

Hydro Oil and Energy



HYDRO

Ormen Lange/Langeled Gas development Project

Langeled
– bringing gas to the
UK market from 2006



The Ormen Lange development

Ormen Lange is the name of the second largest Norwegian gas field and was discovered and identified by Hydro in 1997. The water depth is 850 to 1,100 metres, making Ormen Lange the first deep water project on the Norwegian Continental Shelf.

The Ormen Lange development comprises four key project features:

- Offshore Subsea Facilities, approx. 120 km outside the northwest coast of Norway
- Onshore Process and Gas Export Facilities at Nyhamna on the western coast of Mid-Norway
- Gas Export Transportation system between Norway and UK called Langeled
- Langeled Receiving Facilities on the east coast of UK

The Ormen Lange Field Development Project is of vital importance, not only to its owners, but also to Norway making the country the third biggest exporter of natural gas worldwide. Following the Norwegian Parliament approval of the project development plans on April 2nd 2004, work has started on the Ormen Lange site at Nyhamna to prepare for construction of the onshore processing plant.

Partners and participating interests

Partners in the Ormen Lange field are: Hydro, Shell, Petoro, Statoil, BP and ExxonMobil. Hydro is operator in the development and construction phase.

Shell will take over as operator when Ormen Lange comes on-stream in October 2007. Shell will also be responsible for drilling of the production wells.

The participating interests in Langeled Joint Venture are: Hydro, Gassco, Petoro, Shell, Statoil, BP, ExxonMobil and ConocoPhillips.

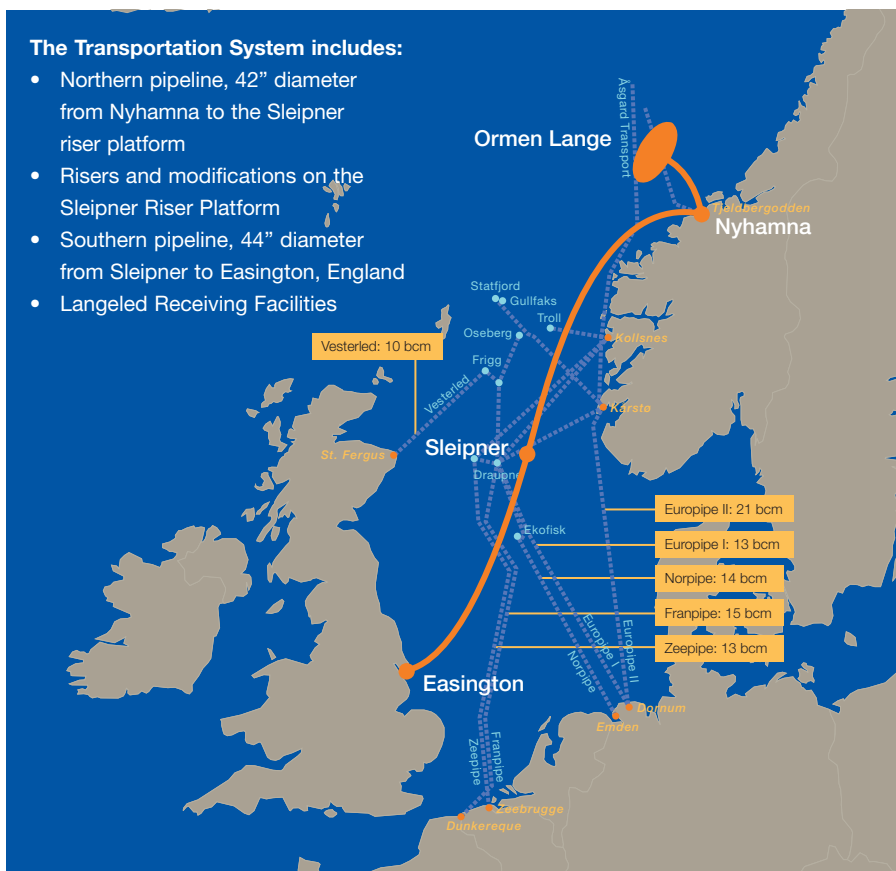
Hydro is operator for Langeled in the development and construction phase. Gassco will take over operation of Langeled from the start of operations. The operator has organised a common

project for execution of the transportation system and the field development to secure the integrity of the Ormen Lange and Langeled project from reservoir to market. Statoil has the management of the Langeled project in cooperation with Hydro. The project organization is staffed with personnel from both Statoil and Hydro.



The Transportation System includes:

- Northern pipeline, 42" diameter from Nyhamna to the Sleipner riser platform
- Risers and modifications on the Sleipner Riser Platform
- Southern pipeline, 44" diameter from Sleipner to Easington, England
- Langeded Receiving Facilities



Langeded

The Langeded joint venture has been established to construct and operate the transportation system from Nyhamna to Easington.

The purpose of the Langeded transport system is to transport gas produced from the Ormen Lange field to market delivery points in the UK and continental Europe and to transport gas from other sources to the UK market. This is achieved by installation of the Langeded pipeline from the Ormen Lange gas processing terminal at Nyhamna via the Sleipner platform and then to UK.

The planned Langeded Transportation System has a total pipeline length of approximately 1,200 km. It will be the longest subsea gas pipeline system in the world. The southern part of the Transportation System from Sleipner to UK, will be operational to transport other Norwegian natural gas from October 2006. The northern leg will be operational in October 2007 when the Ormen Lange field comes on-stream.



Pipeline

Several alternative routes have been considered, particularly in the areas near England where the seabed poses challenges in the form of sand waves and a hard seabed consisting of chalk and sandstone formations. The pipeline will be trenched in areas where the water depth is less than 60 metres, since the stability requirements cannot be met by weight-coating alone.

In 2005 the landfall pipeline in UK and the 525 km section between Sleipner and UK landfall will be installed.

In 2006 the Langeded North will be installed. Hyperbaric welds will be used to connect the various pipeline sections as well as the expansion spools at Sleipner.



Sleipner riser platform

Tie-in to the Sleipner riser platform will enable delivery of Ormen Lange gas to the European continent, enable quality adjustment of the gas to be supplied to the UK and improve regularity through the use of other gas from the Norwegian Continental Shelf. This will provide operational flexibility in routing gas to different markets and facilitate pressure control for optimal energy consumption. The connection to Sleipner will also allow independent operation of the northern and southern pipeline.



Landfall

A landfall solution with a short curved micro-tunnel from a coffer-dam at the beach up to the new receiving terminal has been selected.

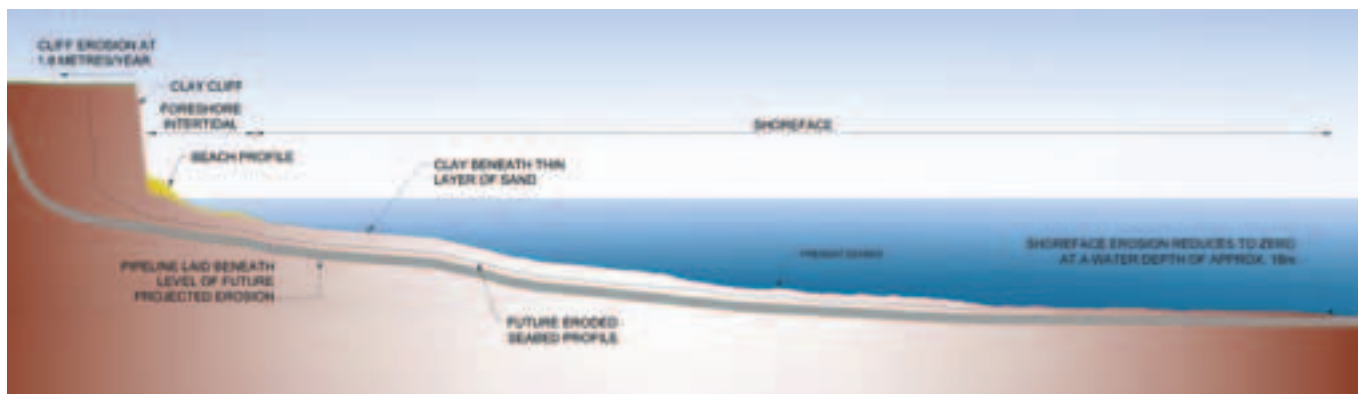
Installation of the new pipeline will necessitate dredging to some distance from land. The extent of such dredging is expected to be approximately 15 kilometres out from the shoreline. The pipeline will be back filled after installation.

The coastline in the area of Easington consists of 20 to 25 metre high erosion-prone cliffs. Erosion protection has been installed in the areas outside some of the terminals. The area immediately north of the existing pipelines is a protected area in which any interference that may cause damage to the cliff or the seashore is prohibited.

The installation of the new pipeline will not affect the protected area.

The sea cliffs at the landfall site, are comprised predominantly of clay laid down during the ice ages. These cliffs and the shoreward part of the seabed are continually being eroded by wave action. The rate of erosion will increase as sea level rises.

The pipeline will therefore be buried at a sufficient depth to avoid exposure in the future.





Terminal

The pipeline will be connected to a new gas receiving facility that will be situated to the west of the existing Centrica terminal in Easington.

In the gas receiving terminal the gas will be filtered, cleaned, measured and adjusted to meet the pressure and temperature conditions required for further

transport through the UK distribution network, National Transmission System (NTS).

There will be a need for reinforcement of the NTS network, either in Easington or further along the distribution network when the receiving facility is put into operation. Such reinforcement will be

undertaken by UK National Transmission System (NTS) through National Grid Transco, the network operator.

From gas delivery in 2006, Centrica will service and operate the land terminal on behalf of Gassco.

Focus on health, safety and environment (HSE)

The Langeled development is based on proven and robust technology which satisfy all safety, environmental and health requirements in addition to commercial requirements.

Possible HSE impact is evaluated for all major decisions. Potential impacts are assessed against acceptance criteria, and the evaluation is documented in project records. The acceptance criteria

are aligned with legal requirements and corporate strategies of the participating companies. In order to ensure no injury, there is focus on safety during all operations and focus on HSE in all contracts. This includes management inspections, close cooperation with and support to contractors, and preparation for operations through desktop exercises, Hazops and Safe Job Analysis.

The project has had frequent communication with regulatory bodies in order to discuss solutions. The main technical solutions are documented in impact assessments and further documented in discharge permit applications.

Ormen Lange/Langeled Facts

> Field Location:	Norwegian Sea, 120 kilometres north-west of Kristiansund
> Production start from Ormen Lange:	2007
> Southern part of pipeline in operation:	2006
> Gas Production:	15 – 20 billion scm/year
> Recoverable gas reserves:	400 billion scm
> Recoverable condensate:	28.5 million scm
> Water depths:	850 – 1,100 metres
> Investments:	Total: 66 billion NOK
> Field development:	46.5 billion NOK
> Transport system:	19.5 billion NOK
> Operator for development and construction:	Hydro
> Operator for production:	Shell
> Operator for transportation in production phase:	Gassco

Statoil will manage of the gas export pipeline project in cooperation with Hydro.

Gassco will be the future operator of the transportation system from the date of gas delivery to UK in 2006.

Centrica will from gas delivery in 2006 operate the land terminal on behalf of Gassco.



Operator for transportation in production phase

