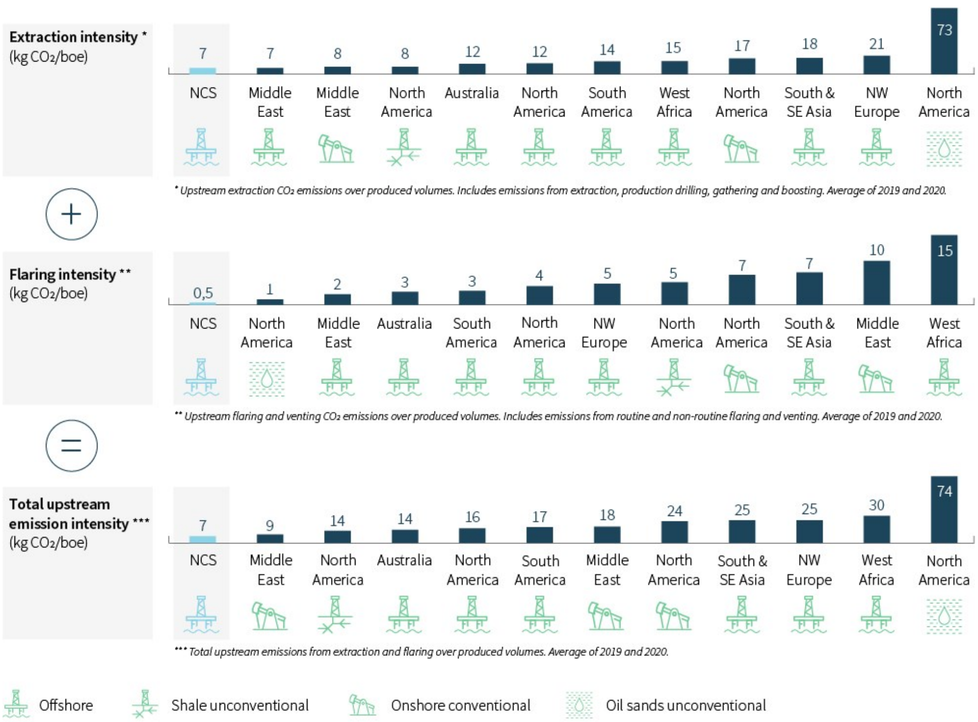
PUBLISERT 19. OKT. 2021 OPPDATERT 4. NOV. 2021

Operational GHG emissions to be reduced

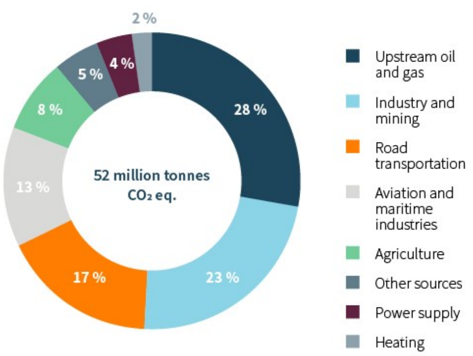
Greenhouse gas emissions (GHG) from the NCS production measured as kg CO_2 per barrel produced (CO_2-intensity), are the lowest among petroleum provinces globally, (Rystad Energy, 2021). This is largely a result of the ban on regular gas flaring introduced in 1974, and the introduction of a petroleum CO_2-tax in 1991.

Figure 16. GHG emission intensity from O&G provinces (Rystad Energy, 2021)



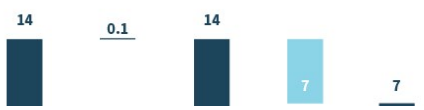
Still, the petroleum production is a significant contributor to the total Norwegian GHG emissions, as Figure 17 shows.

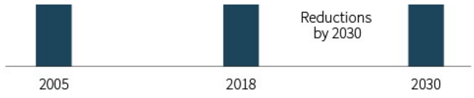
Figure 17. Norwegian GHG emissions per sector in 2018 (Rystad Energy, 2021)



The Norwegian petroleum industry represented by the Konkraft collaboration, launched ambitious GHG emission targets in 2020 aiming for a 40% reduction in operational GHG emissions by 2030 as compared to the 2005 level, and further reducing the GHG emissions to near-zero by 2050. As part of the temporary tax changes for the petroleum industry agreed in the parliament in June 2020, the parliament asked the industry to further strengthen its 2030 target to a 50% reduction by 2030, see Figure 18. (Konkraft, 2021).

Figure 18. GHG emissions from the Norwegian petroleum industry and near-term reduction ambition
(Rystad Energy (2021) based on Konkraft (2021))

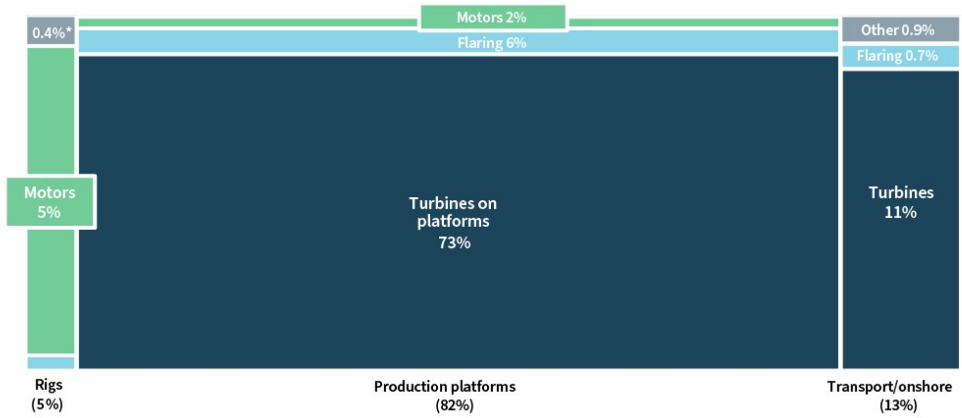




All numbers in million tons CO_2 equivalents

The main contributor to CO_2-emissions on the NCS is turbines, generating energy for the operations, see Figure 19.

Figure 19. Upstream CO_2 emissions in 2018 distributed on source (Rystad Energy, 2021)



*Includes other greenhouse emission gases in addition to CO_2

Source: Norwegian Oil & Gas; NPD; SSB; Rystad Energy research and analysis

The turbines are combustion engines running on natural gas, with thermal efficiencies dictated by fundamental thermodynamic laws and the load characteristics. Without bottom-cycle or heat recovery, offshore gas turbines typically have thermal efficiencies in the 30-35% range. The alternative use of the gas in modern combined cycle power plants onshore have a thermal efficiency above 60%, with a corresponding reduction in CO_2-emissions. In addition, capturing CO_2 for sequestration would be easier on large onshore plants. The case for electrification of the NCS with power from shore based on the Norwegian power mix or from other renewables, is hence strong from a technical CO_2 emissions perspective.

Konkraft has started the evaluations of how the 50% reduction ambition by 2030 could be met, see Figure 20. About 30% could be cut by projects already sanctioned and projects that are well matured, but not sanctioned, and a further 20% could be cut by projects currently in the concept phase. Approximately half of the necessary reductions would have to be cut by projects and measures that still need to be identified, matured and sanctioned.

Figure 21 illustrates that electrification from shore is the most important measure to meet the 2030 ambition. However, energy efficiency, reduction of flaring, and wind power have also been identified as important contributors by Konkraft.

Figure 20. Opportunity space for 50% GHG emissions by 2030 (Konkraft, 2021)

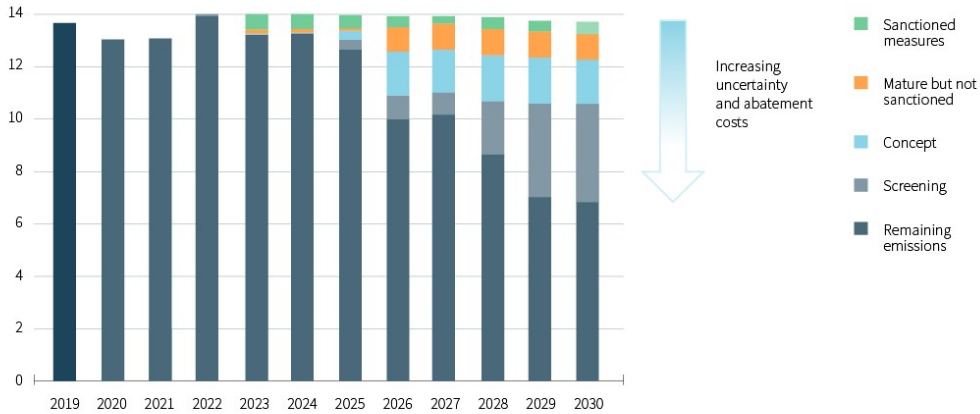
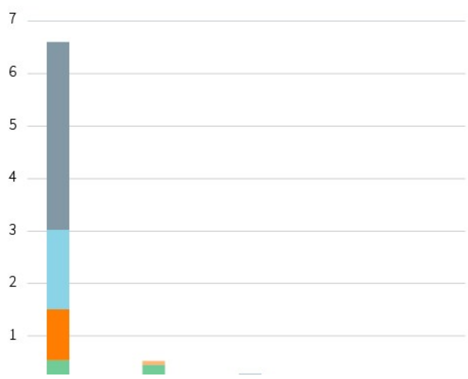
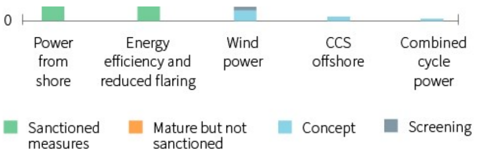


Figure 21. CO_2 abatement effect of opportunities according to Konkraft (2021)





As producing fields mature, their CO_2-intensity can be expected to increase unless measures are taken. Such measures include tie-back of new resources to increase the denominator in the metric, reduced water production through better reservoir drainage solutions or water separation downhole or on the seabed, and improved energy efficiency topside. Such measures, and other technology opportunities that could contribute to bring down GHG emissions, are described in Section 4.

The GHG emissions from the consumption of hydrocarbons is considerably higher than the emissions from the production. This does not mean that production emissions are not important. Firstly, the NCS production emissions are a major contributor to national emissions. Secondly, as oil demand over time is reduced in the transportation sector due to electrification or substitution with low-carbon fuels, an increasing portion of the carbon will be locked in petrochemical products, which increases the relative importance of production emissions.

→Forrige side →Neste side