

# Low-emission 2050 OG21 Summary Report

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Rev.: Final

Date: 11 November 2024



# Executive Summary

The global energy transition is well underway, with rapid expansion of renewables and electrification of personal mobility. A successful global energy transition will reduce, but not eliminate the need for oil and gas in the foreseeable future. Significant oil and gas investments are still needed in all scenarios towards 2050.

Norwegian gas plays a critical role for European energy security, accounting for 25-30% of consumption. The European dependence on Norwegian gas is likely to continue for at least a decade.

There is still significant oil and gas resources on the NCS. The NCS is currently competitive on costs and emissions. Meeting GHG emission targets is however crucial for continued societal support.

The Norwegian petroleum industry aims for a 50% reduction in GHG emission by 2030 and near-zero emissions by 2050. Meeting the 2050 goal is challenging, but possible. Power from shore remains the most important measure to reduce CO2 emissions from the NCS production. However, more power is needed to electrify the Norwegian society and industries, and all possibilities should be investigated, including offshore wind, gas power with CCS and nuclear power, when planning for an efficient, holistic energy system.

Decarbonizing the vessel fleet that serves the NCS installations is also needed to meet the 2050 targets. Modifications and developments that would allow the use of low-carbon solutions are essential.

Offset mechanisms and direct CO2 capture offer additional opportunities to reduce CO2-emissions further. For such to become viable solutions, quality and transparency issues must be addressed.

Costs are a major challenge related to most low-emission technologies. Cost-reductions as well as scalability should be prioritized drivers for R&D.



Photo: Equinor



# Content

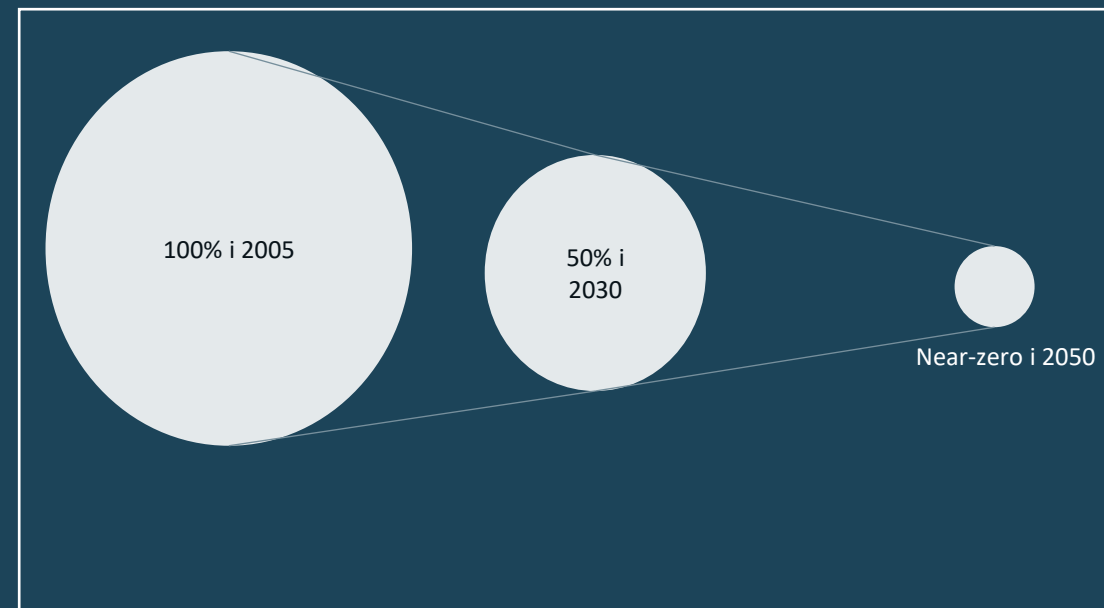
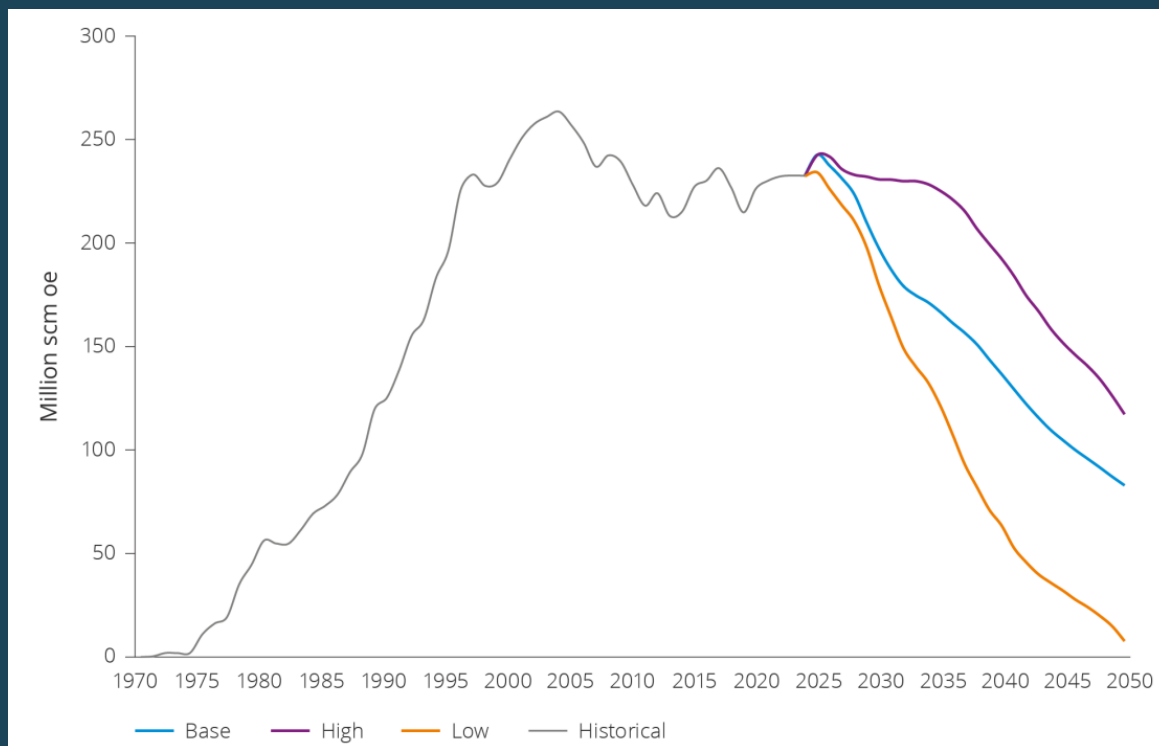
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- 2 On the NCS resources, Norway's importance for energy security, and GHG emission challenges
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# 1. Two long-term goals for the NCS need to be aligned: A desire for continued petroleum production as well as reducing CO2-emissions to near-zero

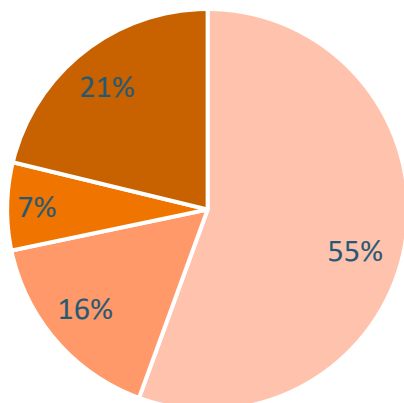
The Norwegian Offshore Directorates high scenario indicates that given continued exploration, field development and technology deployment, the NCS production could decline slowly to become approximately 50% of today's production (NOD, 2024)

Konkraft has defined goals of cutting GHG emissions with 50% by 2030 and further reductions to near-zero emissions in 2050. These goals are in line with the Norway goal of becoming a low-emission society by 2050. (Konkraft, 2024)



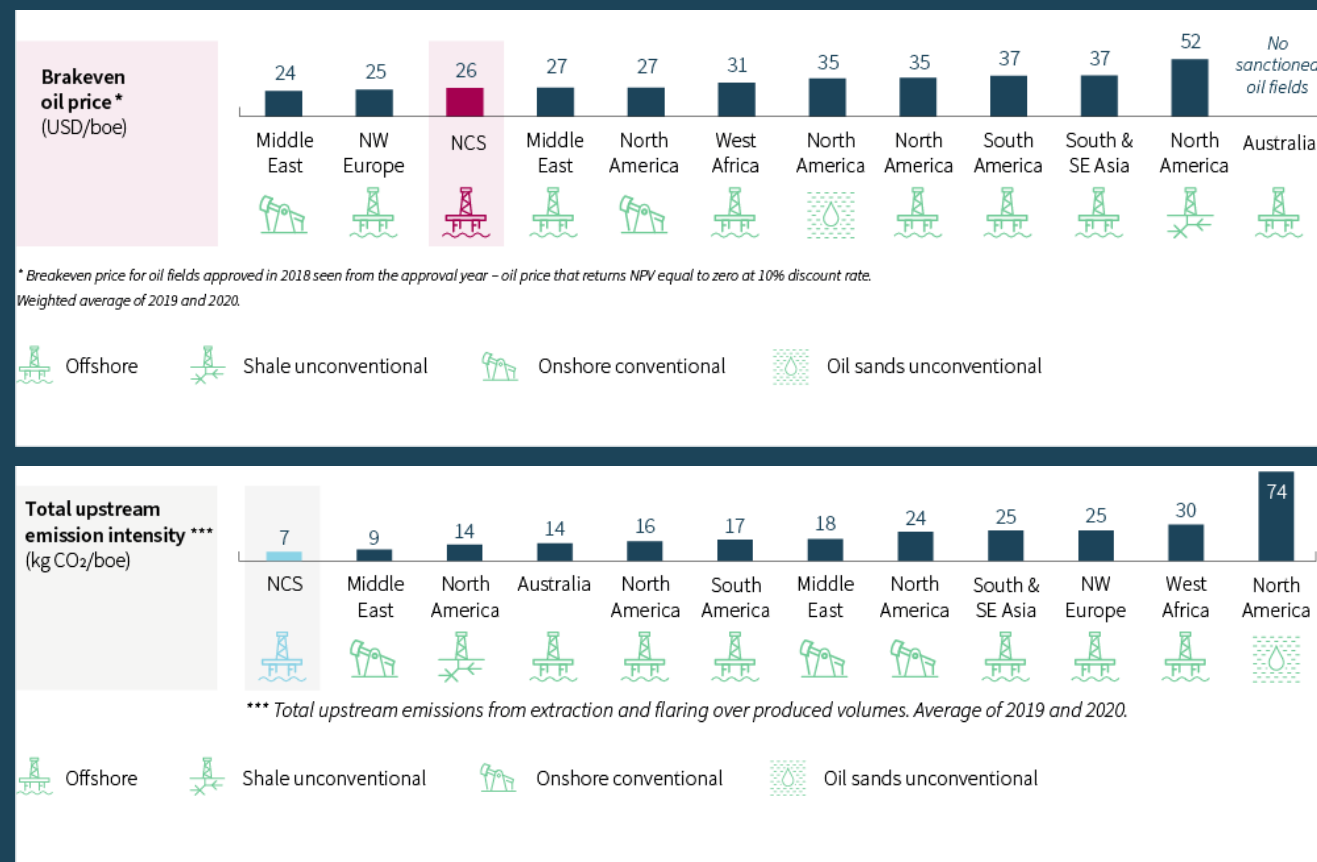
## 2.1 Norwegian energy policy calls for continued development of the petroleum industry. NCS still has resources, and it is competitive

A little more than half of the resources on the NCS have been produced (NOD, 2024)



- Sold and delivered
- Reserves
- Contingent resources in fields and discoveries
- Undiscovered resources

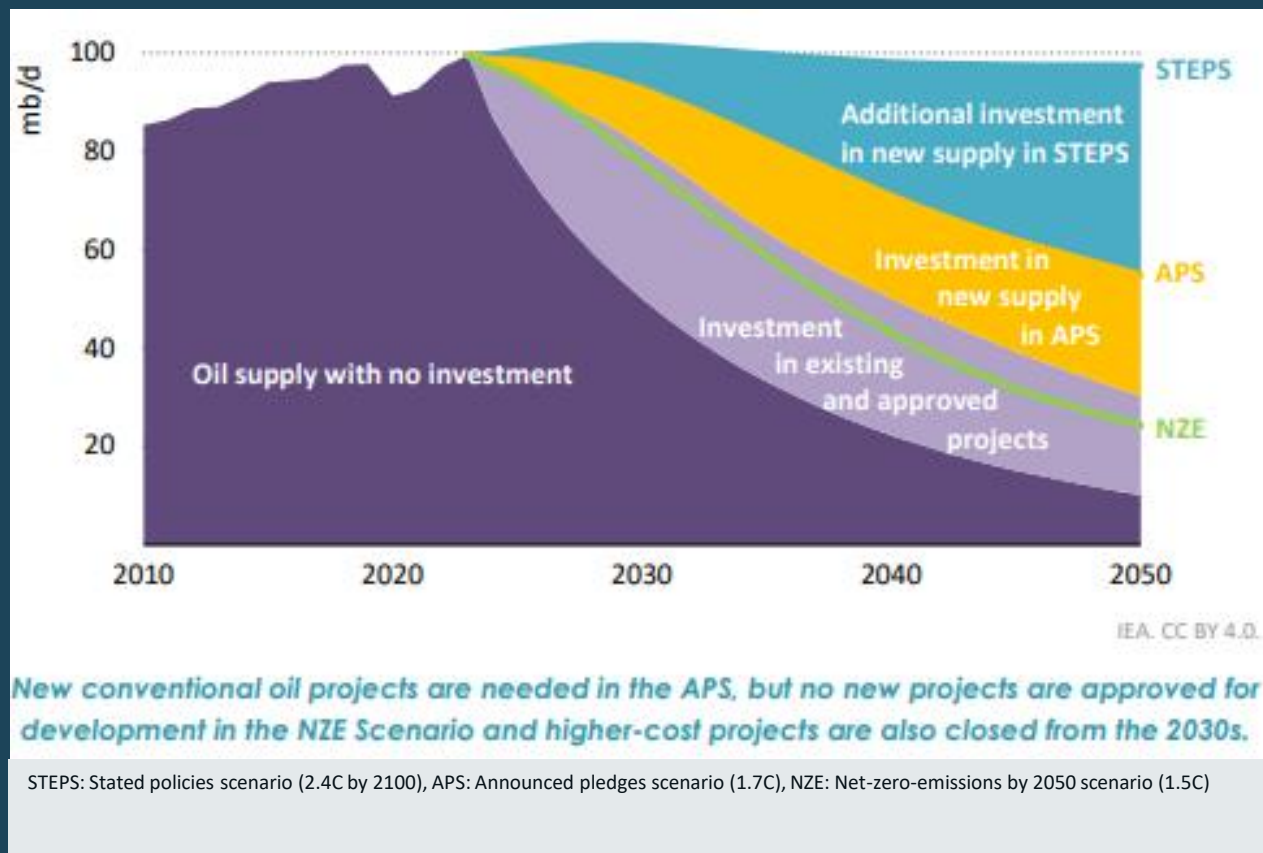
The NCS is competitive on break-even costs, and the production emission intensity is best-in-class (OG21, 2021)



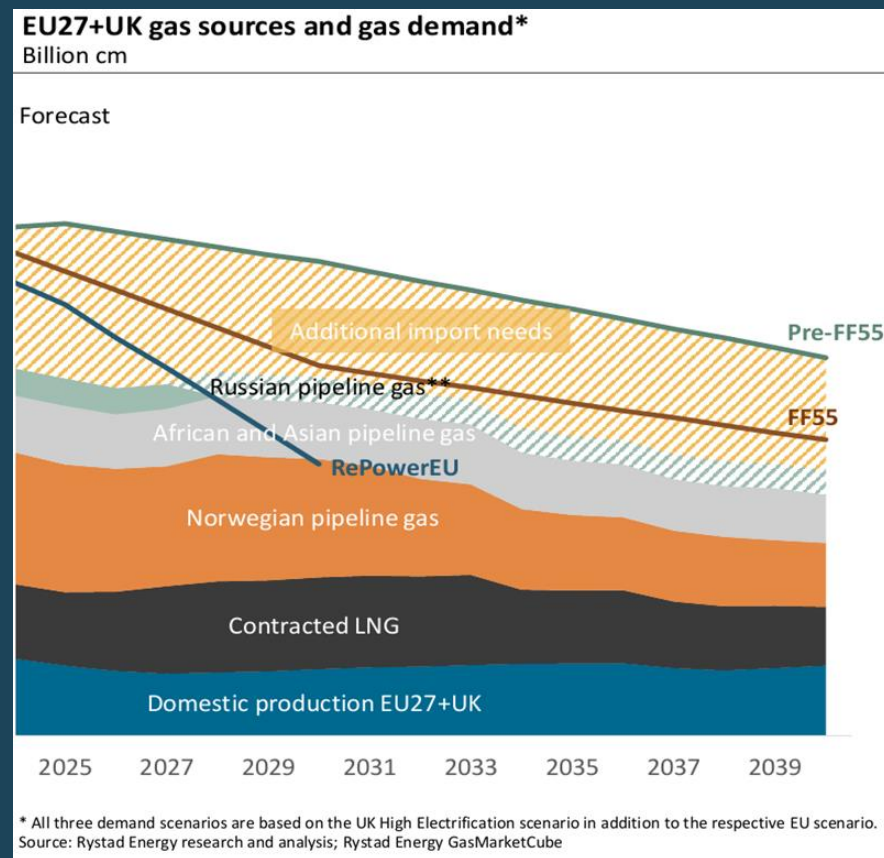


## 2.2. Norwegian petroleum contributes to energy security. Especially the natural gas plays an important role in the European energy transition

Oil will be needed for decades. Even in the net-zero-emissions scenario from IEA the world would in 2050 still need 25% of today's demand for petrochemical and other industry products. In a 2050 perspective demand is highly uncertain, and investments are needed to avoid scarcity (IEA, 2024).



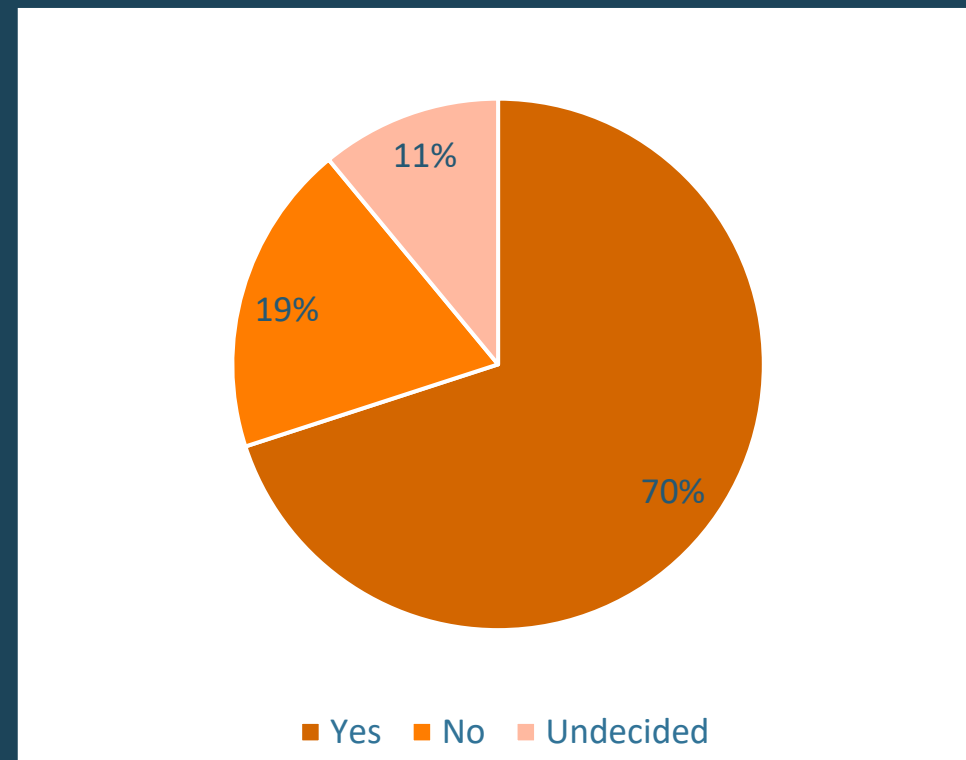
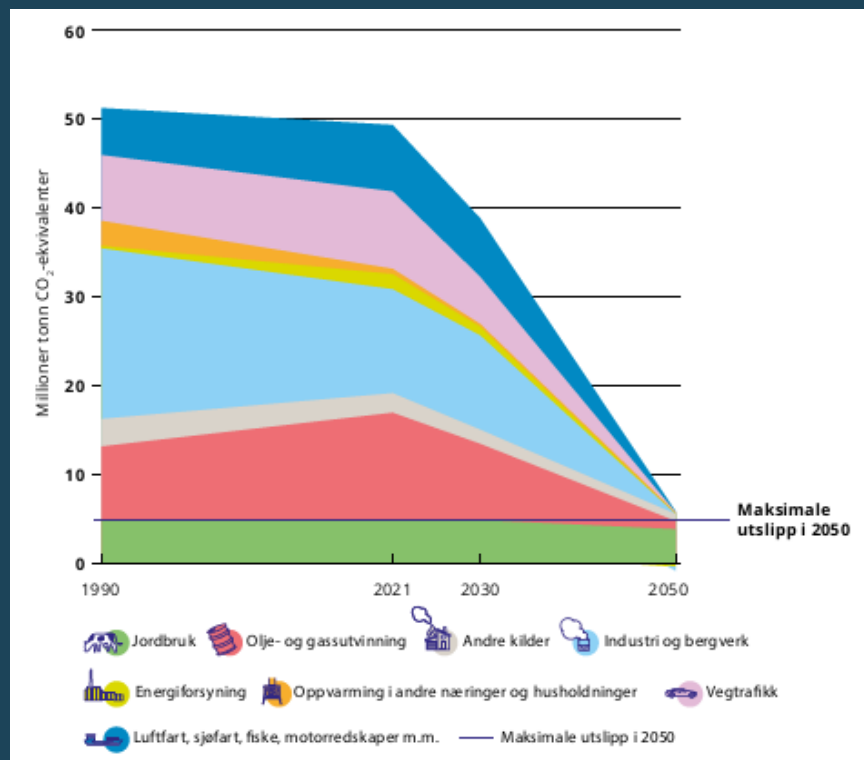
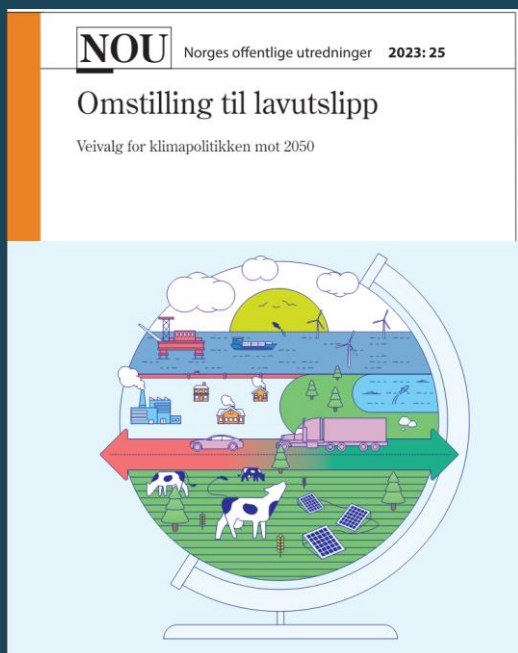
Europe depends on Norwegian gas after the phase-out of Russian gas. Strong demand well into the 30's (Rystad Energy, 2024).



## 2.3 A continued development of the NCS is being challenged by the Climate Committee. The public opinion is however positive to petroleum activities

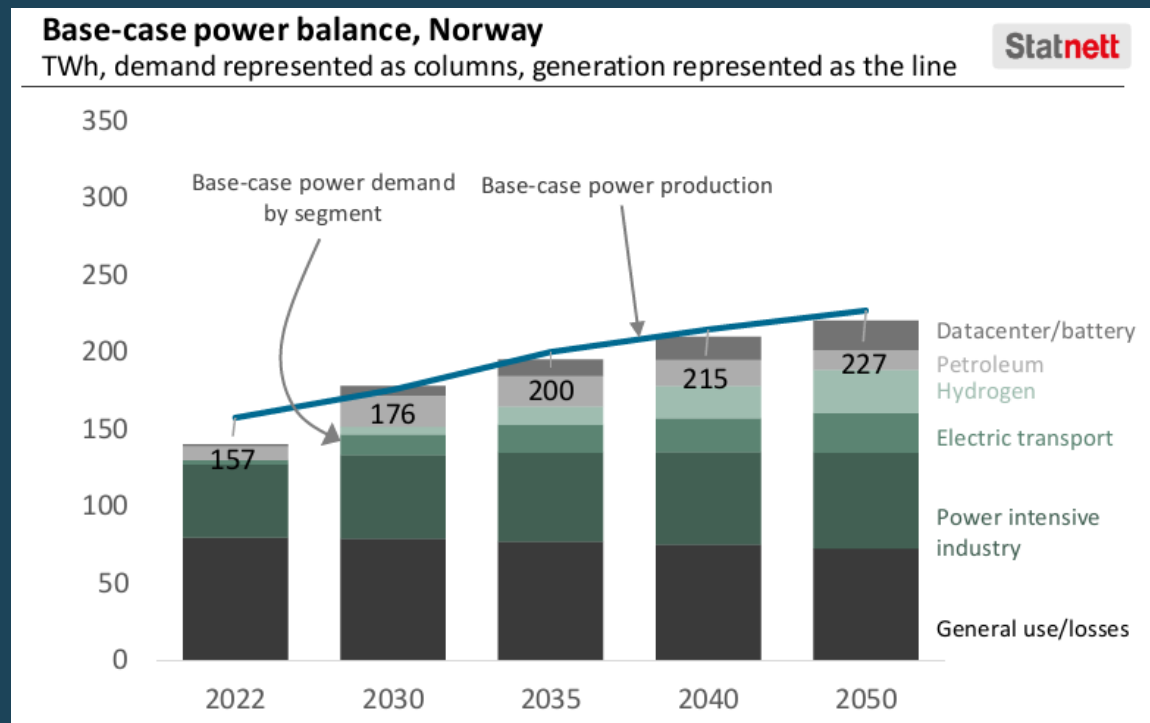
The Climate Committee recommends strategic decisions for the Norwegian transition to a low-emission society by 2050. It recommends an accelerated phase-out of the petroleum industry (NOU 2023:25)

A poll by Offshore Norge in 2024 reveals that a majority of the Norwegian population supports continued petroleum activities on the NCS



## 2.4 Another challenge is the reduced support for the industry's main GHG measure, power-from-shore, even among stakeholders that back NCS activity

Norway expected to go from historical power surplus to a tight power market in the coming years. Electrification of incumbent industries as well as new power-demanding industries drive demand (Rystad Energy, 2024)



Power from shore to NCS installations is being questioned. Stakeholders that previously supported power from shore now ask the petroleum industry to produce its own power



March 2021

March 2024





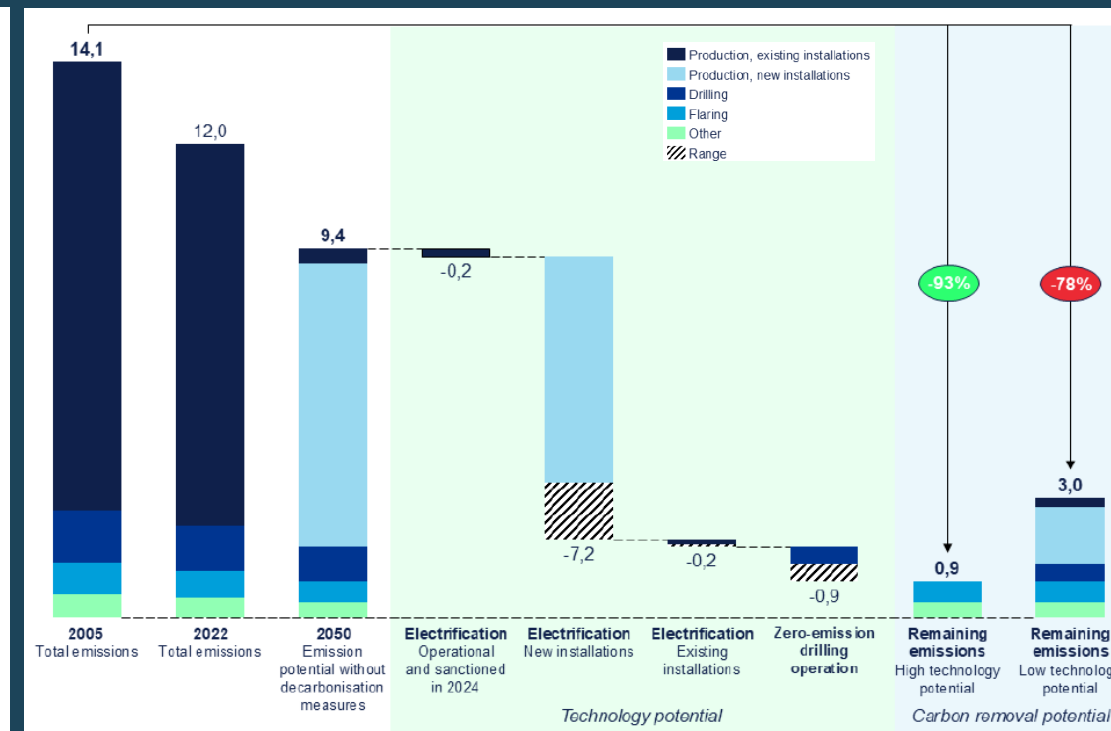
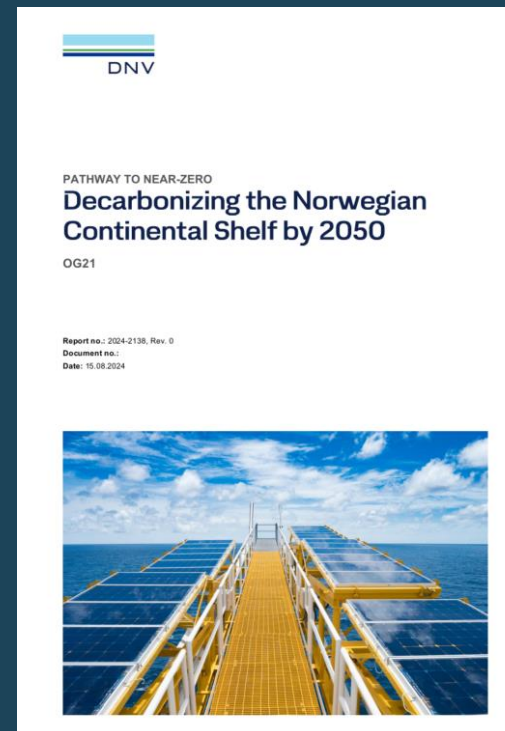
# 3.1 The challenge of aligning the two long-term goals for the NCS has been the motivation for the OG21 project and the commissioning of a related DNV study

The project's objective has been to explore how technology and knowledge can reconcile the desire for high production on the NCS with the Norway goal of becoming a low-emission society by 2050.

DNV was commissioned by OG21 to conduct a study on the topic. OG21 has provided input to the report through workshops and interviews. The roadmap presented by DNV shows that the near-zero emission goal is possible, but challenging (DNV, 2024). The OG21 conclusions (this document) is informed by the DNV report and results from the workshop discussions.

## Key questions to be addressed:

1. What technologies and business models does the Norwegian petroleum industry need, to achieve near-zero production emissions by 2050?
2. What is the current maturity of these technologies and mechanisms, both commercially and technologically?
3. What research, development, demonstration, and innovation (RD&D) efforts are currently underway? What needs more attention and effort?



## 3.2 OG21 is of the opinion that a high production scenario on the NCS is possible in parallel with reducing GHG emissions to near-zero by 2050

### OG21's main conclusions



Energi  
2050

1	Norway contributes to energy security with reliable O&G supplies. The high production scenario of NOD, where Norway's production is approximately halved by 2050, aligns well with global scenarios of 50% less oil and gas demand in 2050 if the global community succeeds reasonably well with the energy transition.
2	DNV's roadmap shows that the 2050 goal of near-zero emissions with a high production path is possible but challenging. The maturation of low-emission technologies alone can make the goal achievable. Quotas, offsets, and direct capture can further reduce emissions.
3	Costs are an important challenge with low-emission technologies. When developing business cases for new low-emission projects, value-adding factors should be explored, including extended use of existing infrastructure, postponed P&A and decommissioning, and CO2-storage revenue.
4	The entire society is being electrified, and the petroleum industry is part of it. The most cost-effective solution is integrated systems and power-from-shore. Last year's observation by OG21 still holds: Norway needs a comprehensive energy plan that balances supply, demand, and transmission capacity.
5	OG21 is, however, agnostic about how new power is made available. The hydropower-based system needs additions as overall power demand increases, and onshore wind, offshore wind, gas power w/ CCS, and nuclear power are all options that should be considered when developing the power system further.
6	There is already a lot of good R&D&I underway that can contribute to achieving DNV's roadmap. R&D investments should be prioritized to target initiatives that are scalable and broadly applicable. The following areas should be given extra attention:
7	This year's deep dive study shows that the energy sectors overlap. The decision to replace Energi21 and OG21 with Energi2050 will provide a holistic approach to R&D&I for energy systems. This year's deep dive gives a flying start to issues that Energi2050 should address.

### R&D priorities



Energy efficiency across all disciplines ranging from subsurface to topside operations and product exports.



Further improve power transmission technologies that would reduce costs of power from shore.



Mature and standardize technologies that would reduce costs and improve efficiency of new power generation.



Mature technologies for powering offshore vessels and mobile units with low-carbon solutions.



Improve quality of and trust in carbon credit mechanisms.

## 4. Abbreviations and references

CCS	Carbon capture and storage
CO <sub>2</sub>	Carbon dioxide
GHG	Greenhouse gas
R&D	Research and development
NCS	Norwegian continental shelf
O&G	Oil and gas

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The logo consists of the letters 'OG21' in a white, stylized, sans-serif font. The 'O' and 'G' are connected, and the '2' and '1' are also connected. The background is a high-contrast, blue-toned photograph of ocean waves with white foam.

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