

NORWEGIAN PETROLEUM
DIRECTORATE

***EOR for NCS – An Important Matter
of National Resource Utilization***

Force seminar – Smartwater EOR

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The Norwegian Petroleum Directorate



Main goal

Contribute to realizing maximum value for our society from the oil and gas activities through prudent and efficient resource management which also safeguards consideration for health, safety, the environment and other users of the sea.

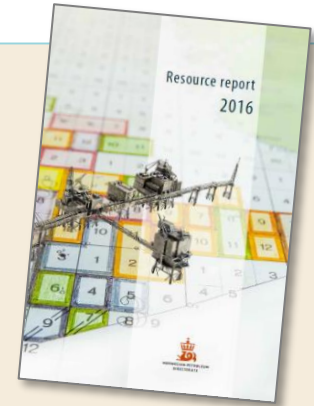
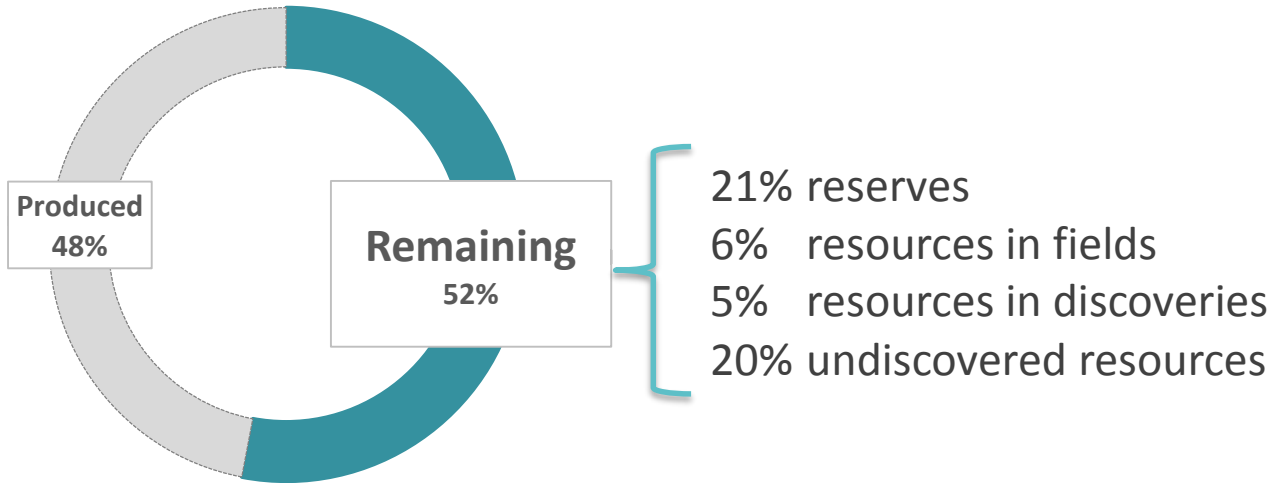
The Petroleum Act

Section 4-1: Prudent production



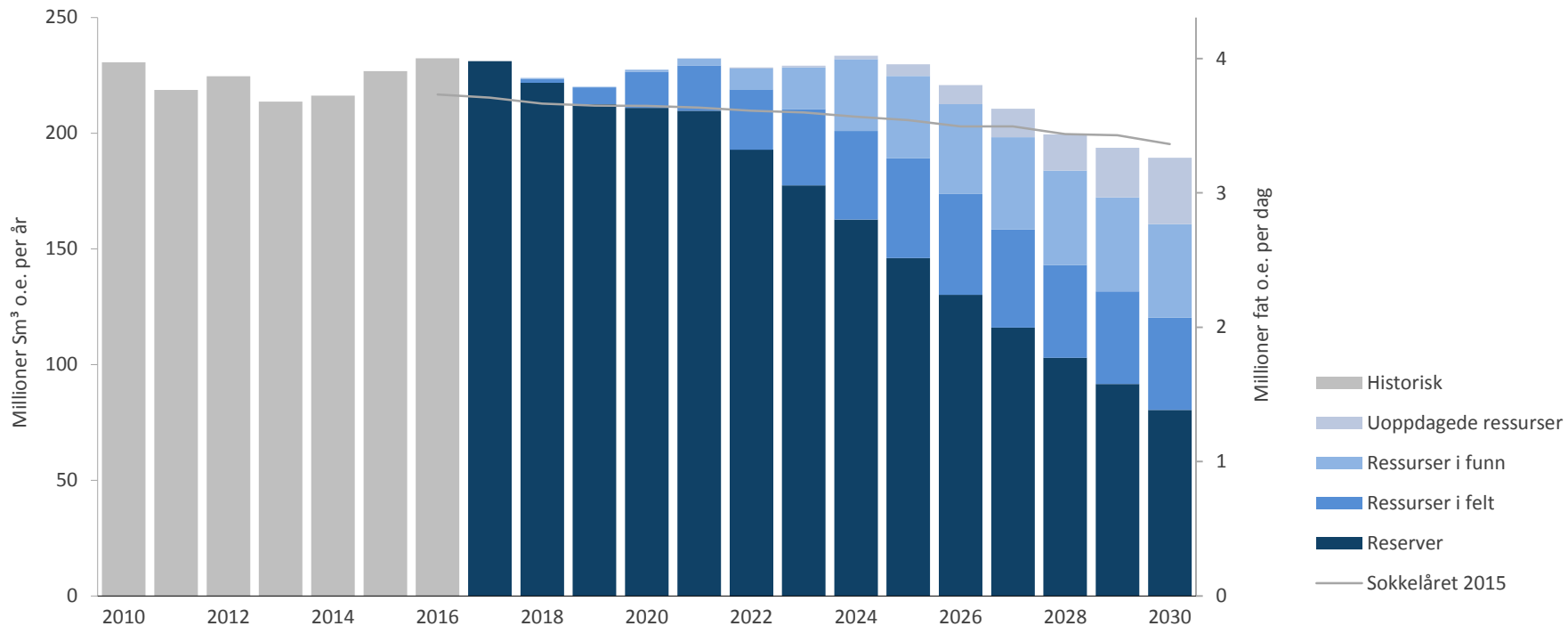
- Production of petroleum shall take place in such a manner that **as much as possible of the petroleum in place** in each individual petroleum deposit, or in several deposits in combination, will be produced.
- The production shall take place in accordance with **prudent technical and sound economic principles** and in such a manner that waste of petroleum or reservoir energy is avoided.
- The licensee shall carry out **continuous evaluation of production strategy** and technical solutions and shall take the necessary measures in order to achieve this.

Total 14.2 billion Scm oe

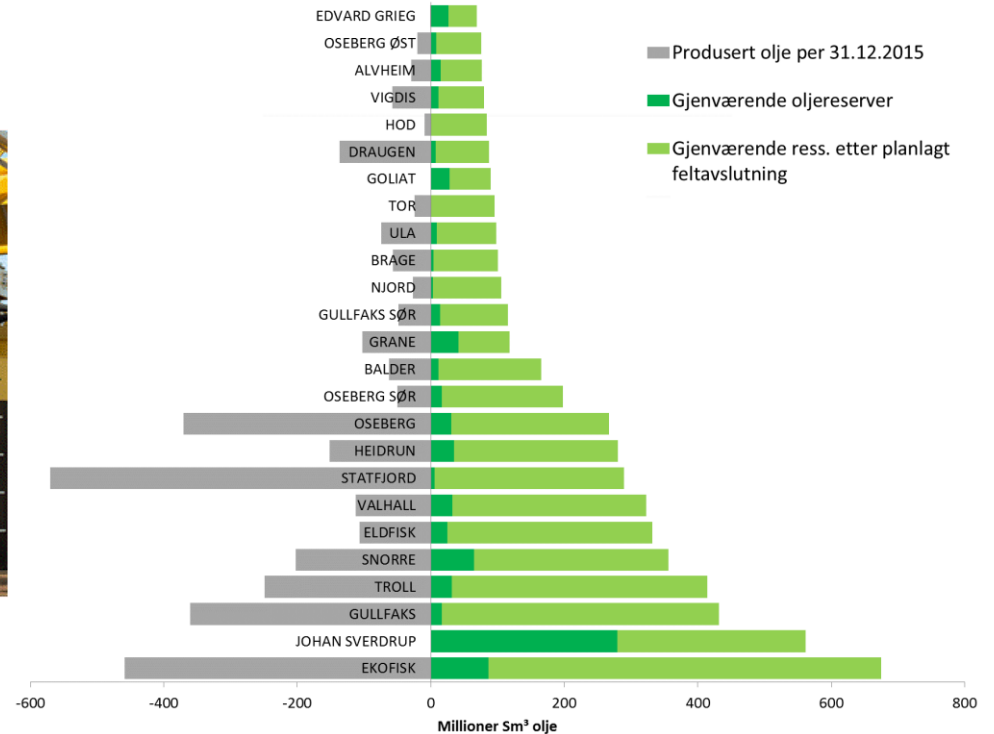


Download the report at npd.no

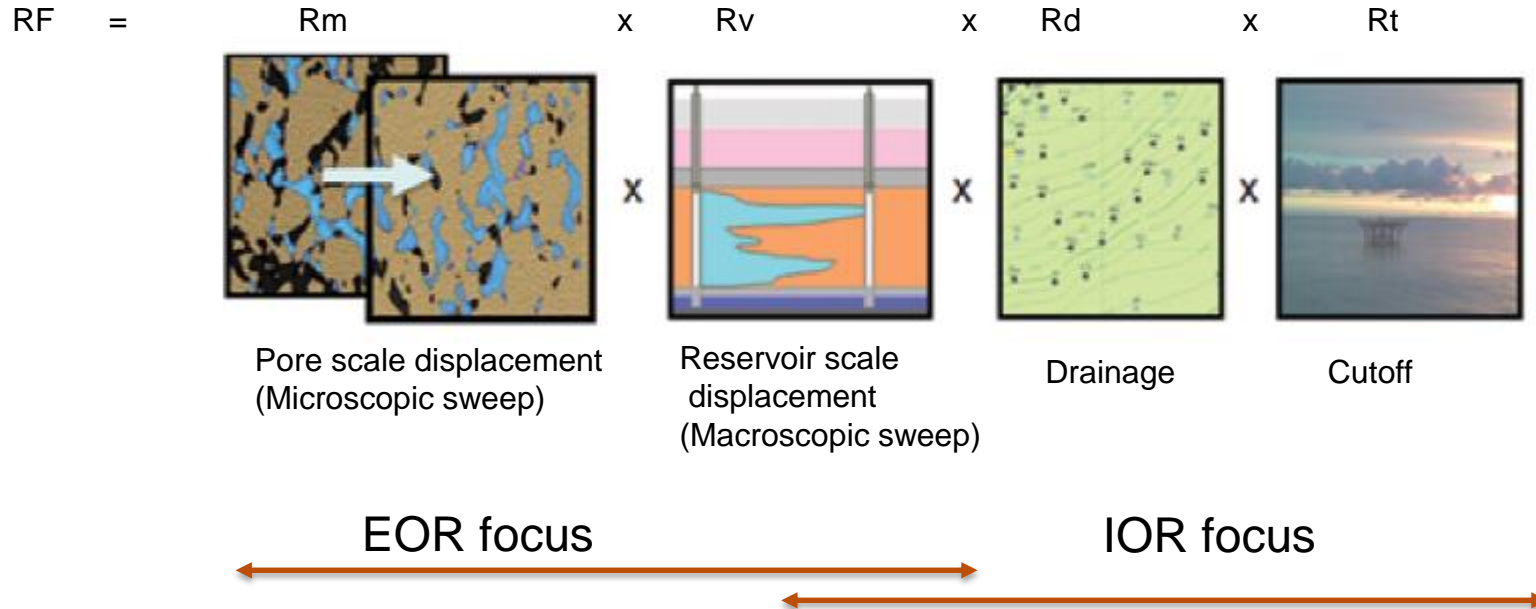
Long term production outlook



New technologies improve recovery

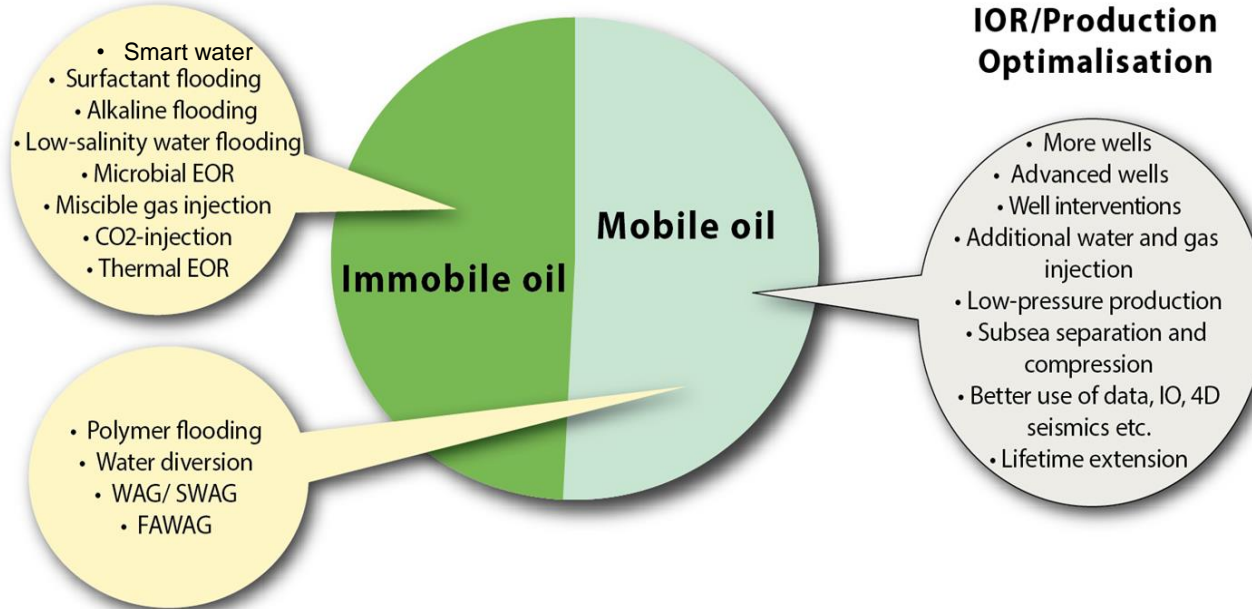


Recovery Factor (RF)

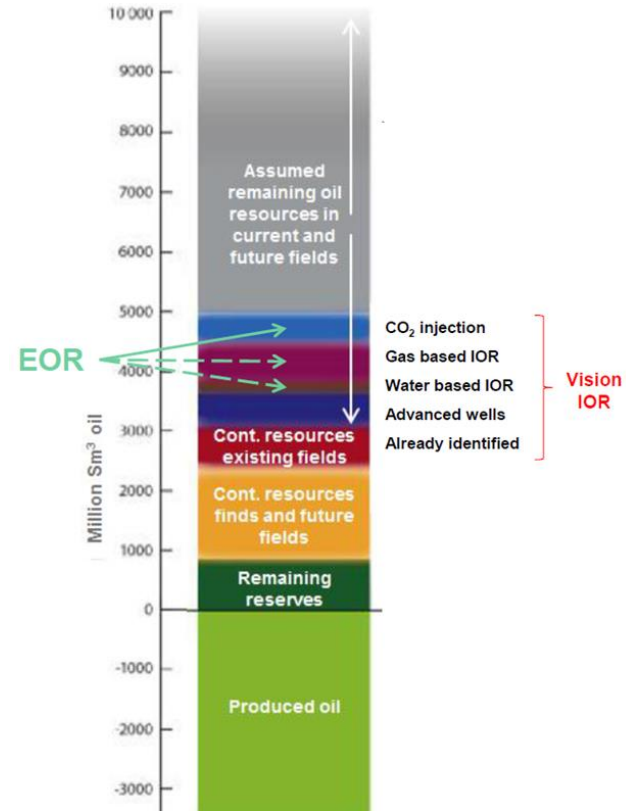


The IOR/EOR toolbox

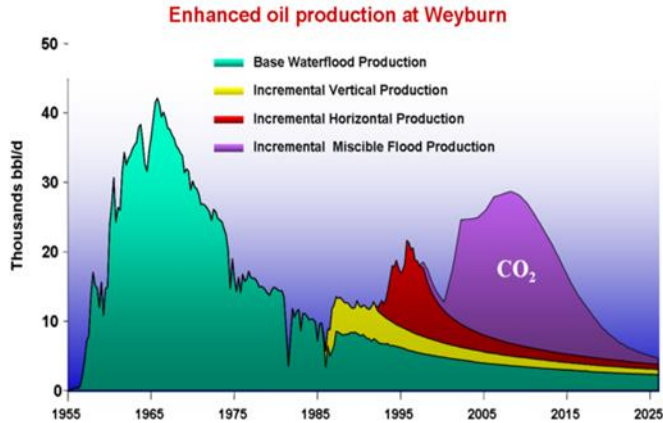
EOR Technologies



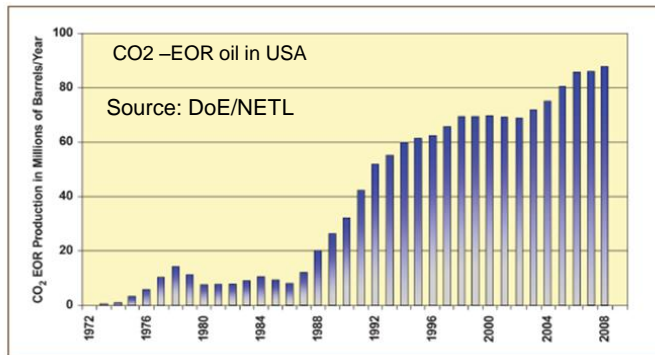
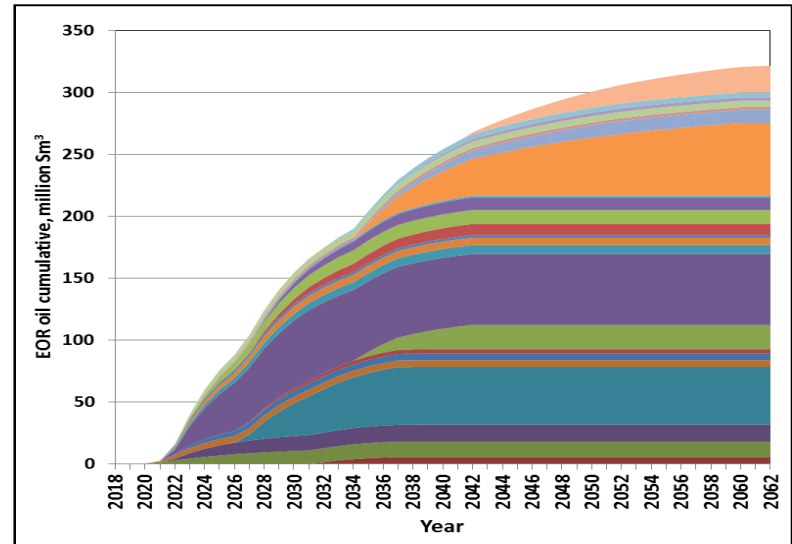
The Åm report



CO₂ for EOR



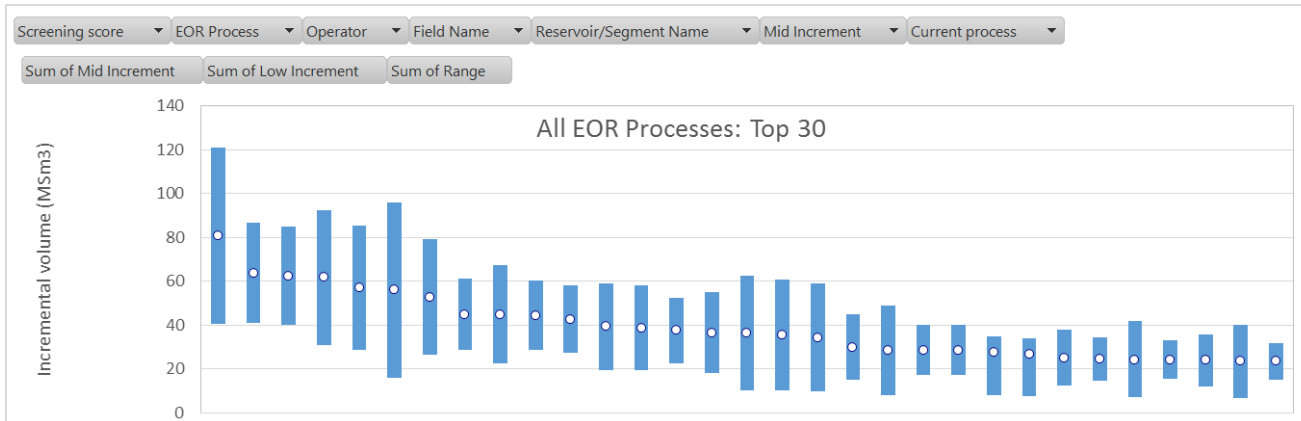
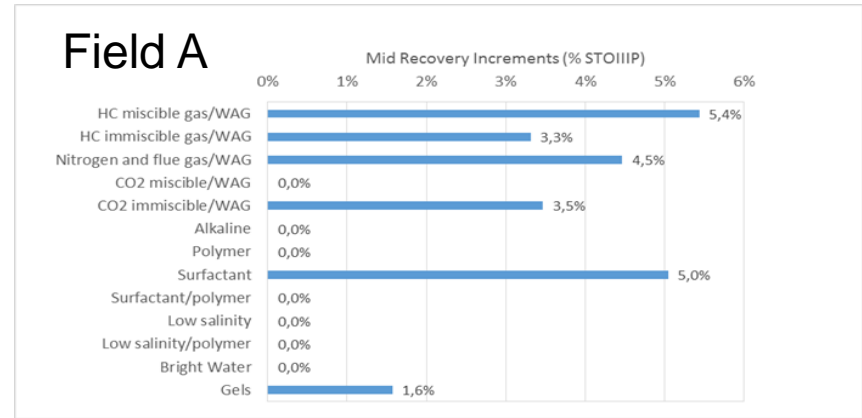
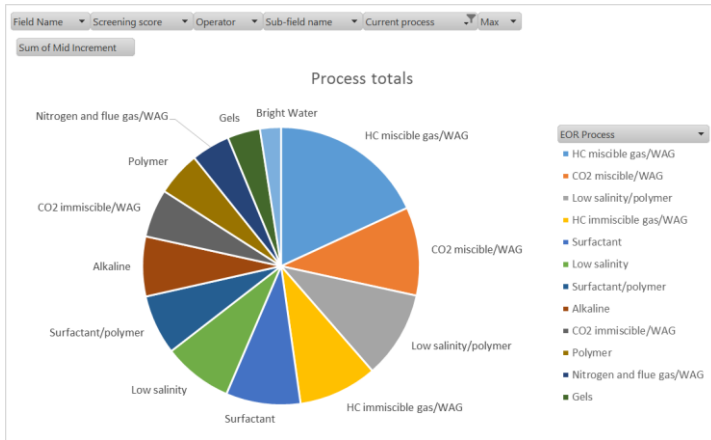
Screening study of 23 oil fields in the North Sea (Norwegian part):



EOR screening study for NCS

- Analytical approach – same as UK study
- Engaged top EOR expertise from Imperial College, UK
- Gather reservoir and field data from operators
- Establish screening criteria and develop EOR screening tool
- 25 largest fields on NCS
- First step in an approach to evaluate the EOR potential on NCS
- Identify EOR methods and fields with significant potentials
- NPD will initiate a dialog with companies in order to mature the opportunities

EOR screening tool → identify opportunities



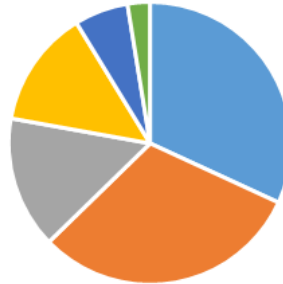
So , what is the EOR potential for NCS?

Work in progress

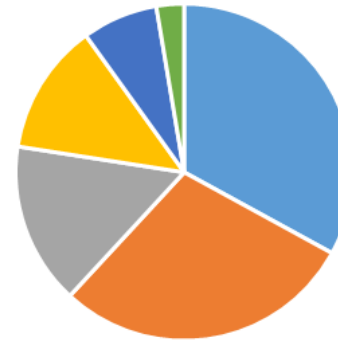
Low Increment



Mid Increment



High Increment



- CO2 miscible/WAG
- Low salinity/polymer
- HC miscible gas/WAG
- Surfactant/polymer
- Low salinity
- Gels

Summary

- There is a significant EOR potential on the NCS
- Some of this potential is time critical
- NPD expects the companies to continuously plan for measures to improve recovery, including EOR
- NPD expects the companies to mature EOR technologies from lab to field by testing the technologies in the fields (pilots).

Thank you for your attention

