



NORWEGIAN PETROLEUM  
DIRECTORATE

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# Gas Injection Field Case Oseberg Field

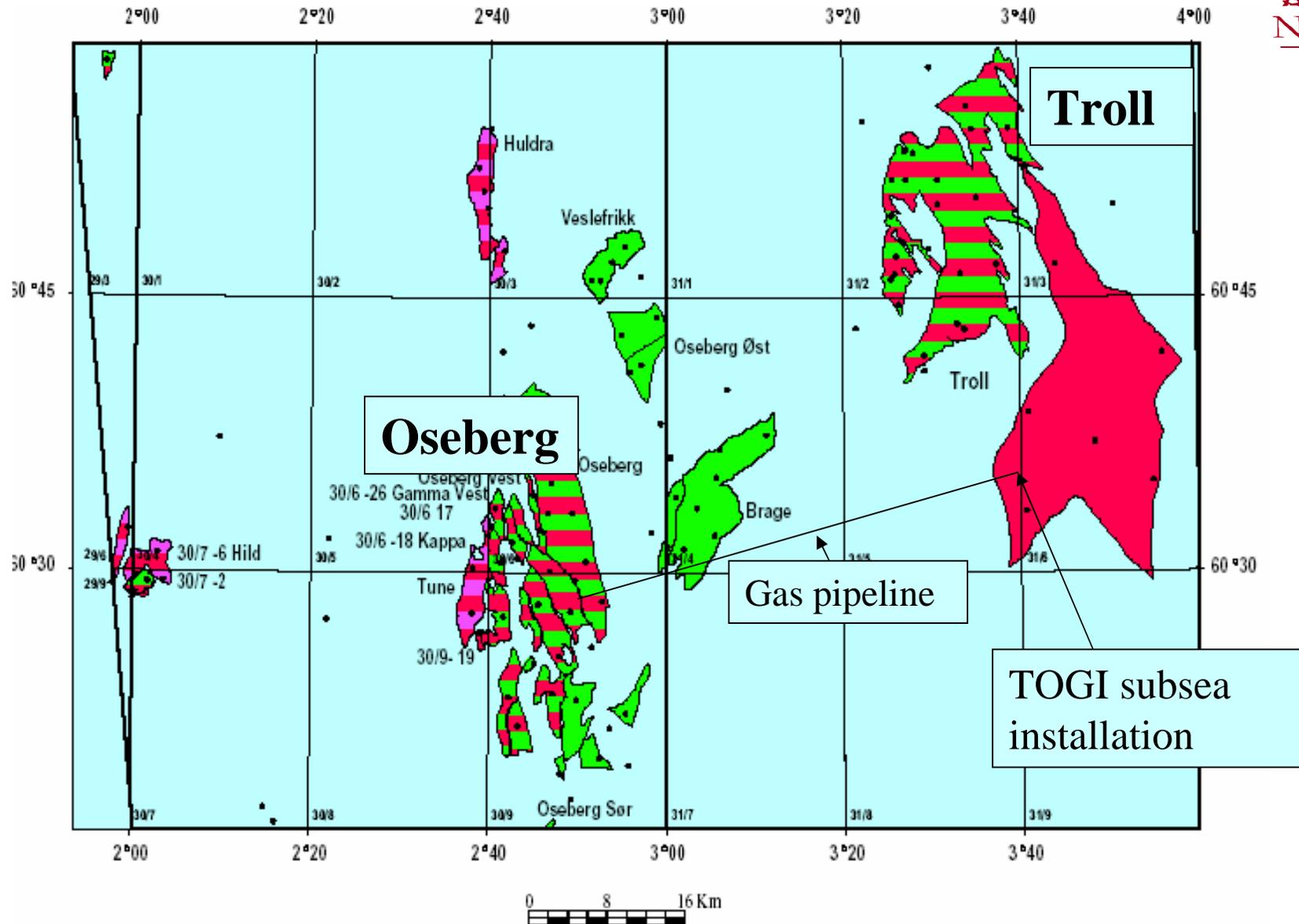
## **Gas - injection in the Oseberg field**

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1. Background information about the Oseberg field and the gas – injection project.
2. How the gas - injection project was decided and the role of the NPD

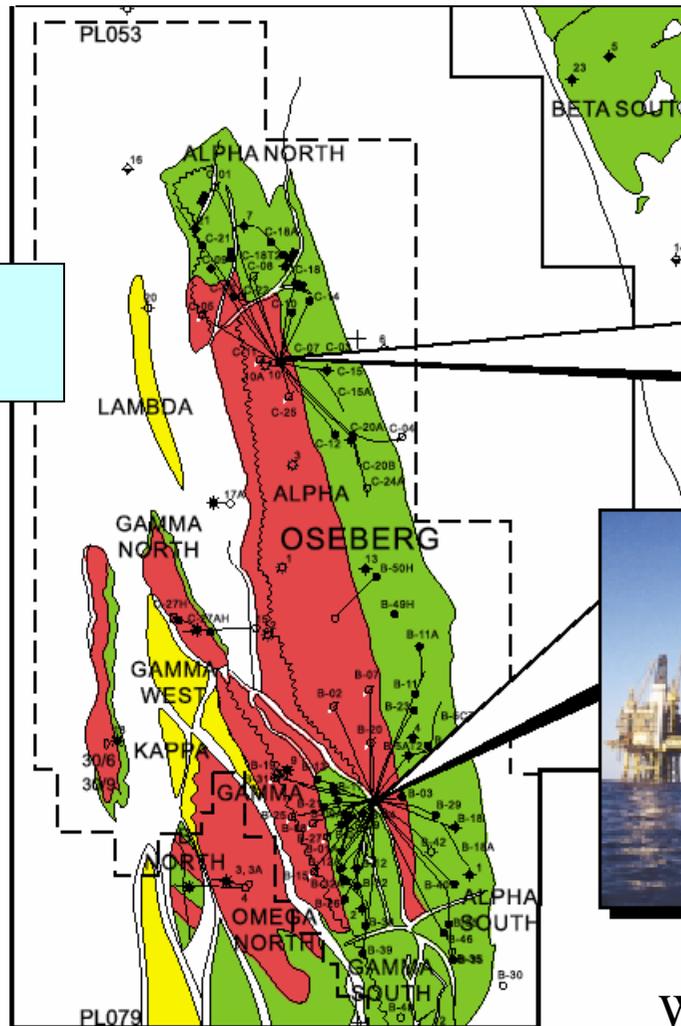
# Oseberg – Troll area of the North Sea



# The Oseberg field and platforms



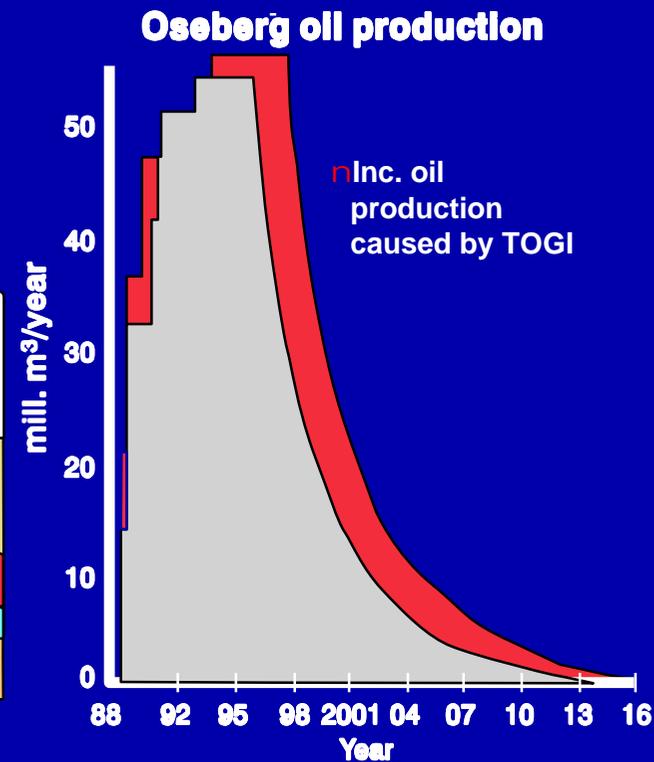
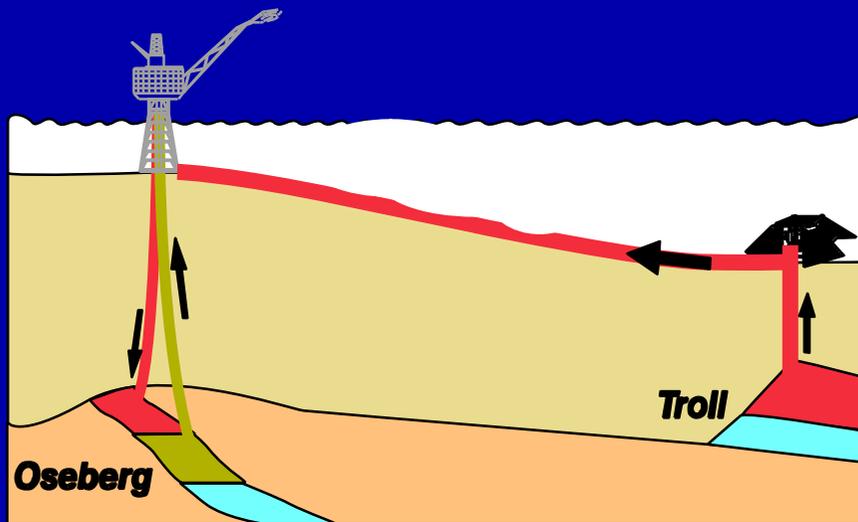
Field operator :  
Norsk Hydro



Oseberg Unit TC/RC.FH8

Water depth : 100 m

# Troll - Oseberg gas injection (TOGI)

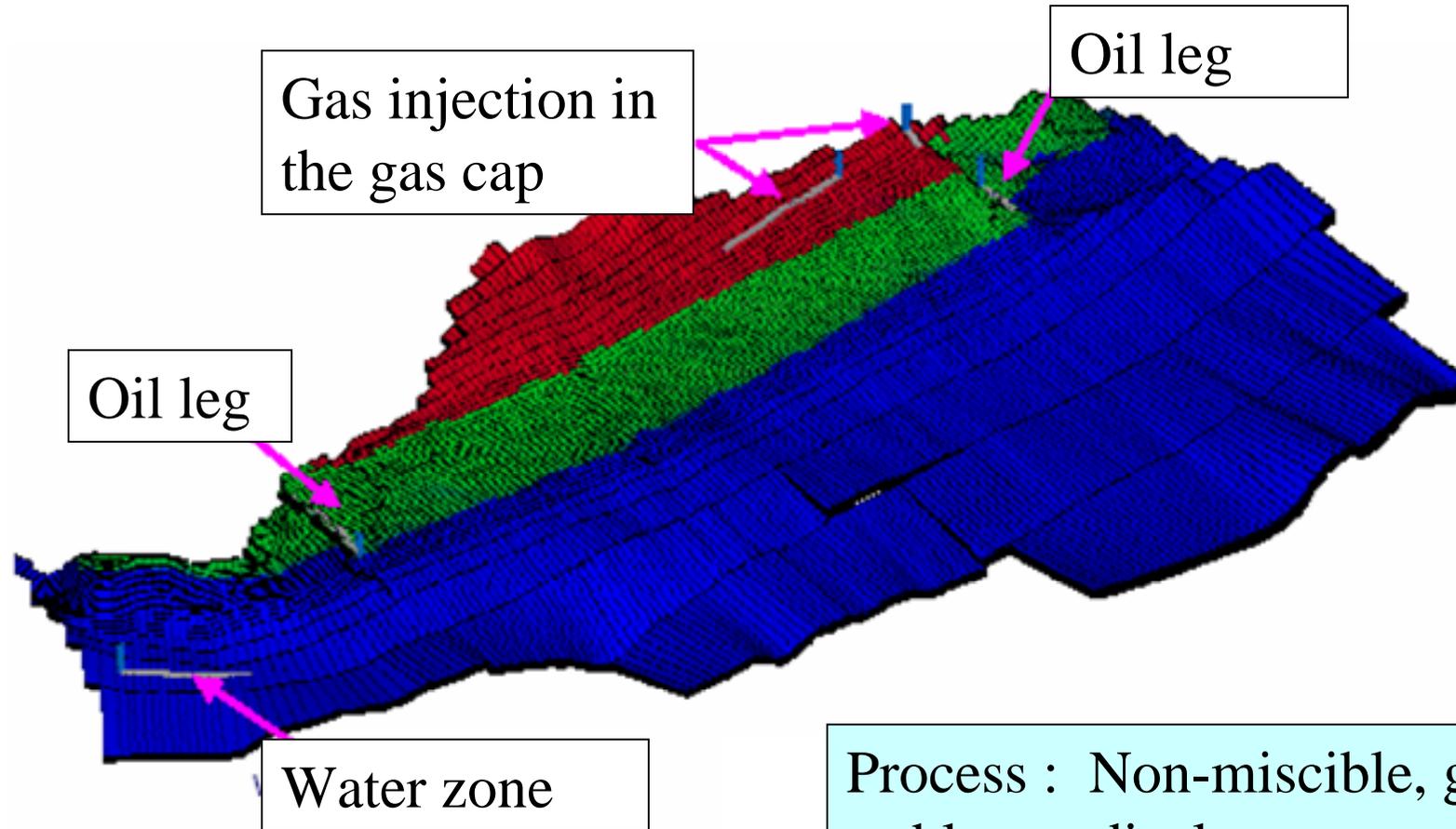


Injection of gas from Troll accelerates and increases oil production on Oseberg. 21 GSm<sup>3</sup> Troll gas has been injected into the Oseberg Field in the period 1991-2002. The injected Troll gas will be reproduced and exported together with the Oseberg gas



Oseberg  
Unit

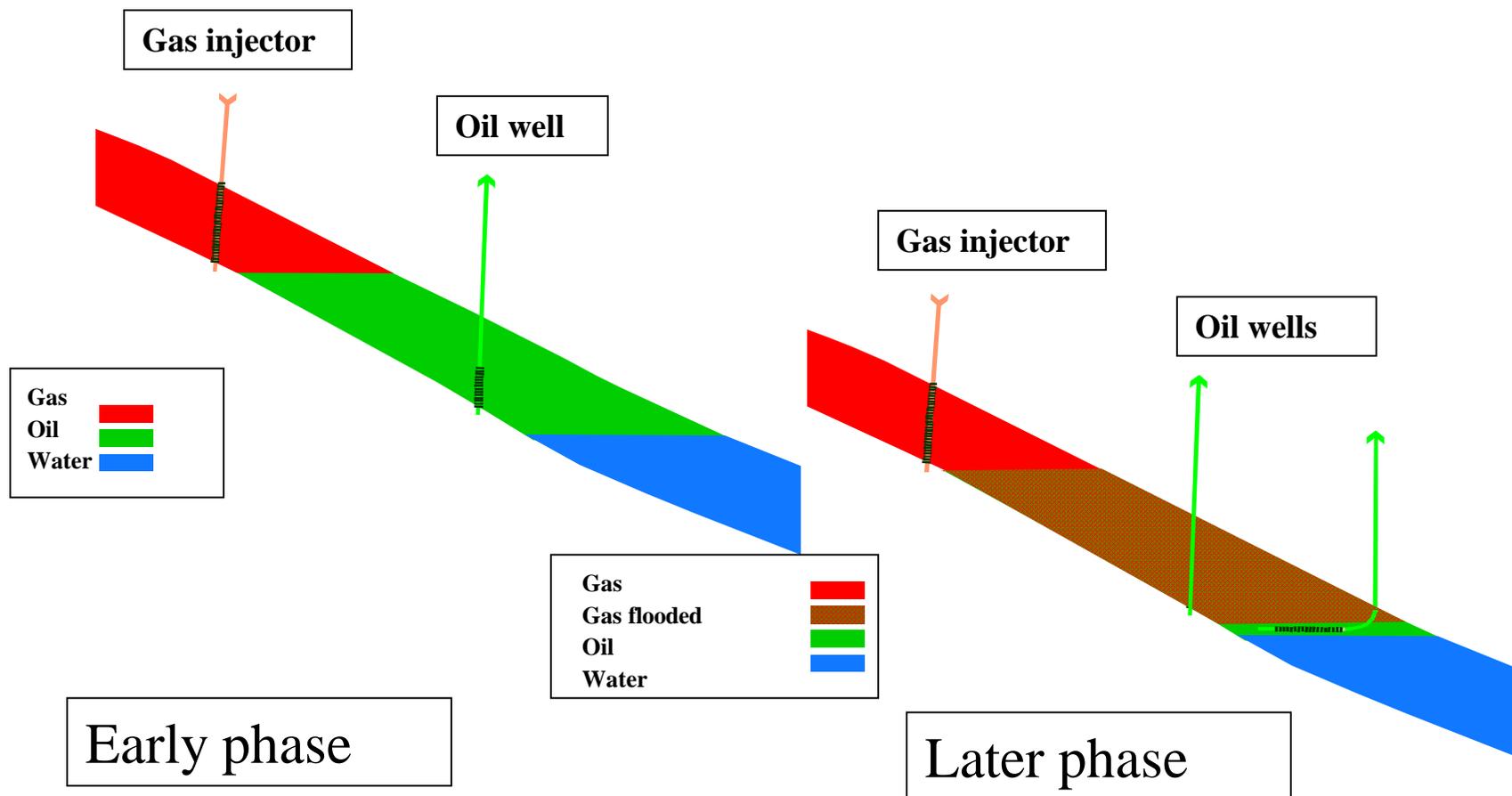
# Gas injection in the Oseberg field



Process : Non-miscible, gravity stable gas displacement, very low residual oil saturation in the gas swept zones.

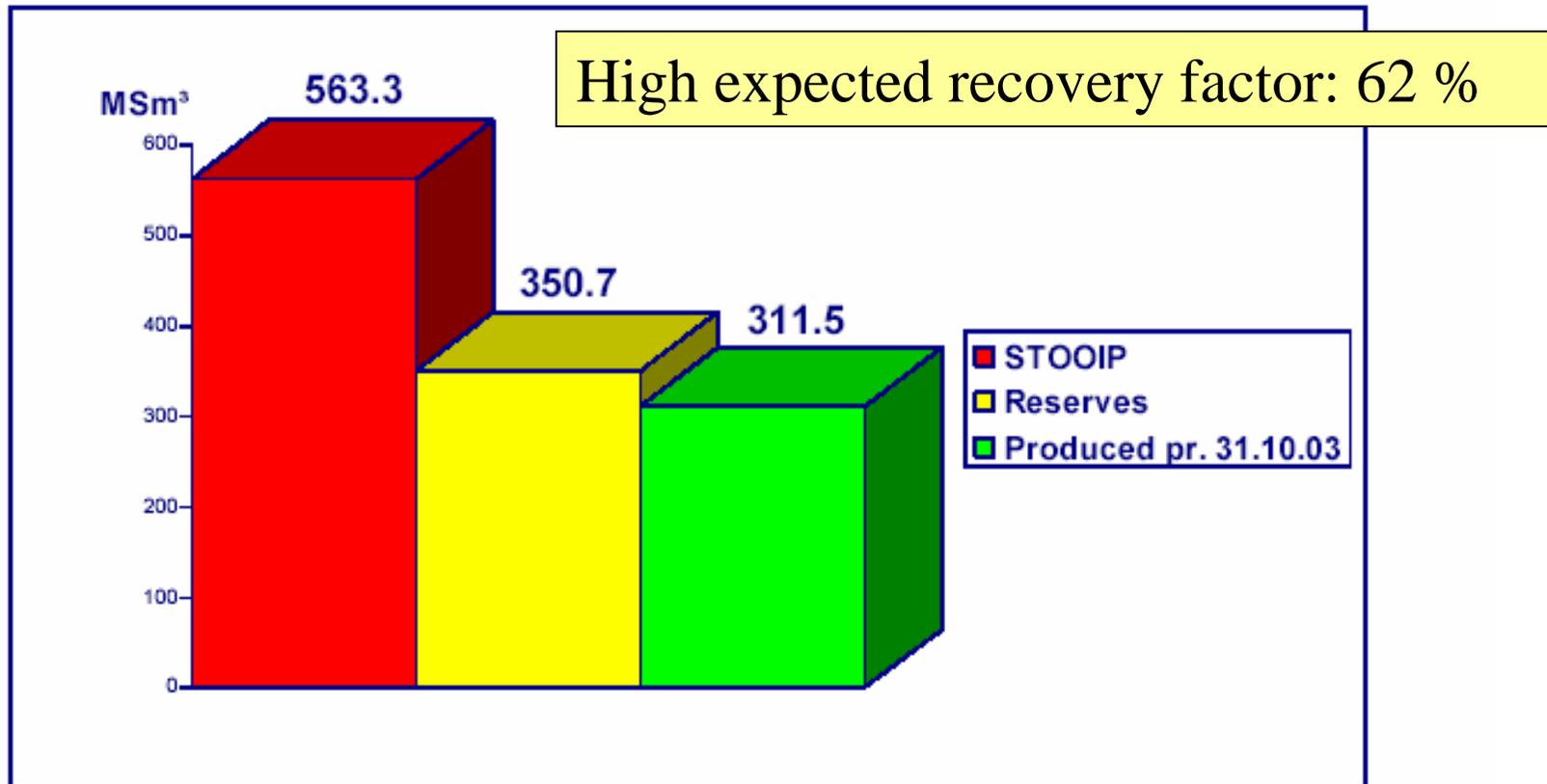
# Oil well strategy

- W The first oil wells were vertical wells
- W Later on horizontal oil well were drilled





## Status production Oseberg Unit Resources/reserves and historic production

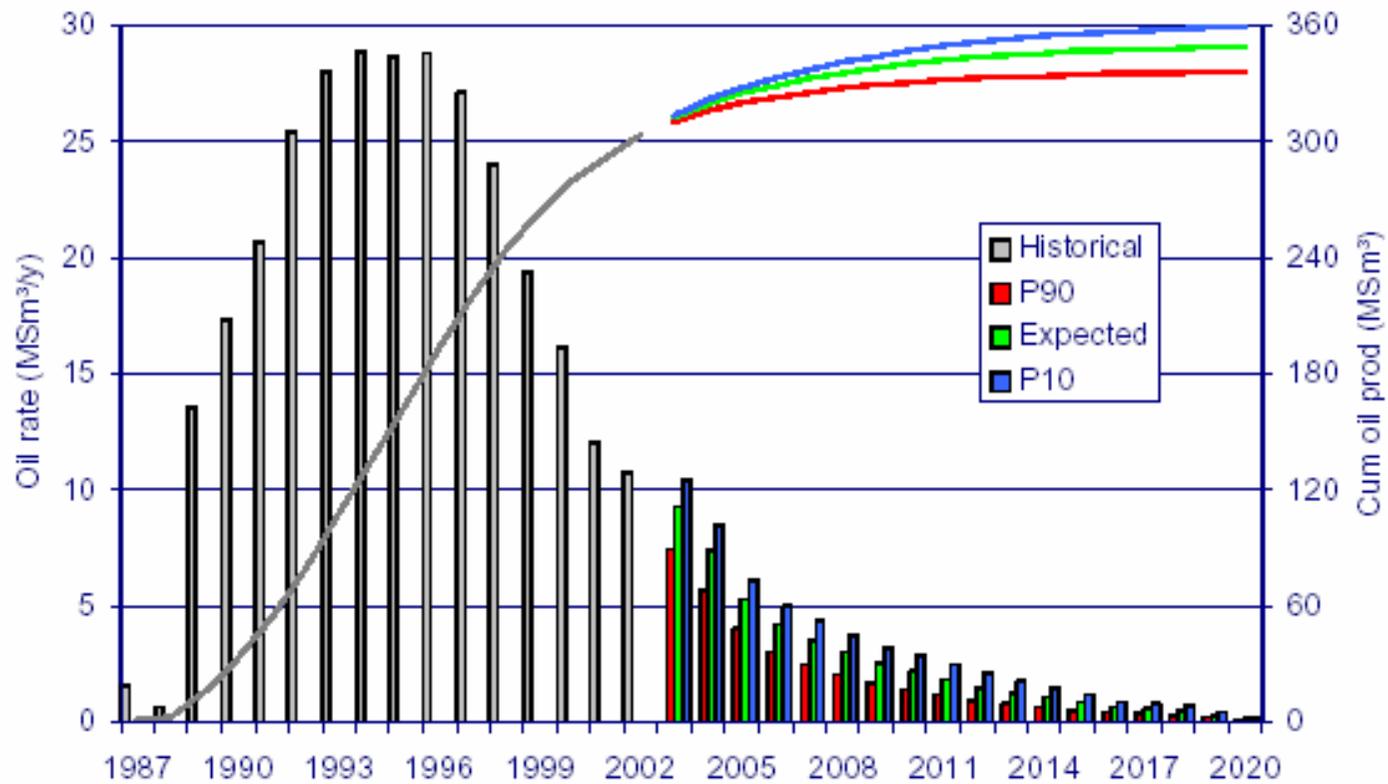


88,8 % of expected reserves produced per 31.10.03

# Oil production profile

Remaining reserves :ca 40 million Sm<sup>3</sup>

## Oseberg Brent Historical and future production



BUN  
Oseberg Unit  
Potek

# How the project decision was made and the role of the NPD

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- W** A field development plan (PDO) was decided on in 1984. This plan implied **water injection** as the main recovery mechanism. (Re-injection of associated gas in a part of the field).
- W** Field owners : Norsk Hydro (operator), Statoil, Saga Petroleum, Elf, Mobil, Total.
- W** The technical people in Norsk Hydro wanted to further evaluate the possibility for full scale gas-injection, but this was not supported by the other companies, and could not be decided by the field owners.
- W** **The NPD then requested (ordered) Norsk Hydro as the field operator to evaluate and reconsider gas-injection.**

## How the project decision was made and the role of the NPD (2)

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- W At the same time the Troll field east of Oseberg had been discovered, and the large gas resources there were revealed.
- W During 1985, while the platform was under construction, Norsk Hydro came up with an alternative plan: Gas from the Troll field (TOGI subsea – module) and full scale gas injection in Oseberg
- W Estimated additional oil recovery was 12 –15 million Sm<sup>3</sup> . The number of injection wells could be reduced from about 20 water injection wells to 2 gas injection wells.
- W Norsk Hydro saw a great advantage in qualifying the subsea-technology for later use at the Troll field.

## How the project decision was made and the role of the NPD (3)

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- W Statoil (100% state owned at that time) was not in favour of the project, **but was instructed by the minister to vote for the gas – injection project.**
- W Norsk Hydro hoped to obtain some tax relief, since the after-tax profitability was considered marginal.
- W Negotiations between Norsk Hydro and the NPD/The ministry of oil and energy took place, and **reduced royalty for Oseberg was offered.**
- W The project was there-after decided by the majority votes of Statoil and Norsk Hydro.
- W A new plan for Oseberg and reduced royalty was approved by the Norwegian Parliament during the spring 1986.

# The role of the NPD/the government in the decision process

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- W Evaluation of an alternative IOR plan was requested**
- W Tax relief was given for this specific project**
- W The state owned Statoil was instructed by the minister.**
- W Result: The project has been very successful and a high recovery factor (62%) has been achieved (70 % recovery in the massive sands).