The Norwegian up-stream pipeline network

Brussels, 13 May 2014

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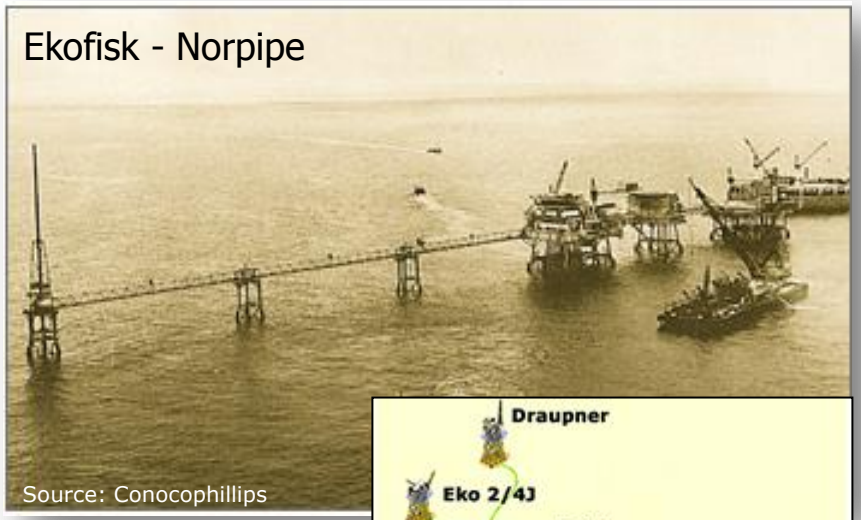
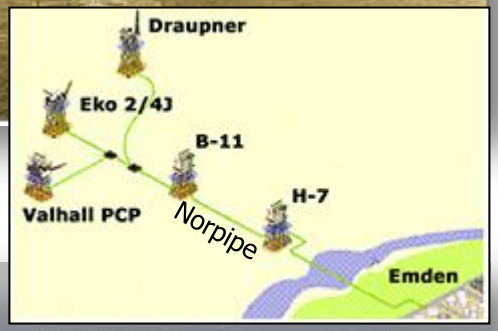
Key figures for the Norwegian petroleum sector

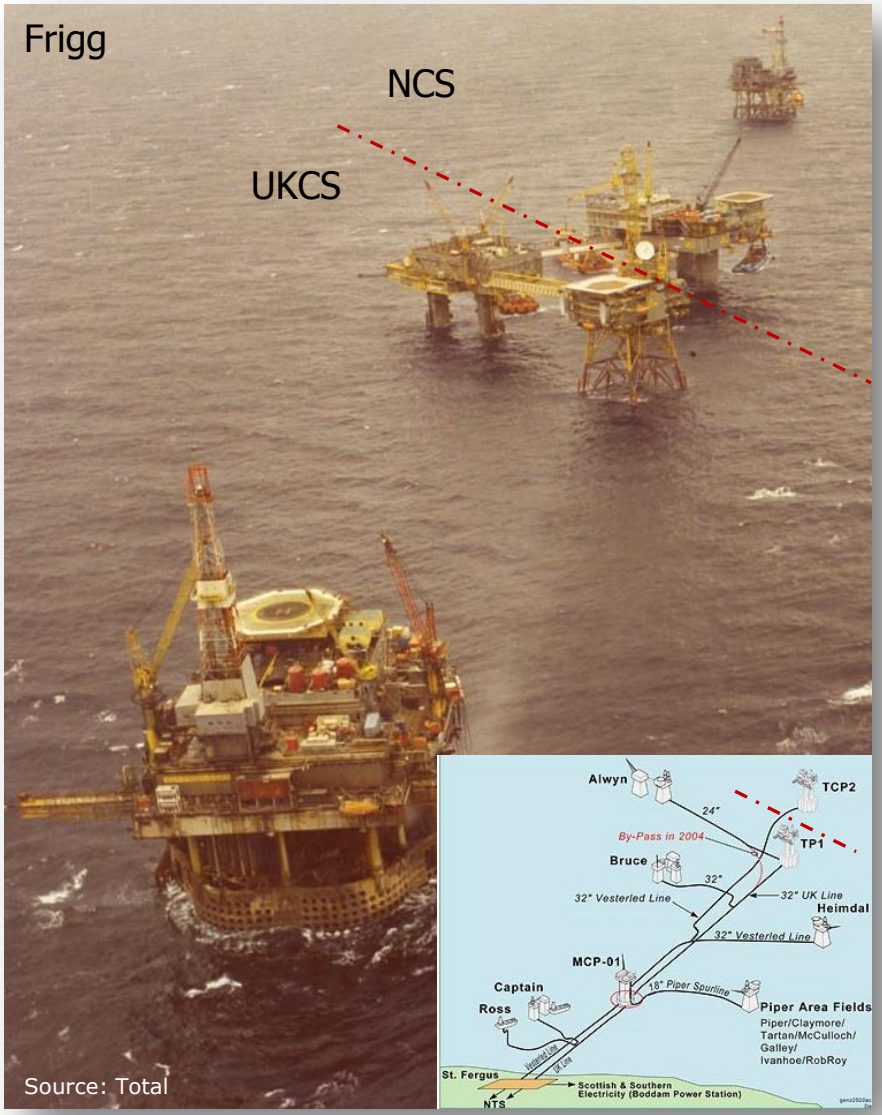
2013

- 78 fields in production – more than 50% of the resources are yet to be produced
- 55 companies are license holders on the Norwegian Continental Shelf (NCS)
- 59 wells drilled in 2013
- The investment level in 2013 was ~25 B€ (incl. exploration cost)
- Oil production (incl. NGL and condensate) in 2013 was about 1.8 million bbl/d
- Gas sale in 2013 was 108.7 GSm³

The Norwegian gas story started in 1977







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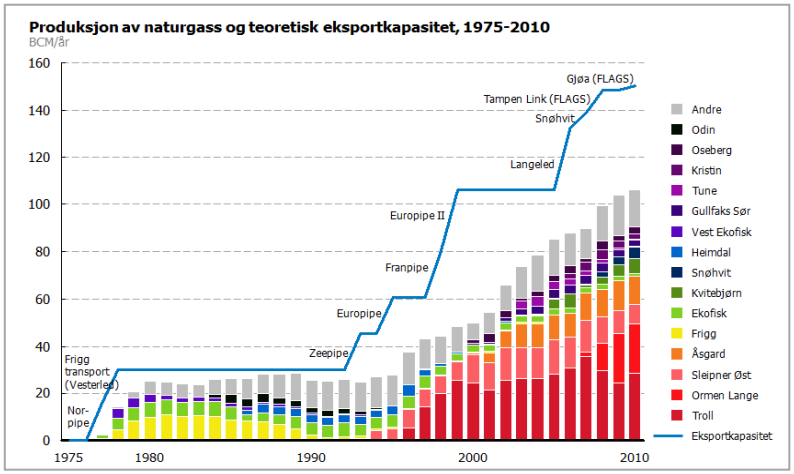
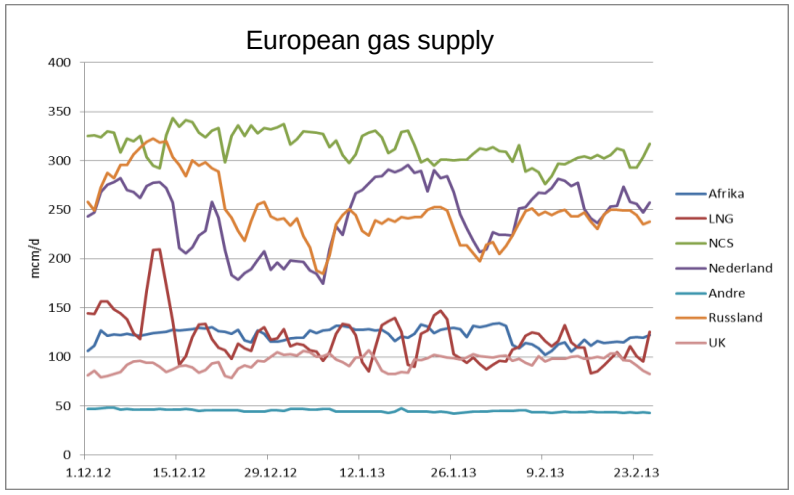
The Norwegian gas infrastructure is developed over the last 40 years





Source: European TSO

- Important milestones:
  - 1977: Start-up Norpipe and Frigg
  - 1985: Start-up Statpipe/Kårstø
  - 1996: Start-up Troll/Kollsnes
  - 1999: Start-up Åsgard
  - 2007: Start-up Ormen Lange/ Nyhamna
- Norway has developed a unique and cost effective gas infrastructure
- Western Europe most important gas source:
  - Russian pipeline gas
  - Norwegian pipeline gas
  - Indigenous production
  - North Africa
  - LNG

Gassco is the operator of the integrated Norwegian gas transport system

- Connected to all major gas-producing fields on the NCS
- 8 000 km of large-diameter, high-pressure pipelines
- Riser platforms
- Large processing facilities in Norway
- Receiving terminals in four European countries
- Connected to major downstream gas transmission systems in Europe and the UK
- Organised as a joint venture – Gassled
- 99.68% system regularity in 2013

The integrated Norwegian up-stream pipeline network

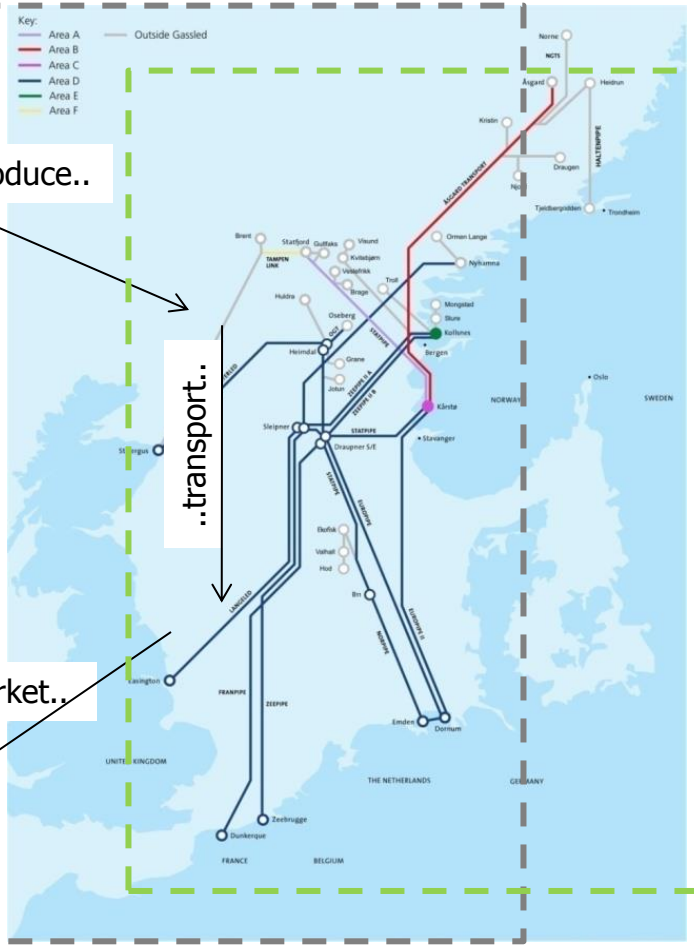
Oil and gas companies individually..

..produce..

..transport..

..and market..

.. their own gas



Special features

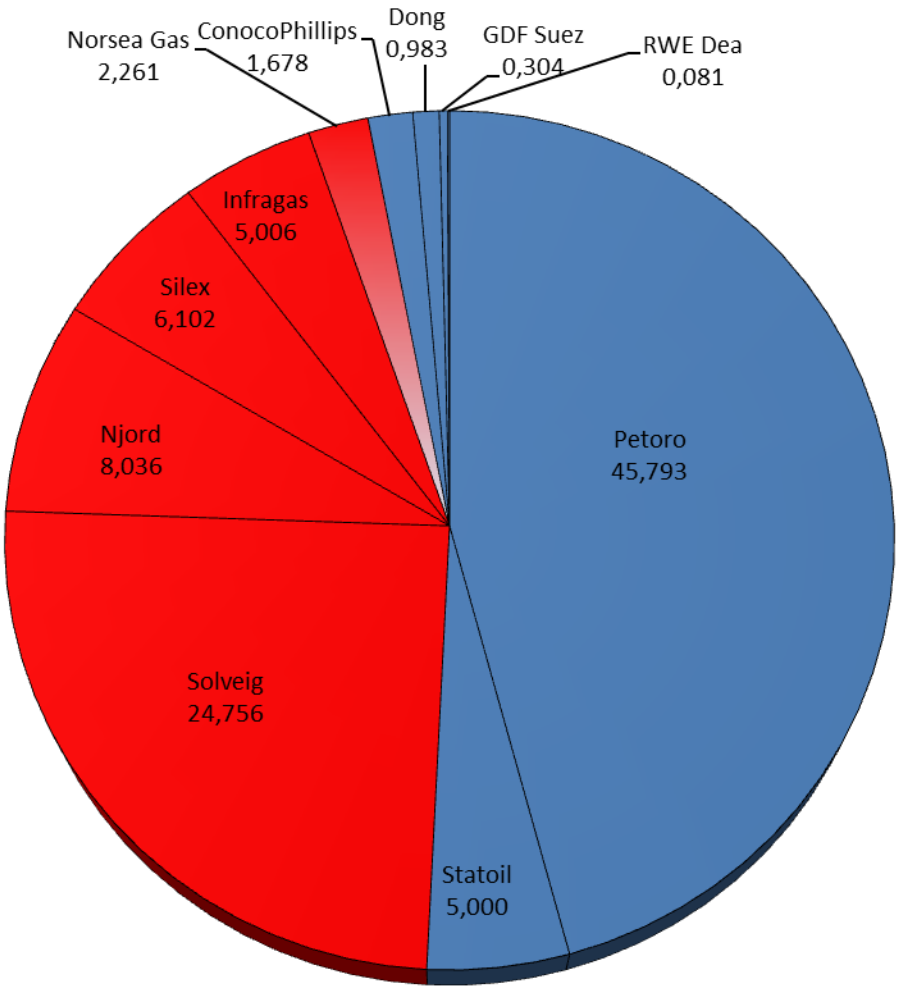
1. Regulated regime
2. User and owner engagement
3. Independent system operator

- ✓ Non-discriminatory
- ✓ Transparent
- ✓ Efficient

The number of shippers have increased the latest years

Note: Some of the above companies have more than one shipping entities setup as authorised shipper

The transportation system is owned by the Gassled joint venture



Njord Gas Infrastructure AS

- UBS International Infrastructure Fund 82 %
- CDC Infrastructure SA 18 %

Solveig Gas Norway AS

- Canada Pension Plan Investment Board 40 %
- Allianz Capital Partners 30 %
- Infinity Investments SA 30 %

Silex Gas Norway AS

- Allianz Capital Partners 100 %

Infragas Norge AS

- Public Sector Pension Investment Board 100 %

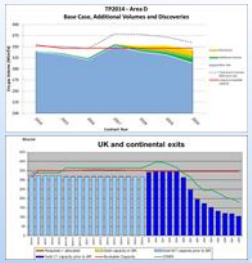
Norsea Gas A/S

Petoro	40,01 %
Solveig	35,25 %
Silex	14,40 %
ConocoPhillips	10,34 %

Work processes for gas infrastructure development

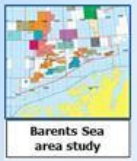
1 Transport Plan

- Annual, systematic effort aggregating data on outlook for gas production, capacity utilization, bookings
- Assessment of available capacity and needs for investments



2 Area studies

- Detailed studies on long-term capacity needs and solutions in specific areas of NCS
- Based on needs identified through Transport Plan or due to new field development projects

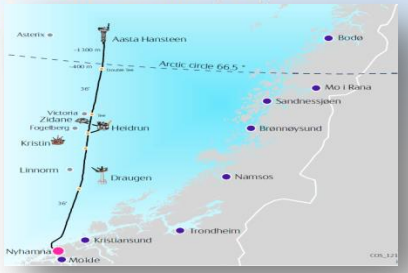


3 Field infrastructure studies

- Independent evaluation of infrastructure solutions leading up to concept selection stage
- Evaluation based on a range of criteria, including technical criteria, project economics and NCS economics

4 Development projects

- Leading infrastructure development projects towards concept selection, investment decision and execution
- Based on needs identified by Gassco or third party



5 Interaction with stakeholders

- Interaction with stakeholders regarding development of gas infrastructure (government, regulator, owners, users)
- Cooperative arenas (IAB, etc.)

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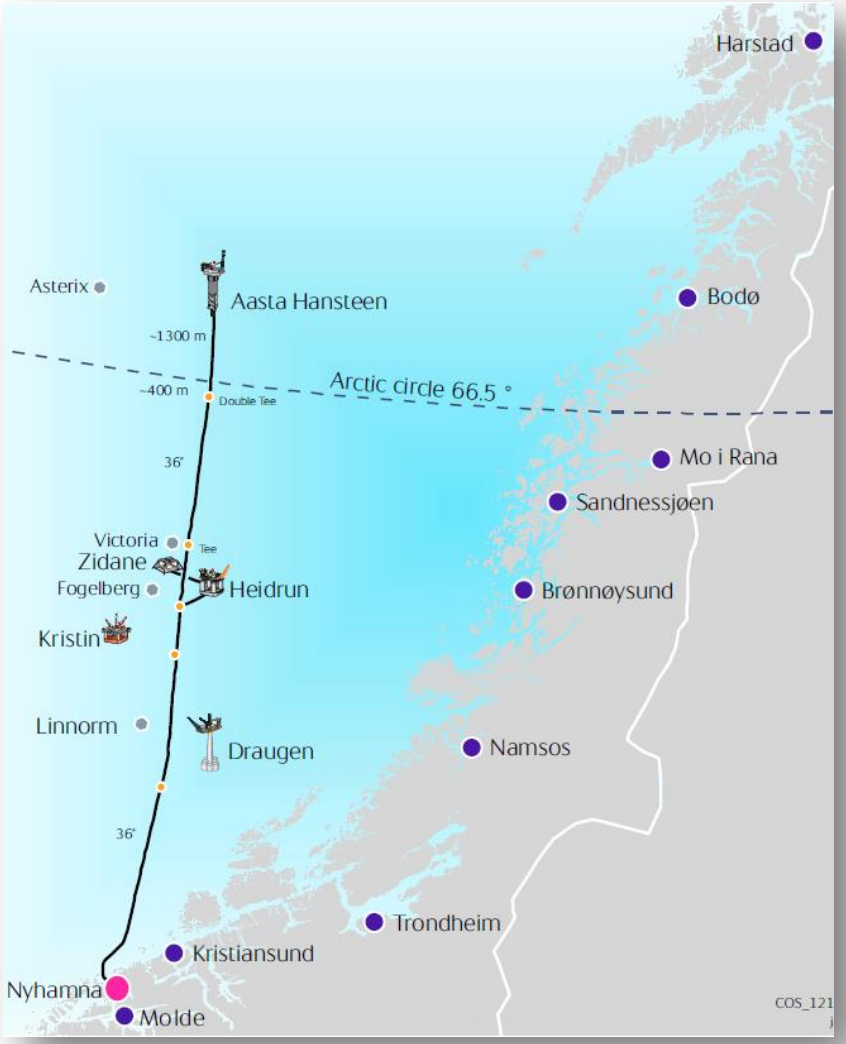
The Norsea Gas Terminal has been in operation for more than 35 years and will be upgraded to ensure safe and reliable operation

- Gassco Emden Project
- Investment decision Q4 2012, start-up October 2016
- Investments; ~6 BNOK (~750 M€)

Extending the gas value chain northwards

- One of Europe's largest industrial projects the next years
- First crossing of Artic circle with a subsea pipeline
- Deepest field development and pipeline on NCS
- Increased processing- and export capacity at Nyhamna
- Investment decision 1Q 2013, start-up 2016

Polarled Pipeline Project



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Aasta Hansteen is the worlds largest Spar and first Spar FPSO

Photo: Aker Solutions/ANB

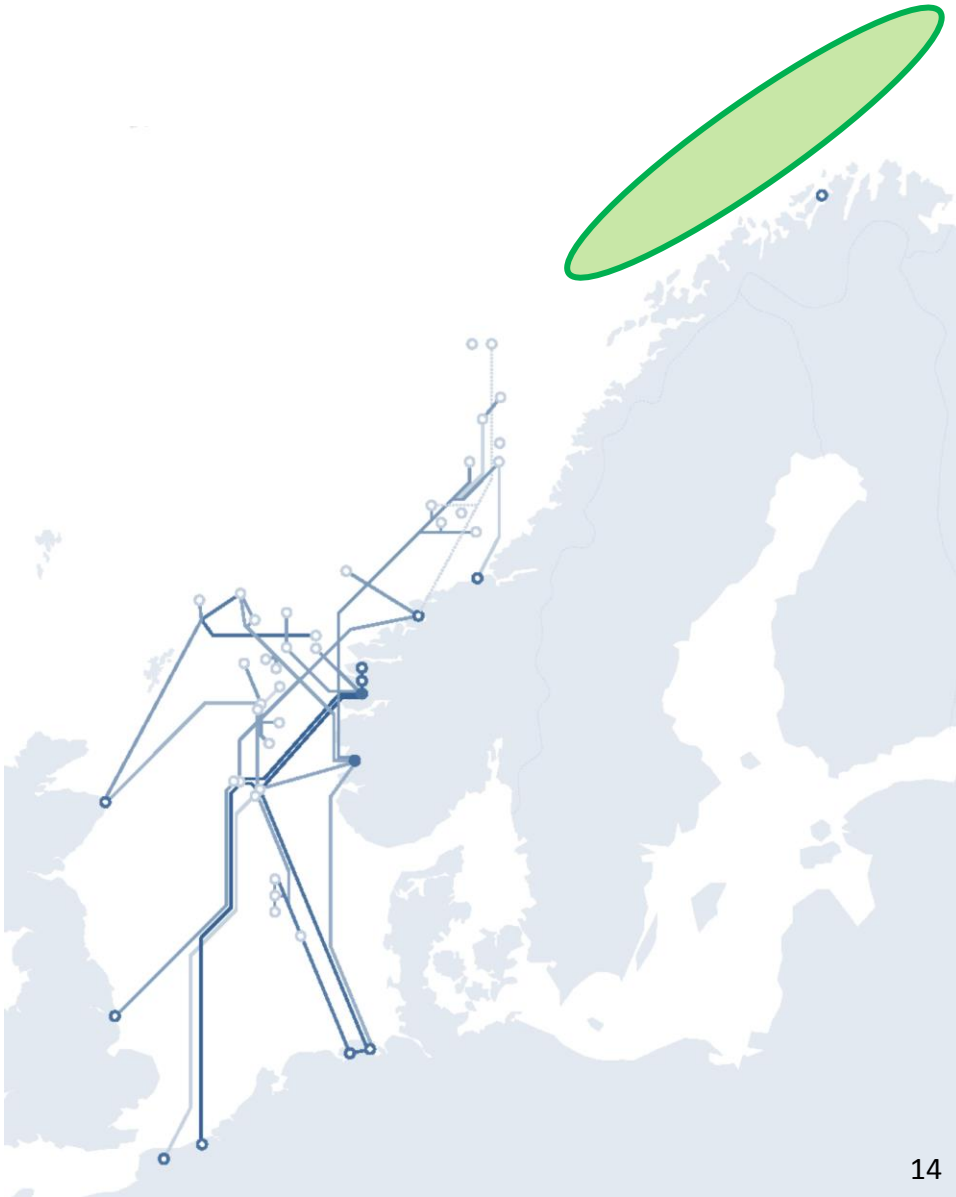
- 198m high
- 1300m water depth
- Harsh weather conditions
- Remote located, >300 km from shore

- 3.8 B€ investments
- 45 BCM of gas reserves
- 23 MSm³/d export rate

- Potential host for future volumes

Development of the resources in the Barents Sea require infrastructure solutions

- Several promising discoveries are made in the recent years
- The industry interest and expectations is high
- The exploration activity in the Barents Sea is extraordinary high
- Long distance to existing infrastructure require development evaluation in an area perspective



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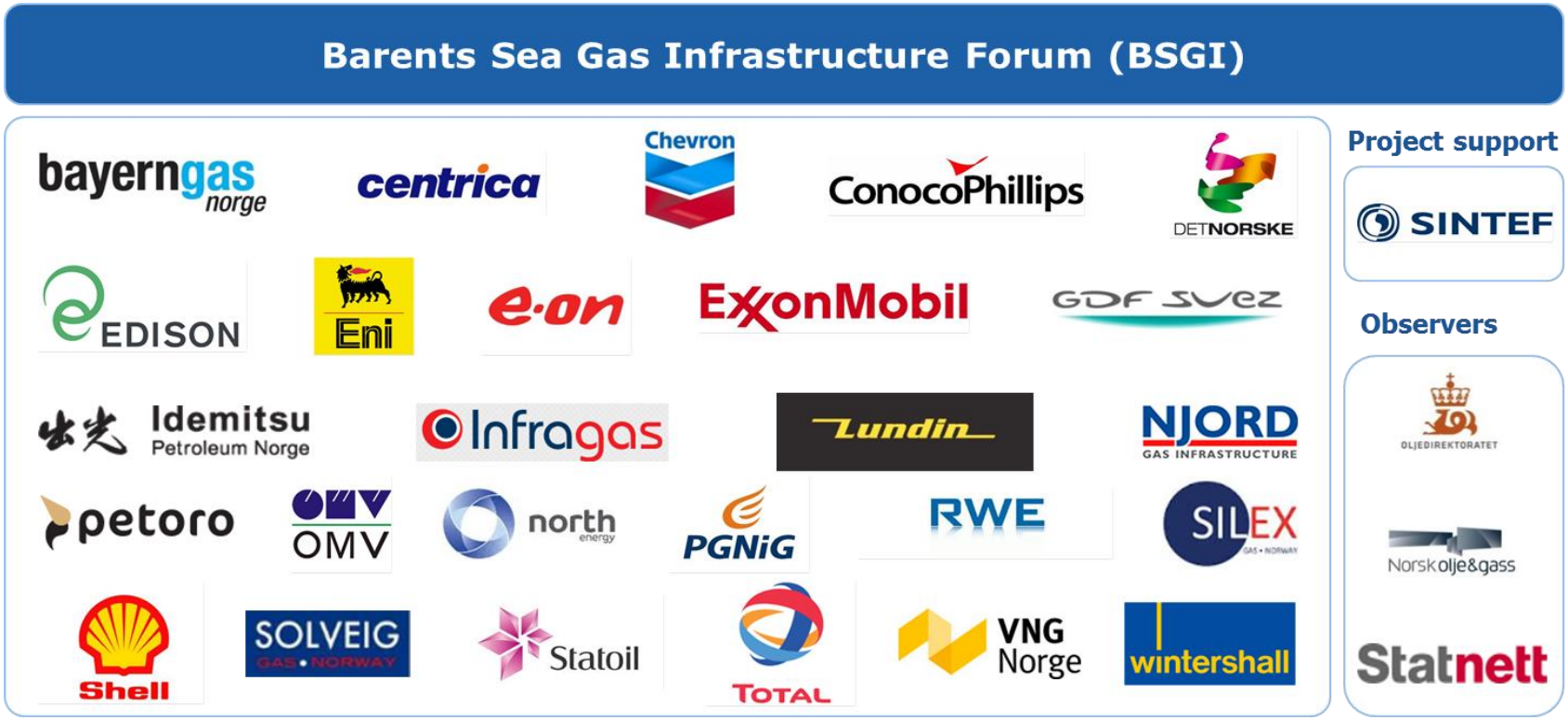
The Barents Sea Gas Infrastructure (BSGI) study is a common effort for evaluating gas infrastructure solutions



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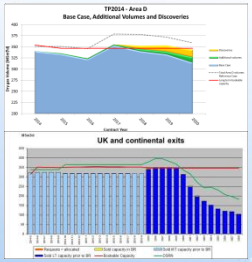

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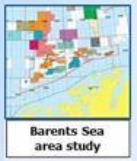

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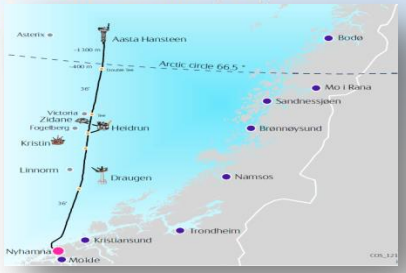

5 Interaction with stakeholders

- Interaction with stakeholders regarding development of gas infrastructure (government, regulator, owners, users)
- Cooperative arenas (IAB, etc.)

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The Transport Plan work process

Transport Plan process

1 Gassco Main Data Collection

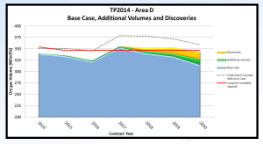
- Field Operators reports information from all fields and discoveries to Gassco
- The coordinated data collection process embraces; Shipment Planning, Transport Plan, Booking Round, Maintenance Planning, GCV and WI Nomination and infrastructure development projects
- Data from Field Operators are verified by Shippers as part of the booking process

2 Design Basis

- The Transport Plan Design Basis is based on Gassled System Capacity Report and Technical Design Basis
- The Design Basis describs existing and sanctioned gas infrastructure with respect to functionality, capacity and design parameters

3 Transport Plan Analyses

- Annual, systematic effort aggregating data on outlook for gas production, capacity utilization and bookings
- Assessment of capacity situation and needs for investments
- Analysses based on both Field Operator Data and an adjusted volume basis



4 Business Opportunity Identification

- Evaluation of results and findings
- Identify bottlenecks in existing NCS gas infrastructure
- Support business drivers for ongoing projects
- Evaluate potential for new infrastructure development projects

5 Interaction with stakeholders and further improvements

- Communication and presentation of findings
- Meetings with stakeholders
- Improvement initiatives

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Purpose of Gassco Main Data Collection is to collect data from all gas fields/discoveries on the Norwegian Continental Shelf

Annual process to collect data from Field Operators on the Norwegian Continental Shelf

Gassco Main Process towards Field Operators:

- Gassco requests Field Operators input (Capacity, quality and uncertainty data)
- Coordinated process together with Norwegian Petroleum Director's Revised National Budget process: 1 September -15 October
- In addition, Field Operators inform Gassco about essential changes in Field Forecasts throughout the year

Amount of data reported is large, quality assurance/ control is important

Extensive quality assurance process:

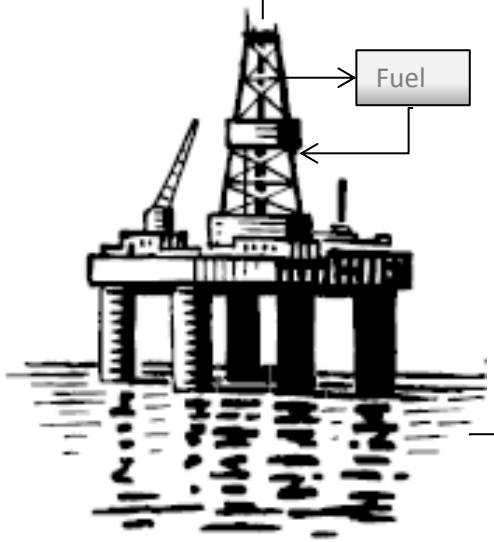
- Comparison with historical produced volume and composition for each field
- Comparison with other reported data
- Consistency check of reported annual production forecast with reported daily production forecast
- Data from Field Operators are verified by Shippers as part of the booking process

The reported data are used in many processes in Gassco

The coordinated data collection process towards the Field Operators embraces:

- Transport Plan
- Booking Round
- Shipment Planning Kårstø/Kollsnes Gas Terminals
- Maintenance Planning
- GCV and WI Nomination
- Infrastructure development projects

Gassco collect data regarding gas export from existing fields and discoveries



Flare

Fuel

Gross gas production

Natural gas injection in own field, exclusive gas lift

Gas for gas lift

CO_2 gas injection

Rich/dry gas deliveries from existing fields and Discoveries, both annual and daily production

Accumulated dry gas Low/Base/High estimate

Gas export composition including Low/Base/High estimate for CO_2, H_2S and C_2

Information requested by Gassco in Gassco Main Data Collection

The Design Basis describes the main assumptions and the scope of work for the Transport Plan

Gassled System Capacity Report

Gassled System Capacity Report:

- The Gassled System Capacity Report is an annual process, to give information regarding the capacities for the gas infrastructure on the NCS, which will be the basis for the Operator in the next booking process
- The report reflects the current system configuration and principles of operating the upstream gas transportion network, taking into account temporary as well as permanent restrictions limiting the capacity utilisation of the Gassled transportation system

Technical Design Basis

Technical Design Basis:

- The Technical Design Basis describes the technical assumptions for the existing and planned gas infrastructure on the Norwegian Continental Shelf, including pipelines, processing plants, terminals and riser platforms.
- The Technical Design Basis supports the design basis regarding relevant Gassco projects and the Transport Plan Design Basis

Transport Plan Design Basis

Transport Plan Design Basis:

- The Transport Plan Design Basis is derived from the Gassled System Capacity Report and the Technical Design Basis and is the framing for the transport analyses
- The Transport Plan Design Basis describes :
  - Technical assumptions
  - Volume basis and compositions
  - Existing and sanctioned gas infrastructure

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Transport plan method overview

1) Transport Plan input

Resources scenarios

Production by area from existing fields and discoveries including uncertainty estimate

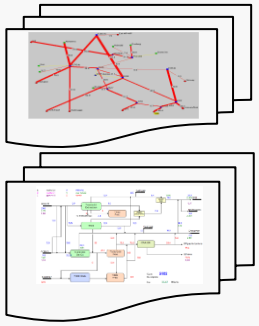
Infrastructure assumptions

Existing and new pipelines and processing facilities

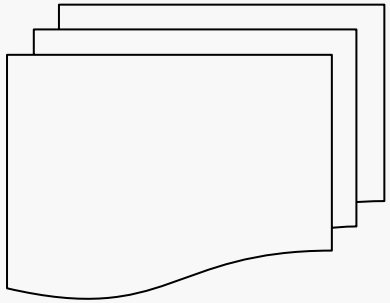
2) Analyses

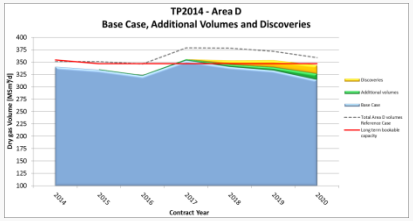
- Capacity
- Gas quality
- Production performance
- Sensitivities

Network optimisation and simulation tools



3) Optimising future development of the gas infrastructure

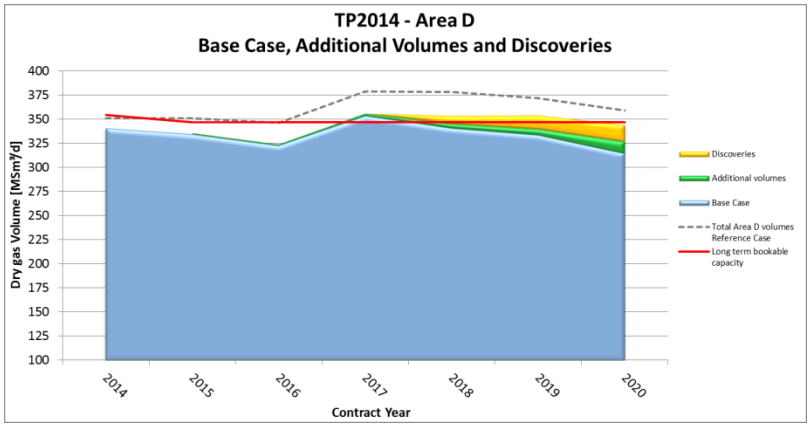


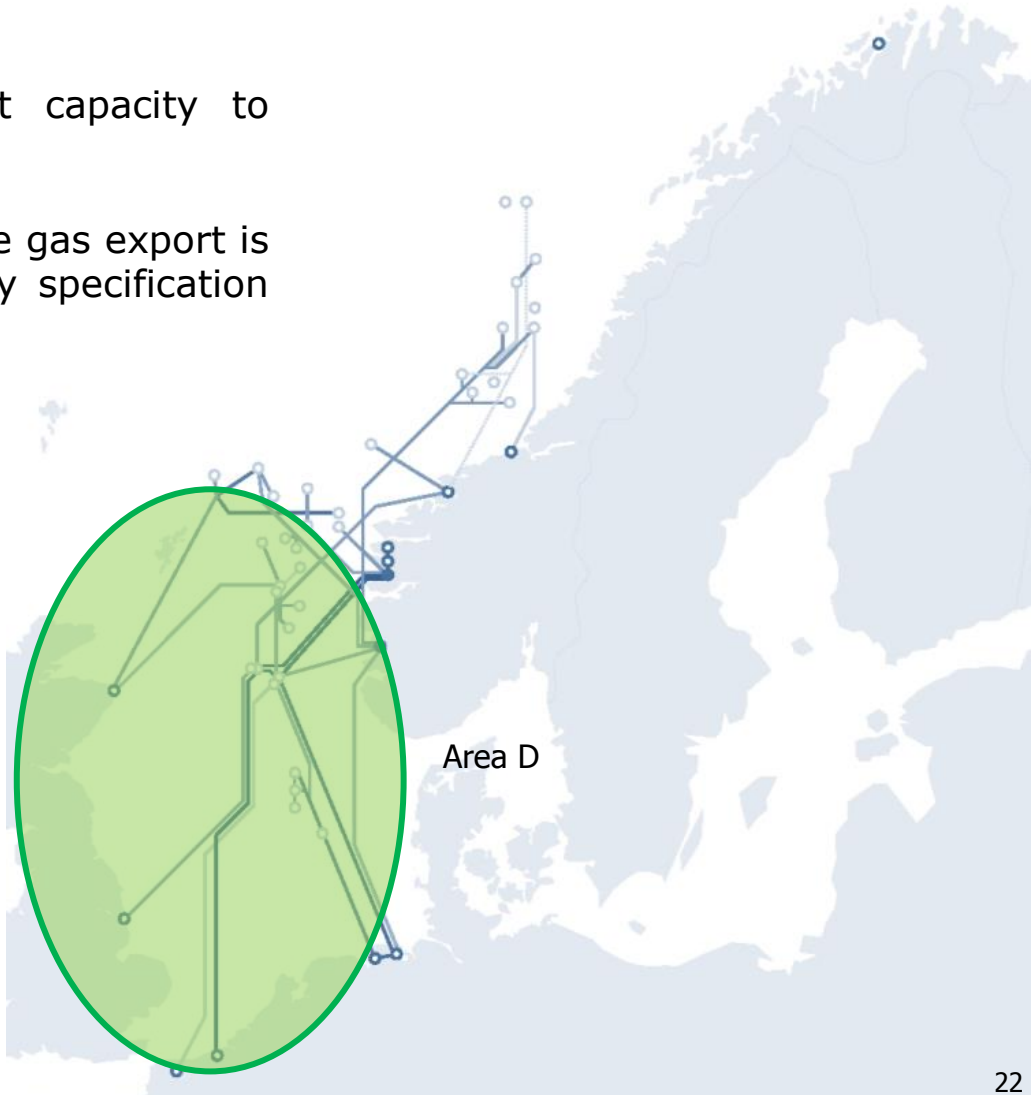


Short term, medium term and long term challenges related to the gas infrastructure

Up-stream gas pipeline network analyses

- The up-stream gas pipeline network will be highly utilised until CY2020 based on existing fields and new discoveries.
- Existing infrastructure has sufficient capacity to meet future need.
- The gas quality analyses show that the gas export is expected to be within the gas quality specification during normal operation.





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More than 30 billion Euro has so far been invested in the Norwegian gas infrastructure. Its technical condition is good, and the system is very flexible and well positioned in relation to key parts of the market.