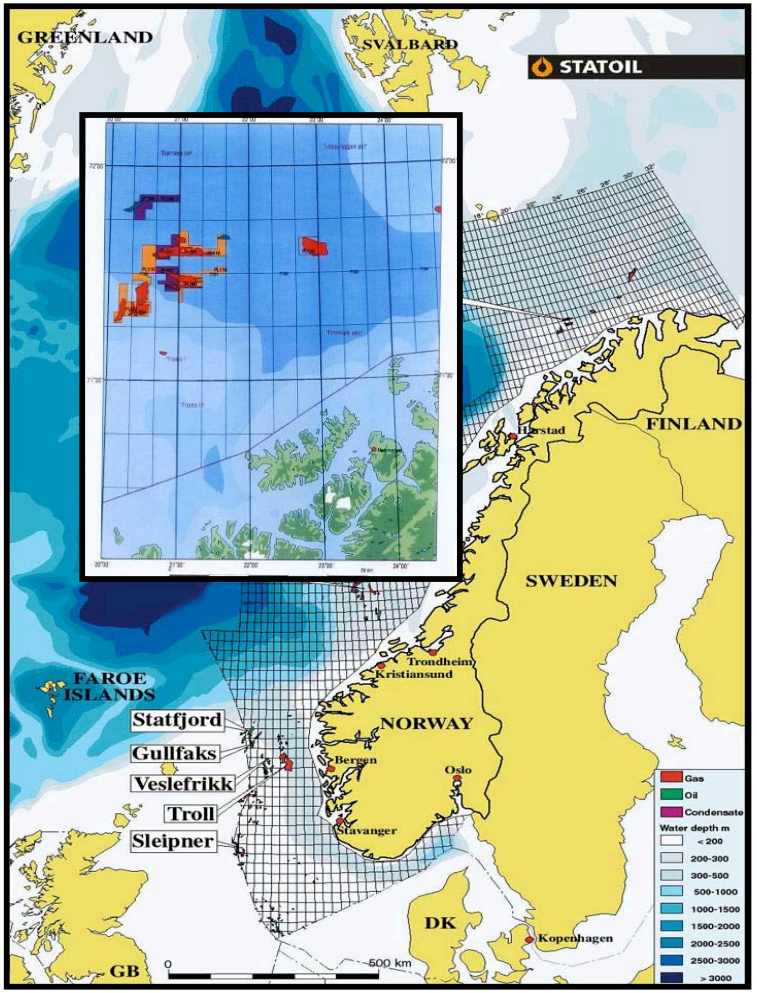
Petoro AS 30.00%

Total E&P Norge AS 18.40%

Gaz de France Norge AS 12.00%

Amerada Hess Norge AS 3.26%

RWE Dea Norge AS 2.81%



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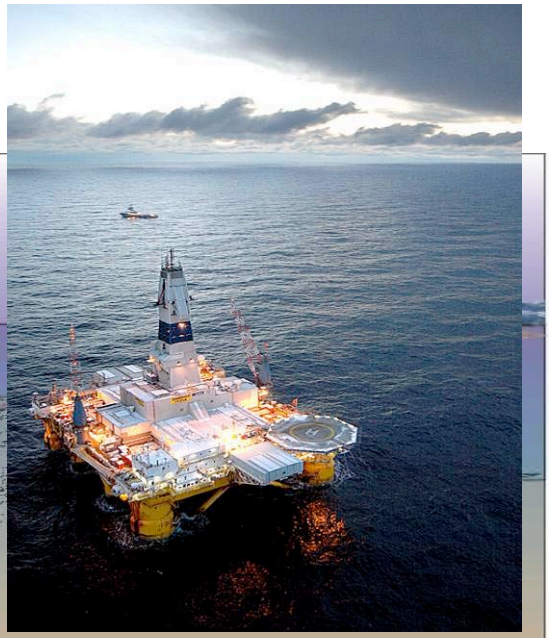
Subsea Production System



- **Subsea development**
- **Initially no installations on the surface**
- **No toxic discharges to the sea**

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Subsea Production System Challenges

- **Flow Assurance**
  - Long distance to shore
  - Rough seabed
- **Long distance control and monitoring**
- **Future Compression**

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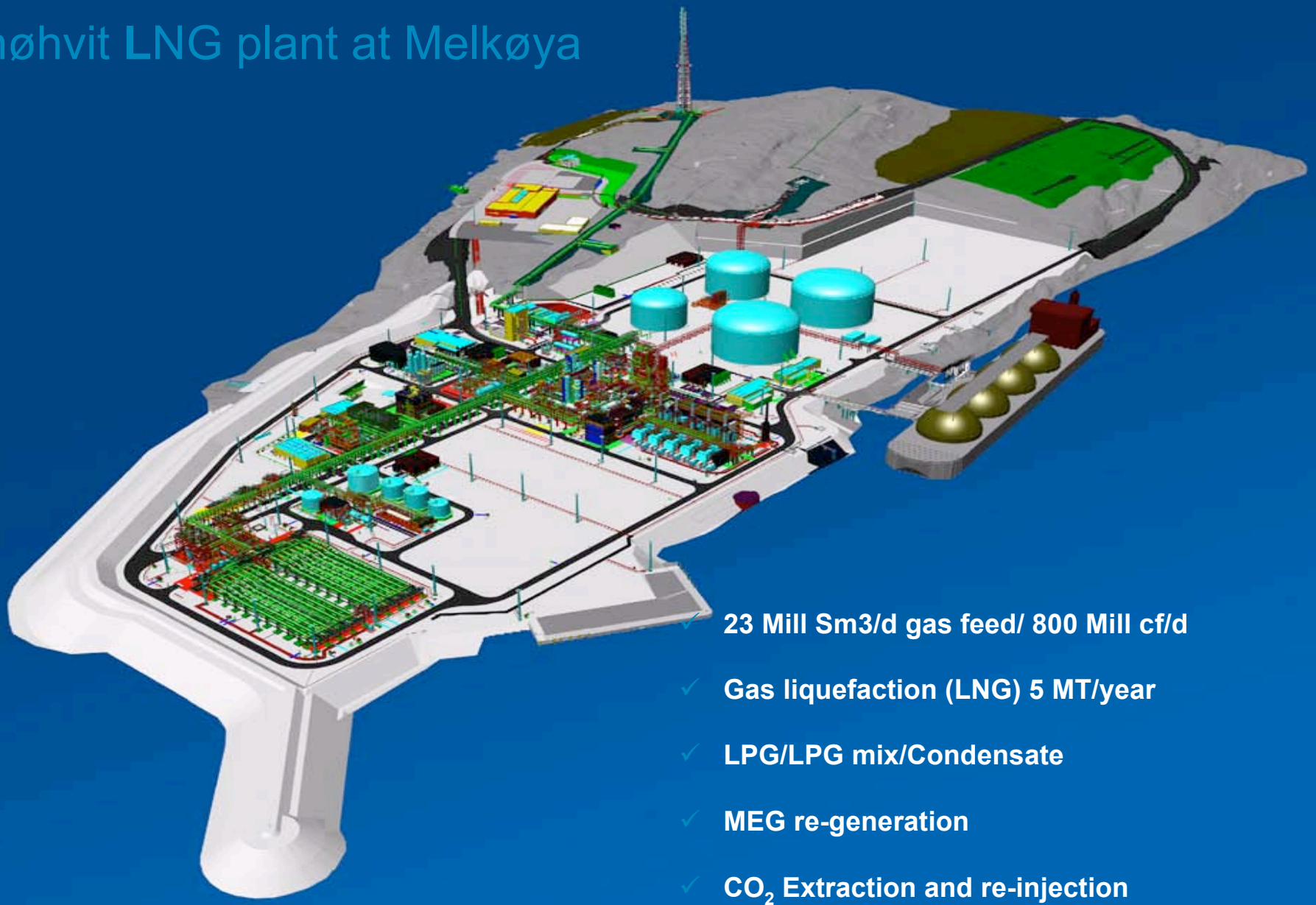
Snøhvit LNG plant at Melkøya



- ✓ 23 Mill Sm3/d gas feed/ 800 Mill cf/d
- ✓ Gas liquefaction (LNG) 5 MT/year
- ✓ LPG/LPG mix/Condensate
- ✓ MEG re-generation
- ✓ CO_2 Extraction and re-injection

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Construction Challenge

- Harsh weather conditions and limited infrastructure made prefabrication a necessity
- Valuable lessons learnt in project management of complex onshore plant

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Sea-spray on structures in the last winter storm ....

Marine transport of Cold box

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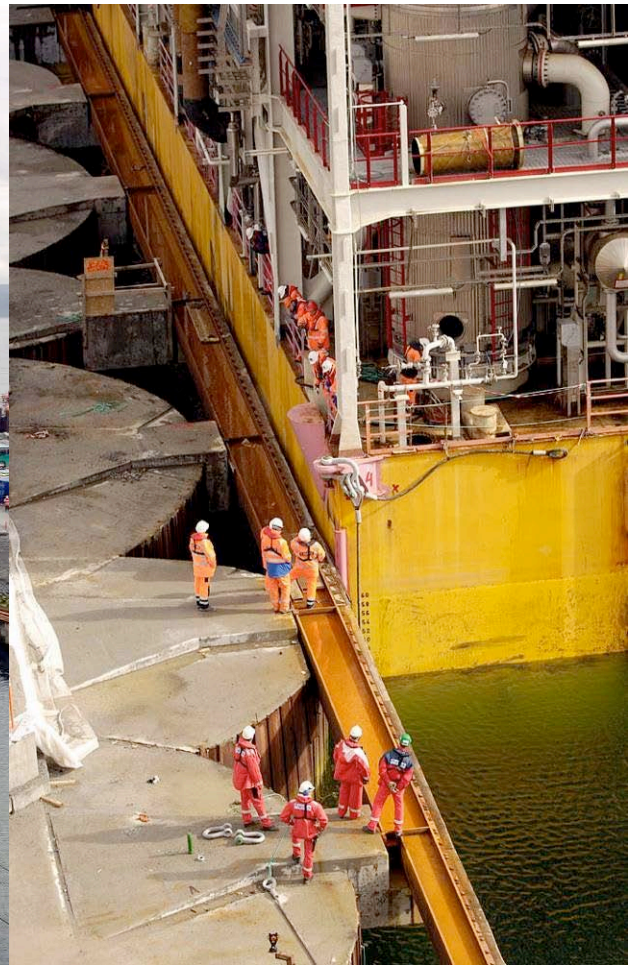
Snøhvit - docking of the process barge



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Snøhvit – First LNG shipment 21 October 2007

Melkøya Oct.2007

Shipping and new markets

Melkøya - Cove Point: 20 days ”return”
Melkøya – Bilbao: 12 days ”return”

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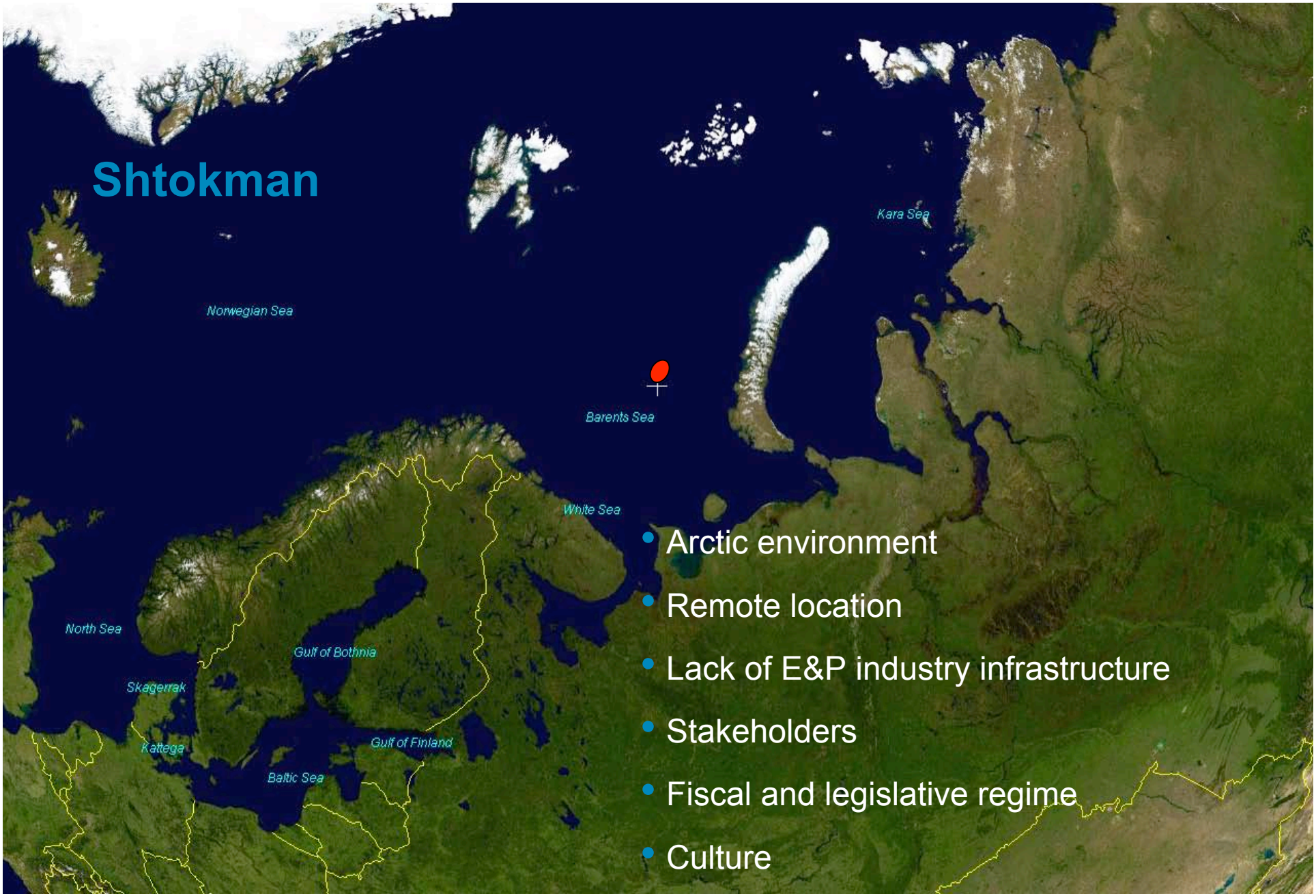

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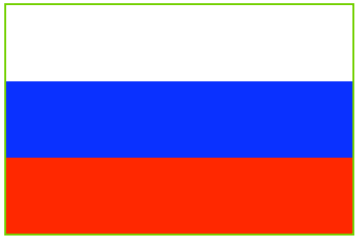
Shtokman

StatoilHydro Agreement with Gazprom – a major step in the Arctic



Gazprom CEO, Mr. A Miller:

- a new page in cooperation
- a keystone in successful operations in the Arctic

StatoilHydro CEO, Mr. H Lund:

- our technology, industrial experience and expertise offshore provide long-term growth opportunities in Russia

Field development Challenge in arctic

- All types of Ice
- Remote locations
- Extreme weather
- Limited support and logistics
- Strict environmental conditions

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What do you have in your rucksack?

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