KonKraft

THE ENERGY INDUSTRY OF TOMORROW ON THE NCS

CLIMATE STRATEGY TOWARDS 2030 AND 2050

STATUS REPORT

2025

KONKRAFT

KonKraft is a collaboration arena for Offshore Norge, the Federation of Norwegian Industries, the Norwegian Shipowners' Association, the Confederation of Norwegian Enterprise (NHO), and the Norwegian Confederation of Trade Unions (LO), together with the LO members – the United Federation of Trade Unions and the trade union Styrke.

KonKraft aims to be a premise provider for national strategies for the petroleum sector and will work to maintain the competitiveness of the Norwegian continental shelf so that Norway remains an attractive investment area for the Norwegian and international oil and gas industry, including supplier companies and the maritime industry. The council is KonKraft's highest authority. In addition, KonKraft has an executive committee and a secretariat which is responsible for ongoing activities and day-to-day operations.

Why a status report?

The KonKraft partnership developed the climate strategy *"The Energy Industry of Tomorrow on the NCS – Climate Strategy towards 2030 and 2050"* in 2020. The strategy describes the industry's efforts to achieve national and global climate goals. The development and follow-up of a common climate strategy demonstrate the partners' willingness to adapt and their ambitions for realising a low-emission society. One of the KonKraft collaboration's primary aims is to cut greenhouse gas emissions from the Norwegian oil and gas industry by 50 per cent by 2030 and to near zero by 2050. In parallel with reducing emissions from petroleum activities, a new and forward-looking energy industry will be built on the Norwegian continental shelf, comprising offshore wind, hydrogen, and carbon capture and storage (CCS).

OFFSHORE NORGE · Norsk Industri · Norges Rederiforbund Norwegian Shipowners' Association · NHO · LO · Fellesforbundet · STYRKE

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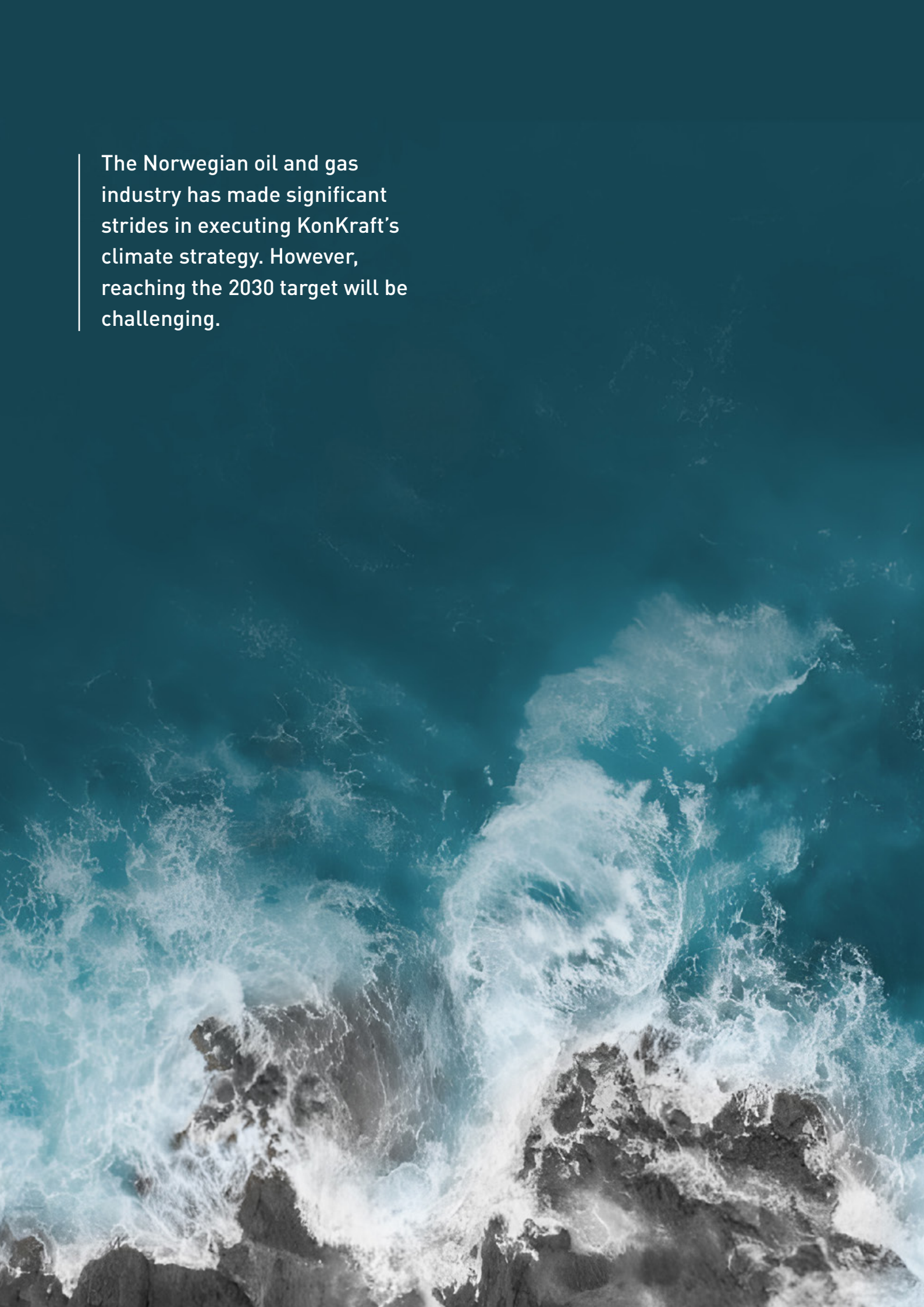
The Norwegian oil and gas industry has made significant strides in executing KonKraft's climate strategy. However, reaching the 2030 target will be challenging.



SUMMARY

The oil and gas sector is Norway's largest industry. Climate transition within this sector is crucial for achieving national climate ambitions, maintaining competitiveness, and securing long-term employment and energy supply. Recent developments in international politics, characterised by increased geopolitical unpredictability and heightened international tensions, are affecting energy markets and the conditions for the Norwegian continental shelf as an energy supplier. Norway maintains its position as a reliable gas supplier to Europe and continued its high production levels in 2024, producing 241.2 million Sm^3 o.e. of oil and gas — an increase of almost 8 million Sm^3 o.e. compared to 2023.

The EU is Norway's most important gas market, and with the planned phase-out of Russian gas by 2027, Norwegian gas deliveries will play an even more vital role in securing the EU's gas supply. *The 2035 Climate Report – Towards a Low-Emission Society (Klimamelding 2035 på vei mot lavutslippssamfunnet)* highlights that the EU's and the UK's long-term need for gas imports is expected to be significantly higher than future production on the Norwegian continental shelf. Production on the NCS is expected to decline sharply in the coming years. To ensure that Norway can continue supplying energy to Europe, further exploration and new discoveries will be necessary. Sound resource management on the Norwegian

FIGURE 01 UPDATED OPPORTUNITY SPACE SPRING 2025
Emissions in Mt CO_2e/year

Source: KonKraft

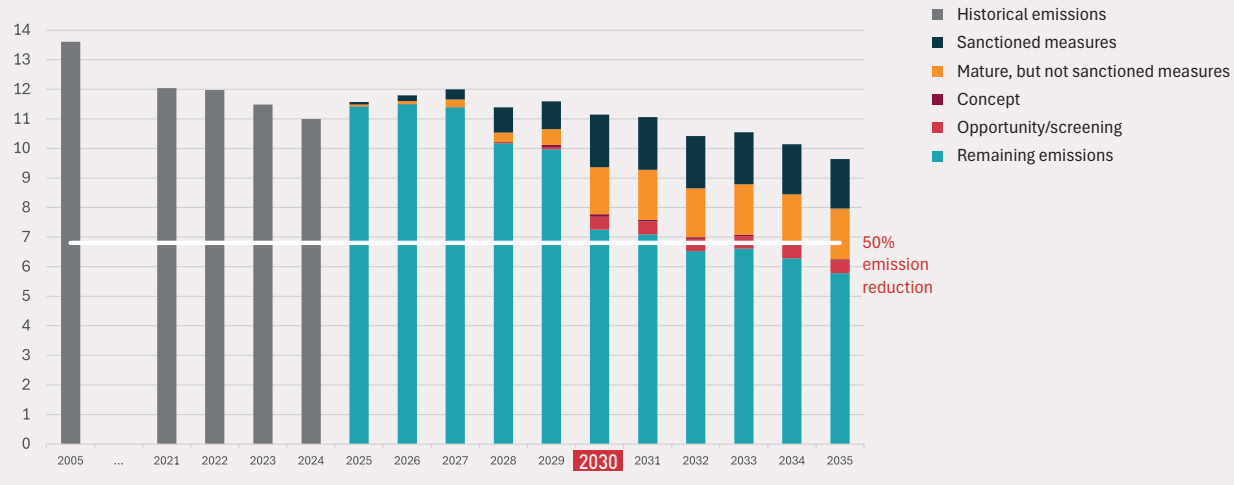


Figure: Updated opportunity space as of spring 2025 with projections for emissions and the estimated effect of large, sanctioned climate measures and measures under assessment. The projections also include planned new field developments and decommissioning, which means that the total effect of emission-reduction measures at the various levels of maturity varies somewhat over time. (Source: KonKraft)

continental shelf will not only be crucial for the EU's energy security but will also generate revenue for Norway and help secure employment and prosperity for current and future generations.

In light of growing geopolitical tensions, the Norwegian continental shelf now faces new challenges related to protecting energy supply chains against security threats. This is particularly true for traditional energy carriers such as oil and gas, but it also affects the development of emerging low and zero-emission value chains, such as offshore wind and carbon capture and storage.

An escalation of global trade conflicts is likely to contribute to rising costs. Regardless of whether an escalation occurs, the increased uncertainty surrounding the stability of global trade, combined with climate considerations, has prompted the EU to strengthen and secure its own value chains, from raw materials to processing capacity. This may lead to higher costs, as new industrial capacity must be built and developed in areas that have not previously been competitive in the global market. For players on the Norwegian continental shelf, this development could result in significantly higher supplier costs and increased uncertainty about the pace and direction of the energy transition. In this year's status report, we take a closer look at how geopolitical shifts affect the threat picture and the further development of the NCS. See Chapter 5: Troubled waters.

The Norwegian oil and gas industry has made significant strides in executing KonKraft's climate strategy. However, reaching the 2030 target will be challenging

KonKraft's annual status report shows steady progress towards a 50 per cent reduction in emissions from offshore and onshore facilities. In 2024, emissions from the Norwegian oil and gas industry amounted to 11 Mt CO_2e, a decrease of 0.48 Mt CO_2e compared to 2023. Despite high production in recent years and a new annual record for gas production in 2024, emissions on the Norwegian shelf continue to fall.

Operators and the supply industry are constantly assessing the most cost-effective climate measures to reduce emissions. A compilation of operator companies' identified and planned climate actions as of spring 2025 indicates a combined emissions reduction potential of 3.9 Mt CO_2e by 2030 (see Figure 1). If all ongoing operator climate actions are realised, they will result in a total reduction of 47 per cent compared to 2005 levels. The updated opportunity space shows that the Norwegian oil and gas industry is on track to realising emission reductions. However, supply chain constraints and higher costs of critical equipment mean that some projects that are currently in the maturation phase will not come on stream until 2032. Over the past year, several major initiatives have matured and moved from the *opportunity/ screening* stage to *mature but not sanctioned*. Progress in maturity is important to ensure that projects are realised on time and contribute to emission reductions by 2030. Of the total potential in the project portfolio, *sanctioned measures* account for approx. 1.8 Mt CO_2e and *mature but not sanctioned measures* account for 1.6 Mt CO_2e. Realisation of all *sanctioned* and *mature but not sanctioned measures* could reduce emissions from the oil and gas industry in 2030 by 43 per cent compared to 2005 levels. Realisation of less mature measures, along with the identification and implementation of new ones, as well as a predictable and stable regulatory framework, will be decisive for how close the industry comes to achieving its 2030 goals.

Electrification is the most crucial climate action in the sector

Electrification of oil and gas installations with power from shore remains the measure operator companies consider most important for reducing emissions and meeting their own climate targets. Moreover, power from shore also plays an essential role in enabling Norway to reduce its greenhouse gas emissions. Since the last status update, all major planned and applied for power from shore projects have secured reserved grid capacity. Confirmed grid capacity is a key prerequisite for final investment decisions in these projects.

Power from shore remains the measure with the highest potential to reduce emissions both before and after 2030, with a total reduction potential of 3 Mt CO_2e by 2030, provided all measures have been implemented by then. More than half of the emission reduction potential is associated with projects for which companies have already made an investment decision (*sanctioned measures*). If we include projects that are approaching an investment decision (*mature but not sanctioned*), the reduction potential is more than 90 per cent. Electrification projects approaching investment decisions include the area solutions for Halten Nord, Tampen, and Balder/Grane, and will collectively require a maximum of approximately 2 TWh of power. The electricity need represents a small proportion of national power demand.

Electrifying the entire Norwegian continental shelf has never been a goal per se. Rather, the objective is to eliminate emissions from key hubs on the shelf that will have long-term production. Last year's political debate relating to changes to terms and conditions, and the potential reversal of granted licences that form the basis for investment decisions, has created uncertainty in the planning and execution of the remaining power-from-shore projects on the Norwegian continental shelf. The sector depends on predictable climate and energy policy framework conditions to enable companies to invest in continued production and emission reduction measures for the long-term development of the offshore industry.

The NOx agreement between the Norwegian government and industry was established in 2008 and has since contributed to significant CO_2 emission reductions. The agreement expires in 2027 but should be extended until 2030.

This year's long-term emission forecast indicates that emissions could decline by as much as 70 per cent by 2040

KonKraft has a long-term goal of near-zero emissions from offshore and onshore facilities by 2050. Both Norwegian authorities and industry players clearly want to develop, not phase out, activities on the Norwegian continental shelf. The preparation of annual long-term forecasts for the oil and gas industry towards 2050 provides an indication of the need for sustained emission cuts and contributes to the discussion on what is required to achieve KonKraft's long-term goal.

FIGURE 02 LONG-TERM EMISSION FORECAST TOWARDS 2050
Emissions in Mt CO_2e/year

Source: KonKraft

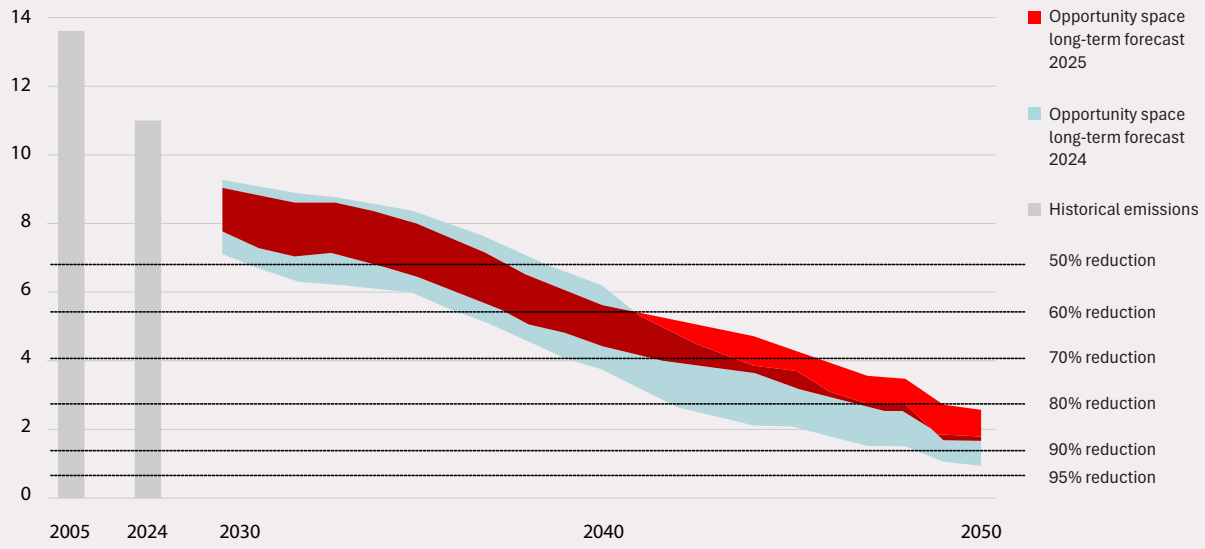


Figure: NCS emission forecast 2030–2050 Comparison of opportunity spaces in the 2024 and 2025 forecasts

To compile the long-term forecast, the operating companies have provided their best estimates of activity and emissions towards 2050, including expectations for exploration, new discoveries, increased recovery, and decommissioning of fields. The long-term emission forecast for the NCS, published in spring 2025, indicates that emissions could be reduced by approximately 70 per cent by 2040 and nearly 90 per cent by 2050, provided all identified and planned climate measures are implemented (see Figure 2, highlighted in red). As in last year's forecast (highlighted in light blue), a significant decrease in emissions is expected towards 2050. At the same time, considerable uncertainty remains in the forecast, particularly beyond 2035/2040, regarding activity levels on the NCS and the impact of climate measures identified and implemented after 2030. Shelf activity is also dependent on oil and gas prices and future industry framework conditions.

After 2040, this year's forecast shows a slightly higher level of emissions than last year's. This is primarily due to lifetime extensions, combined with the assumption that additional fields will come on stream.

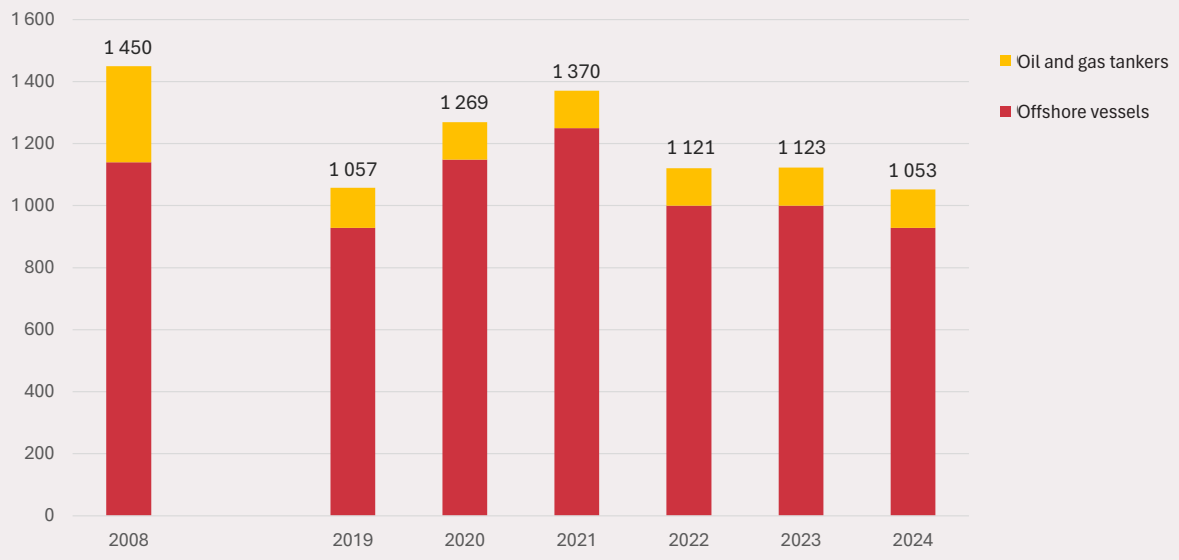
In this year's forecast, the emission pathway with only sanctioned measures is on average 1.5 Mt CO_2e per year above the emission pathway for implementation of all identified measures during the period 2030–2050. As a result, cumulative emissions will be approximately 27 Mt CO_2e higher during the entire period leading up to 2050 if only sanctioned measures are implemented. It is once again important to emphasise that there is considerable uncertainty associated with long-term emission forecasts.

Emissions from offshore vessels operating on the NCS

VPS estimates total emissions from oil and gas tankers and offshore vessels on the NCS at 1.05 Mt CO_2 in 2024, of which 0.93 Mt CO_2 are from offshore vessels, see Figure 3. The figure represent a decrease of around 6 per cent from 2023 to 2024 and are 27 per cent lower than the estimated emission levels for 2008.

FIGURE 03 DEVELOPMENT IN EMISSIONS FROM OFFSHORE MARITIME ACTIVITY – HISTORICALLY (2008) AND THE LAST SIX YEARS (2019–2024) PER VESSEL SEGMENT, NORWEGIAN ECONOMIC ZONE

Source: VPS and DNV



VPS's analysis of greenhouse gas emissions from maritime activity in offshore operations within the Norwegian economic zone extends beyond the oil and gas industry. As the authorities work to develop requirements targeting maritime emissions from the oil and gas industry, it will become increasingly important to distinguish more clearly between these activities, vessel types, and emissions. This is particularly important, as oil and gas operators' influence is limited to emissions from contracted vessels.

Consequently, this year's report includes efforts to determine which vessels in VPS's overview were contracted by NCS operators. The preliminary overview is based on lists from eleven of the largest NCS operators. This is the first time such an overview has been compiled. It should be noted that it does not cover all vessels contracted by oil and gas operators or their subcontractors, and that further work will help improve the overview.

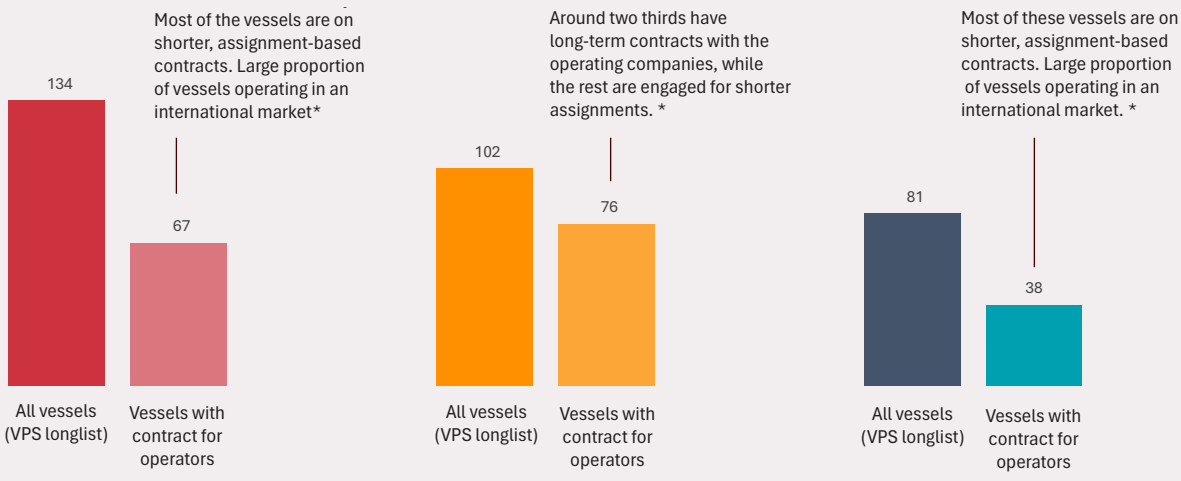
The overview, see Figure 4, indicates a significant difference between the number of vessels included in VPS's overview and the number of vessels under contract with NCS operators.

It is also important to note that many vessels contracted by the operating companies are only chartered for short periods and operate in an international market, frequently sailing in and out of the Norwegian economic zone. The type of contract, operating pattern, and extent of a vessel's involvement on the Norwegian continental shelf can be decisive for whether emission-reducing measures can be implemented.

The primary aim of these two analyses is to highlight the following: (i) Vessels contracted by operators account for only part of the offshore activity in the Norwegian economic zone and (ii) It is important to also highlight other emissions in the Norwegian economic zone, i.e. emissions from vessels not contracted by operators.

FIGURE 04 CONTRACTED VESSELS IN THE OIL AND GAS INDUSTRY LISTED BY VPS. THE VESSEL SELECTION WAS COMPILED BY OFFSHORE NORGE.

Source: Offshore Norge



*Overall estimates based on input from the Offshore Norge working group for maritime emissions

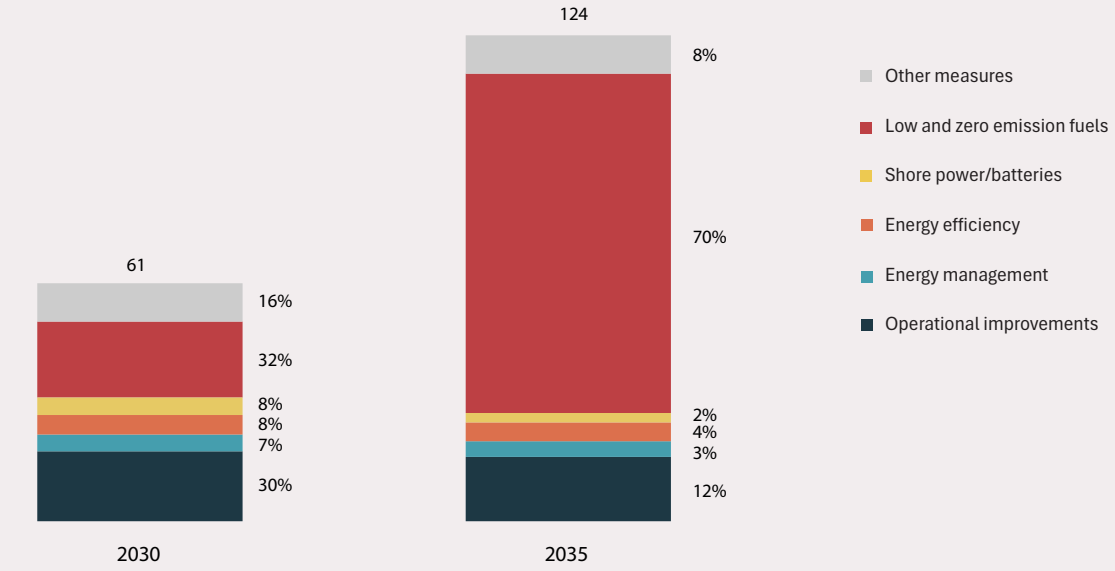
FIGURE 05

POTENTIAL CLIMATE MEASURES TO REDUCE EMISSIONS FROM OFFSHORE VESSELS

Work is ongoing on method development and updating of the data basis

(1000 tCO_2)

Source:Offshore Norge



RANGE OF OUTCOMES FOR EMISSIONS FORECAST TOWARDS 2030 and 2035

Work is ongoing on method development and updating of the data basis

1000t CO_2

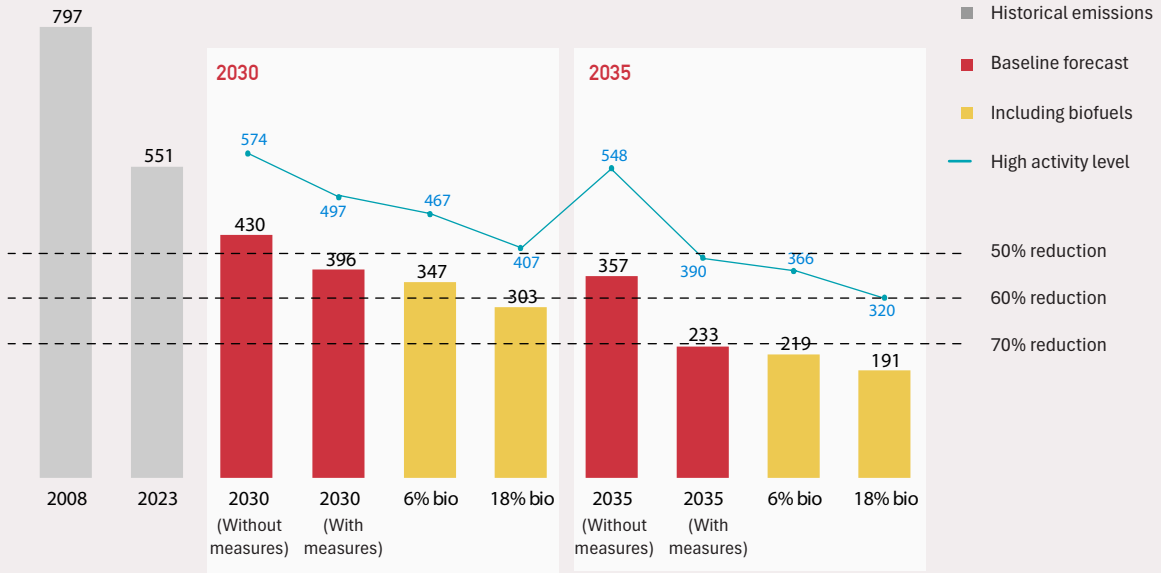


Figure: Reduction potential for climate measures within offshore maritime vessel segments 2023–2030/2035, by measure category.

New forecast for core maritime segments in the oil and gas industry

As part of KonKraft's 2020 climate strategy, it was decided to establish quantitative targets for emission reductions in offshore maritime activities. When designing such a target, it is crucial that the emissions included in the target are emissions that the oil and gas industry can have an impact on.

The vessel categories that the operating companies have the best opportunity to impact and that have been identified as particularly relevant are: supply, standby, anchor handling, IMR and seismic vessels.
The work to establish a target is being assessed in light of the authorities' efforts to develop low and zero-emission requirements for offshore vessels, as well as relevant regional and international regulations.

Preliminary results[1] from this year's survey show that significant emission reductions have already been achieved since 2008, and that there is an estimated potential for further reductions from 2023 onwards of 60,000 t CO_2 per year by 2030 and 124,000 t CO_2 per year by 2035, down 11 and 22 per cent respectively compared to 2023 levels. Much has already been realised through operational improvements, energy efficiency and shore power. In the longer term, uptake of low and zero-emission fuels will be necessary for greater emission reductions. As shown to the right in Figure 5, the level of activity on the Norwegian continental shelf, along with the regulatory framework for biofuels, will significantly influence how emissions from the maritime segments develop towards 2030 and 2035.

Project development within emerging value chains is progressing more slowly than anticipated

A slower pace in the development of low and zero-emission value chains both in Norway and Europe is delaying the implementation of emission cuts and the transition to low and zero-emission energy carriers on the Norwegian continental shelf. The development of the European hydrogen market has been delayed by uncertainty associated with demand, incomplete regulatory frameworks, and high prices. As a result, the development of Norwegian production projects for blue hydrogen has been put on hold. However, players on the Norwegian continental shelf report progress in offshore wind, CO_2 storage and seabed minerals.

1 The numerical basis for seismic vessels has not yet been included in the figures. The working group will continue to develop the forecast with the aim of establishing a quantitative target for maritime emissions.

A slower pace in the development of low and zero-emission value chains both in Norway and Europe is delaying the implementation of emission cuts

Players on the Norwegian continental shelf report progress in offshore wind, CO_2 storage and seabed minerals.

Two-fold development in offshore wind

The offshore wind initiative in Norway has experienced both ups and downs over the past year. The Ventyr consortium is currently developing the project area for what will become Norway's largest offshore wind farm in Sørlige Nordsjø II, with a total installed capacity of 1,500 MW. May also saw the announcement of three project areas for floating offshore wind at Utsira Nord. The areas will be allocated based on qualitative criteria, and one of the projects could receive state aid of up to NOK 35 billion.

At the same time, increased offshore wind power costs and uncertainty about the framework conditions have sparked greater debate about the need for offshore wind in Norway. Several players have already withdrawn from the tender process for Utsira Nord. This reluctance persists despite the fact that the Norwegian Water Resources and Energy Directorate (NVE), Statnett and DNV, in recent reports, identify offshore wind as crucial for meeting future power demand and keeping electricity prices low over the long term.

Efforts to establish CO_2 storage sites on the Norwegian continental shelf are moving forward

Several NCS players are working to establish CO_2 storage sites on the Norwegian continental shelf. The Northern Lights project, which was awarded the first NCS exploitation licence, is expected to begin injecting CO_2 from Heidelberg Materials' cement plant in Brevik in 2025. The other NCS licences aim to commence injection activities after 2030. If all awarded CO_2 storage licences begin injection as scheduled, the total injection capacity could reach approximately 25 Mt CO_2 per year by 2030 and around 100 Mt CO_2 per year by 2035. However, it is uncertain whether all the projects will be realised.

Significant potential for knowledge and technology transfer from the oil and gas industry to seabed mineral exploration and extraction

The seabed in Norwegian waters contains a number of minerals and metals considered strategically important for societal development, industry, technology advancement and the energy transition. In April 2024, the Norwegian government decided to open up an area in the Norwegian Sea and the Greenland Sea for mineral activities, and in June, proposals for licensing areas to be included in the first licensing round were submitted for consultation, with the aim of awarding the initial licences in the first half of 2025. While the government's mapping of relevant areas is ongoing, the licensing process has encountered delays.

There is significant potential for knowledge and technology transfer from the oil and gas industry to seabed mineral exploration and extraction. At the same time, further research and analysis is needed across the entire value chain – from geological surveys and potential environmental impact to efficient and sustainable extraction. The authorities have made good progress in establishing the necessary regulations to ensure the proper implementation of mineral activities, but significant work remains on certain parts of the regulatory framework. Predictability is essential, and mineral activities must be planned and organised by the authorities with a view to long-term development, not just the initial survey and data collection phase.

Norway maintains its position as a reliable supplier of gas to Europe. However, the development of low and zero-emission value chains is progressing somewhat slower than expected

1

BACKGROUND

The oil and gas industry represents Norway's largest industry. Climate transition within the sector is crucial to achieving national climate ambitions and securing long-term jobs and energy supplies from the NCS. KonKraft's annual status reports monitor the oil and gas industry's efforts to reduce emissions and promote cooperation and accountability among offshore players in achieving the industry's climate goals. Recent developments in international politics – marked by heightened geopolitical tensions, greater unpredictability, and rising supply chain costs for oil, gas and renewable energy – are impacting energy markets and the conditions for the Norwegian continental shelf as an energy supplier. Nevertheless, Norway remains a reliable supplier of gas to Europe, although the development within low and zero-emission value chains is progressing somewhat slower than expected.

1.1 Record year for gas deliveries to a Europe focusing on energy security

In 2024, the high production levels on the Norwegian continental shelf continued at approximately 241.2 million Sm^3 o.e., up by almost 8 million Sm^3 o.e. compared to 2023[2]. Norway remains a reliable gas supplier to Europe, exporting more gas than ever before. In order for Norway to maintain its deliveries, further exploration and the development of discoveries will be necessary to prevent a rapid decline in production from existing fields. In 2024, oil production declined due to decreasing output from existing fields and the limited number of new fields coming on stream.

In recent years, geopolitical unpredictability and increased international tensions have affected European energy value chains. The loss and phase-out of Russian gas supplies, combined with vulnerabilities linked to authoritarian or unstable states dominating supply chains, high energy prices, and sabotage of energy infrastructure, have made security of supply and cooperation on emergency preparedness in the energy sector increasingly critical.

2 Norwegian petroleum (as of 31 March 2025) , Production forecasts

In the spring of 2025, the European Commission launched a roadmap to completely phase out EU dependency on Russian gas supplies, also addressing risks related to security of supply, the need for flexible power, and market stability. In 2024, Russian gas deliveries accounted for 20 per cent of the EU's total gas imports. The roadmap calls for the discontinuation of all existing spot contracts for Russian gas by 2025 and maintains the ambition of phasing out all Russian gas by 2027. According to Eurostat, Norwegian gas deliveries accounted for 46 per cent of the EU's pipeline gas imports in 2024 and are expected to play a crucial role in securing a reliable energy supply for Europe in the future.[3]

1.2 Development of new low and zero-emission value chains is losing momentum

At the same time as there is increased focus on safety and cost reductions in energy policy, the development of low and zero-emission value chains is progressing too slowly to meet the transition goals. The development of the European hydrogen market has been delayed by uncertainty associated with demand, incomplete regulatory frameworks, and high prices, compared to fossil alternatives.

In Norway, virtually all production projects for blue hydrogen have been put on hold or cancelled over the past year. KonKraft has invited Norwegian authorities to collaborate on a national blue hydrogen strategy aiming for an annual production of 1 Mt by 2032 and 2 Mt from 2035. The collaboration is partly based on the Norwegian-German energy partnership launched in January 2023. The necessary conditions for achieving the ambitions have not yet been established.

To ensure competitive and long-term management of oil and gas resources on the shelf, continued cooperation between the authorities and the industry will be essential. In May 2024, the Norwegian government invited KonKraft to join an energy partnership to strengthen the power balance, further cut emissions and maintain a high level of activity on the Norwegian continental shelf. The energy partnership is a dialogue arena between KonKraft and the authorities which will ensure further development of the shelf whilst also reducing emissions. The Norwegian continental shelf is in a crucial phase regarding investment and the development of long-term low-emission production and development of low and zero-emission value chains. With climate plans and targets being set internationally for 2035 and 2040, it is crucial that the industry and authorities succeed in working together on the long-term transition and competitiveness of the NCS.

1.3 White Paper No. 25 (2024–2025): Climate Report 2035 – Towards a Low-Emission Society

In April 2025, the Norwegian government presented its updated climate strategy *White Paper No. 25 (2024–2025): Climate Report 2035 – Towards a Low-Emission Society*. KonKraft welcomes that the climate report explicitly states that the primary objective of petroleum policy is to enable profitable oil and gas production over the long term. This is important to ensure continued energy supply to Europe — and will become even more critical as the EU phases out Russian gas by the end of 2027. The climate report points out that the EU's and the UK's long-term gas import needs are likely to be significantly higher than future production on the Norwegian continental shelf. Sustainable resource management on the NCS will not only be crucial for the EU's energy security but will also generate income for Norway and help secure employment and prosperity for current and future generations.

KonKraft supports the climate report's view that carbon pricing should remain the main instrument for reducing emissions and bases its work on halving emissions on the Norwegian continental shelf by 2030, with a further reduction to nearly zero by 2050.

3 Eurostat (21.03.2025), Imports of energy products to the EU down in 2024.

1.4 KonKraft's climate strategy – 50 per cent emission reduction by 2030 and near zero by 2050

In 2020, KonKraft developed the climate strategy "*The Energy Industry of Tomorrow on the NCS – Climate Strategy Towards 2030 and 2050*". As part of the strategy, the industry set a target to reduce emissions by 40 per cent by 2030. Subsequently, the Norwegian parliament issued a resolution requesting that the government present a plan together with the industry to reduce greenhouse gas emissions by 50 per cent by 2030. Since 2021, KonKraft has based its strategy on the parliament target, but already then emphasised that the final ten percentage points would be significantly more challenging to achieve without a strengthened support framework, and that investment levels and costs of measures are expected to be higher than for the remaining part of the portfolio. KonKraft thus based its ambitions for emission reduction efforts towards 2030 on the following:

- The oil and gas industry in Norway[4] will reduce its absolute greenhouse gas emissions by 50 per cent by 2030 compared to 2005 and further reduce emissions to near zero by 2050.

- Norwegian oil and gas industry, together with shipping companies and rig owners, will be a driving force in ensuring that vessel categories within offshore maritime activities actively contribute to achieving the goal in the government's action plan for green shipping of a 50 per cent emission reduction by 2030 in domestic sea transport and fishing.

In last year's status report, the timeline for the projection of emissions was extended to 2050. The long-term forecast is related to operator companies' expectations of potential petroleum activity towards 2050, given a long-term development (including exploration, discoveries, and new production), and not the phasing out of petroleum activity on the Norwegian continental shelf. In this year's report, we have updated the forecast for the operators' expected opportunity space towards 2050.

The forecast involves significant uncertainty and highlights the need for emission reduction measures for the oil and gas sector to achieve the long-term target of near-zero emissions by 2050. It will also serve as an important basis for further discussions and the establishment of milestones.

In addition to the goal of reducing emissions from their own operations, the oil and gas industry has ambitions to create a new and forward-looking energy industry on the Norwegian continental shelf that will help other players reduce their emissions. The KonKraft partners aim to develop new value chains for offshore wind, hydrogen, CCS, and seabed minerals on the continental shelf.

Annual status reports provide an updated picture of how the industry is progressing towards the goals and the development of the new value chains based on the planned projects by the stakeholders. Due to delayed market development for renewable and low-emission hydrogen, virtually all major Norwegian blue hydrogen production projects have been postponed or cancelled.

> The KonKraft partners aim to develop new value chains for offshore wind, hydrogen, CCS, and seabed minerals on the NCS

4 Includes emissions from operations on the Norwegian continental shelf as well as gas processing plants at Kårstø, Kollsnes, Nyhamna, Melkøya, and the Sture terminal

The Norwegian oil and gas industry is making good progress towards its target of a 50 per cent reduction in emissions, but it will be challenging to reach the target by 2030

2

STATUS AND PROGRESS OF OFFSHORE ACTIVITIES AND ONSHORE FACILITIES

The spring 2025 analysis shows that the Norwegian oil and gas industry is making good progress in implementing KonKraft's climate strategy, but achieving the target of a 50 per cent emissions reduction by 2030 will be challenging. To achieve the goal, it is necessary for all identified and planned measures to be matured and implemented according to schedule. Furthermore, there will be a need for further climate measures that are not currently identified.

2.1 Reduced emissions from petroleum activities on the NCS towards 2035

KonKraft's 2025 status report shows that the Norwegian oil and gas industry is making good progress towards its target of a 50 per cent reduction in emissions, but it will be challenging to reach the target by 2030. In 2005, emissions from the oil and gas industry totalled 13.6 Mt CO_2e.
To meet the climate goal, emissions must therefore be reduced to below 6.8 Mt CO_2e. The status report quantifies emission reductions across the operating companies based on expected activities and planned and identified emission-reducing measures of varying maturity.

In 2024, emissions from offshore and onshore facilities amounted to 11 Mt CO_2e, a decrease of 0.48 Mt CO_2e compared to 2023. Despite high production in recent years and a new annual record for gas production in 2024, emissions on the Norwegian shelf continue to fall. The decrease from 2023 is partly due to the electrification of Troll Vest, Sleipner and Gina Krog with power from shore, as well as Hywind Tampen completing its first full year of operation.

Operators and the supply industry are constantly assessing the most cost-effective measures to cut emissions. A compilation of operator companies' identified and planned climate actions as of spring 2025 indicates a combined emissions reduction potential of 3.9 Mt CO_2e by 2030. If all ongoing operator climate actions are realised, they will result in a total reduction of 47 per cent compared to

2005 levels. The updated opportunity space shows that the Norwegian oil and gas industry is on track to realising emission reductions. However, several factors related to costs and deliveries of critical equipment mean that some projects that are currently in the maturation phase will not come on stream until 2032. To achieve the climate goal of a 50 per cent emission cut, all reported measures must be matured and implemented according to schedule. Moreover, it will be necessary to implement further climate measures that have not yet been identified.

The development in emissions and the effect of possible emission-reducing measures of varying maturity towards 2035 is shown in Figure 6. The analysis is based on a review involving all operators on the Norwegian continental shelf in spring 2025 and it considers companies' emission forecasts, emission reduction measures, planned new fields, and decommissioning. The figures encompass the total emissions from petroleum activities on the Norwegian continental shelf, including the total emissions from the oil and gas processing plants at Kårstø, Kollsnes, Nyhamna, Melkøya, and the Sture terminal.

The measures are categorised into different maturity levels:

- Sanctioned measures – The investment decision has been made, but the measure is not operational yet (most mature)
- Mature but not sanctioned measures – The technical details are being clarified, and the measure is approaching an investment decision
- Concept – Conceptual studies are under way, and the measure is approaching a preliminary implementation decision
- Opportunity/screening – Opportunities for the measure are being developed and assessed at a preliminary level (great uncertainty)

FIGURE 06 UPDATED OPPORTUNITY SPACE FOR CLIMATE ACTION, SPRING 2025
Emissions in Mt CO_2e/year

Source: KonKraft

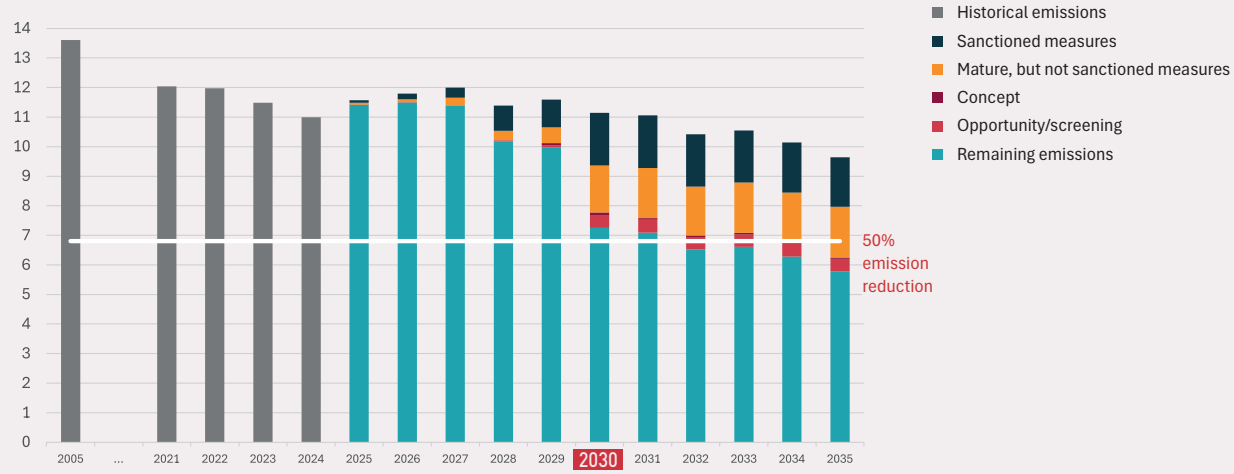


Figure: Updated opportunity space as of spring 2025 with projections for emissions and the estimated effect of large, sanctioned climate measures and measures under assessment. The projections also include planned new field developments and decommissioning, which means that the total effect of emission-reduction measures at the various levels of maturity levels varies somewhat over time. (Source: KonKraft)

The level of activity in the Norwegian petroleum industry is expected to increase in the coming years due to new developments. However, the implementation of sanctioned emission-reducing measures will help prevent an increase in emissions over the next few years. From 2028 onwards, emissions are expected to decline significantly as several major remaining climate measures are implemented and reach their full effect. Decommissioning will also contribute to reduce emissions as of 2028.

Significant and mature climate measures planned towards 2030 include:

- Electrification of Njord, which will result in annual emission reductions of 120,000 tCO_2e from 2027.
- Electrification of Oseberg and Draugen, expected to achieve annual emission reductions of approximately 270,000 and 170,000 tCO_2e from 2028.
- Hammerfest LNG will be ready for electrification in 2028, with grid connection expected in 2030, leading to emission reductions of around 840,000 tCO_2e per year.

This year's projections indicate that emissions could be reduced by just under 60 per cent by 2035, provided that all identified measures — including those already sanctioned and those under development — are implemented on schedule.

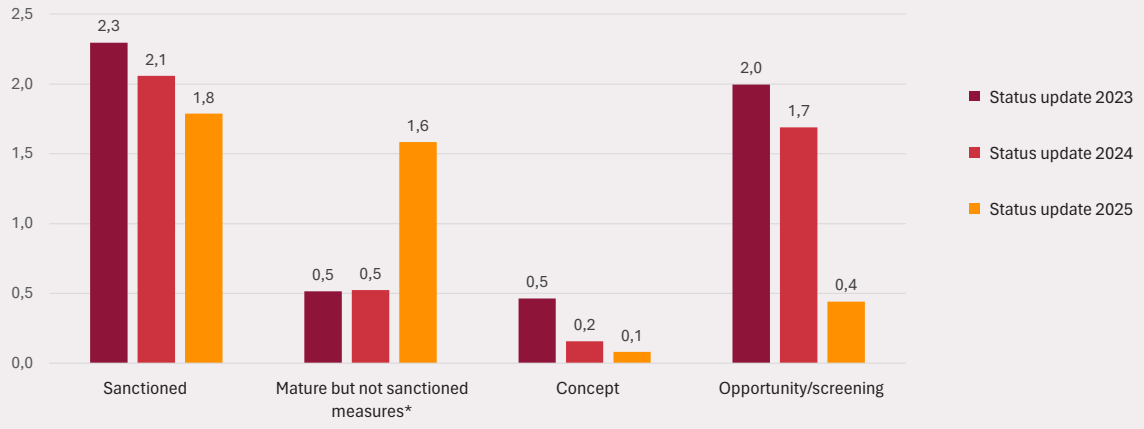
2.1.1 The project portfolio has matured further compared to last year

Over the past year, several major initiatives have moved from *opportunity/screening* to *mature but not sanctioned*. The development in maturity is important for the projects to be realised on time. Emission reduction potential in 2030 from identified climate measures, categorised by maturity level, as well as changes in maturity level compared to previous years' status reports is illustrated in Figure 7.

Of the total potential in the project portfolio, *sanctioned measures* account for approx. 1.8 Mt CO_2e and *mature but not sanctioned measures* for approx. 1.6 Mt CO_2e. Realisation of only sanctioned measures would reduce emissions from the oil and gas industry by 31 per cent compared to 2005 levels, while implementation of all sanctioned and mature measures would result in a 43 per cent reduction by 2030. There are few projects left at the concept stage, while almost 0.5 Mt CO_2e is still at the opportunity/screening stage. Realisation of *sanctioned,*

FIGURE 07 CHANGES IN MATURITY LEVEL FOR THE MEASURES IN THIS YEAR'S REPORT COMPARED TO THE 2023 AND 2024 STATUS UPDATES (Mt CO_2e i 2030)

Source: KonKraft



* Long-term energy efficiency efforts are included in the project stage "Mature, but not sanctioned measures".

FIGURE 08 CHANGES IN TOTAL REDUCTION POTENTIAL IN THIS YEAR´S REPORT COMPARED TO THE 2023 AND 2024 STATUS UPDATES. (Mt CO_2e in 2030)

Source: KonKraft

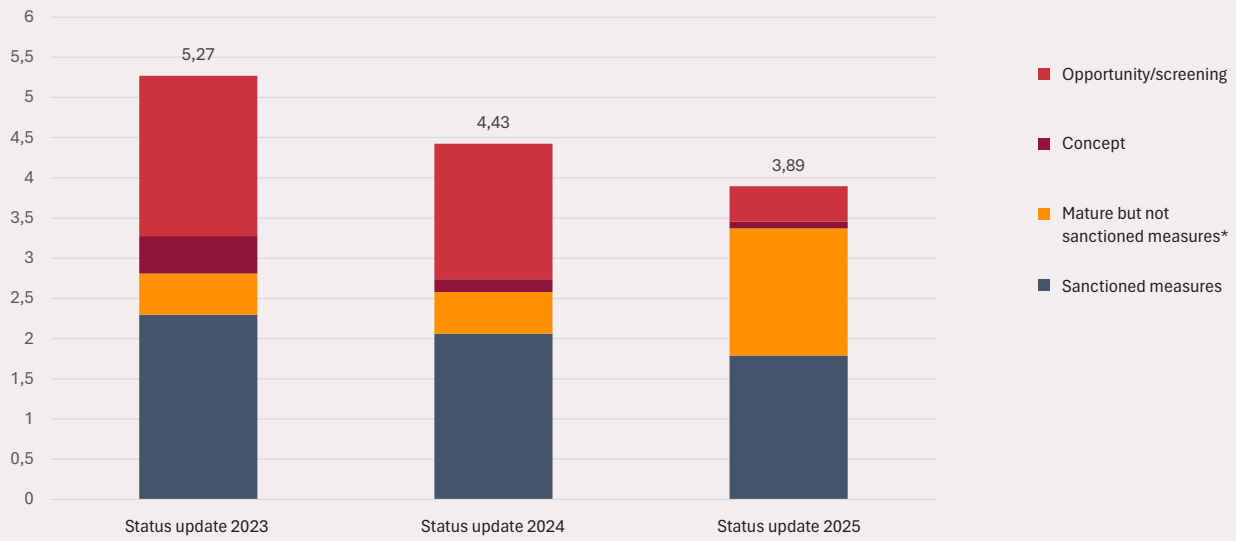


Figure: As 2030 approaches and climate measures are implemented, the overall potential of the project portfolio declines. *Long-term energy efficiency efforts are included in the project stage "Mature, but not sanctioned measures"

mature and *opportunity/screening* measures represents a potential of a 47 per cent emissions reduction in 2030. It typically takes about six years for major climate measures to progress from feasibility studies (DG1) to implementation (DG4). Consequently, it is crucial that measures at the opportunity/screening stage are further developed, and that new measures are identified and implemented to enable the sector to achieve a 50 per cent reduction in emissions.

As 2030 approaches, the overall potential for emission reductions in the project portfolio decreases compared to previous years, as shown in Figure 8. The decrease is due to the fact that measures are removed from the portfolio as they are put into operation and the future effect of the measures is included as part of the projection in the baseline forecast. The decrease can also be attributed to a reduction in the expected effectiveness of some projects and the cancellation of some less cost-effective projects.

In addition to power from shore, energy efficiency improvements and reduced flaring are among the most important measures for reducing emissions from the oil and gas industry

2.1.2 Power from shore is still the measure with the greatest potential and all main projects have reserved grid capacity

Electrification of oil and gas installations with power from shore is a necessary prerequisite for the sector to achieve its climate goals and for Norway to reduce its greenhouse gas emissions. Since the last status update, all major planned power-from-shore projects have secured reserved grid capacity. Confirmation of sufficient grid capacity is essential to enable investment decisions in these projects. Power from shore remains the measure with the highest potential to reduce emissions both before and after 2030, with a total reduction potential of 3 Mt CO_2e by 2030, see Figure 9. More than half of the emission reduction potential comes from projects where investment decisions have been made (*sanctioned measures*), and more than 90 per cent when including projects approaching an investment decision (mature, but not sanctioned measures). Electrification projects approaching investment decisions include the area solutions for Halten Nord, Tampen, and Balder/Grane, and will collectively require a maximum of approximately 2 TWh of power. Although the remaining projects have now been allocated grid capacity, making an investment decision may still be financially challenging.

In addition to power from shore, energy efficiency improvements and reduced flaring are among the most important measures for reducing emissions from the oil and gas industry. By 2030, measures related to energy efficiency and reduced flaring could collectively result in emission reductions of 0.5 Mt CO_2e. The potential is likely even higher as the forecast does not capture companies continuously implementing relevant and profitable projects with short planning horizons. In conjunction with effective energy management in operational activities, the measures impact company value creation through improved resource management, cost reductions, and better utilisation of turbines and engines. Figure 10 illustrates the impact of energy efficiency measures at installation level for a number of Equinor and ConocoPhillips installations. Measures to reduce methane emissions have also contributed to lowering greenhouse gas emissions. Collaboration and exchange of lessons learned between companies may lead to the implementation of even more energy efficiency and emission reduction measures.

FIGURE 09 CATEGORISATION OF VARIOUS CLIMATE MEASURES WITH EXPECTED EFFECT IN 2030 (Mt CO_2 in 2030).

Source: KonKraft

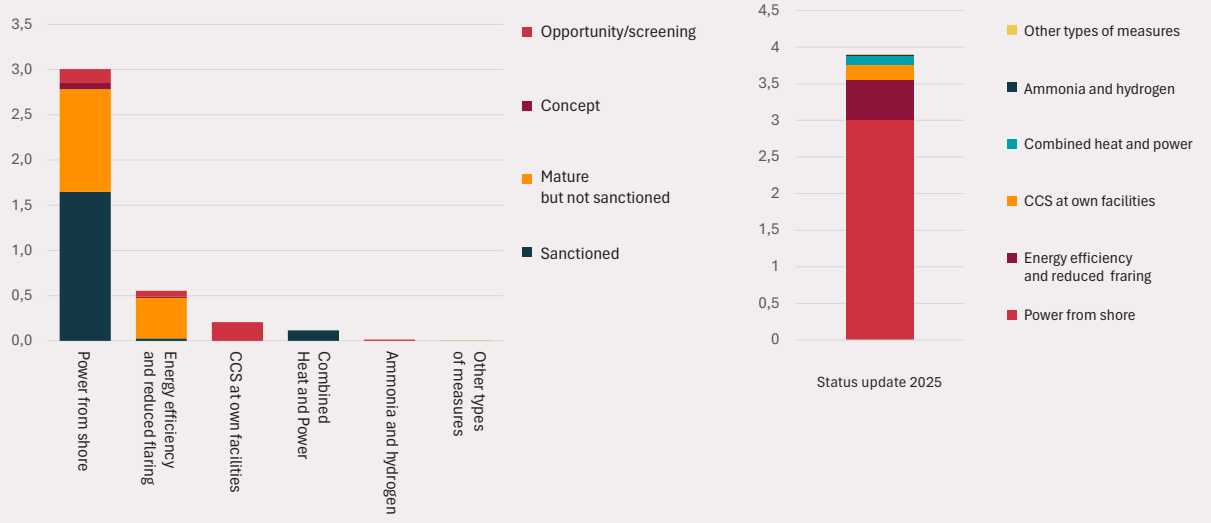
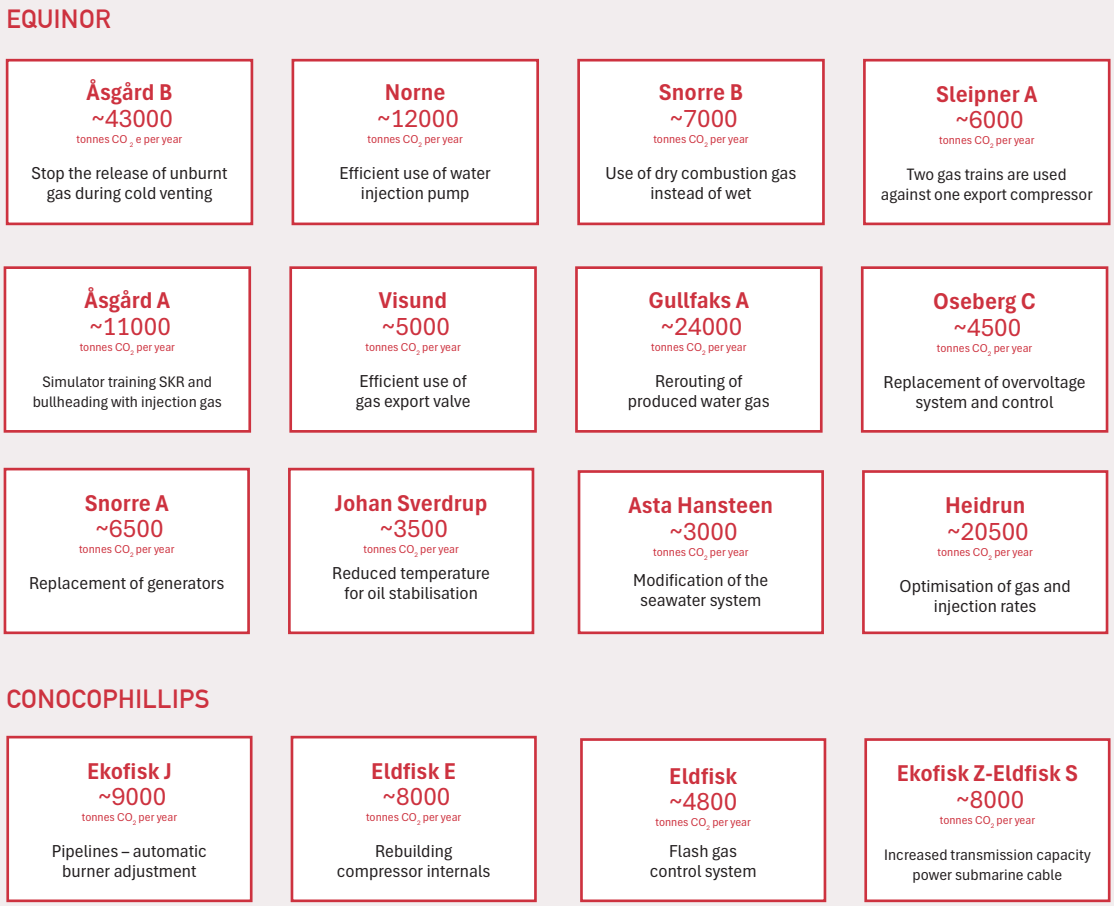


Figure: Categorisation of sanctioned climate actions and actions under consideration, expected effect by 2030 (Mt CO2 in 2030).

*Long-term energy efficiency efforts are included in the project stage "Mature, but not sanctioned measures"

FIGURE 10 EXAMPLES OF ENERGY EFFICIENCY IMPACT AT INSTALLATION LEVEL, 2023-2025

Source: Equinor and ConocoPhillips



Operators regularly assess which climate measures offer sufficient cost-effectiveness to warrant implementation. Measures such as electrification with local offshore wind and power generation on offshore installations with CCS are associated with significantly higher costs compared to power-from-shore solutions and energy efficiency measures. Over the past year, offshore wind power with a direct platform connection has been removed from the portfolio of measures. Moreover, electrification of Ekofisk and Eldfisk with a connection to the Sørlige Nordsjø II offshore wind farm is no longer considered viable due to the high costs associated with modifying the installations.

Operators continuously assess which climate measures are cost-effective to implement in order to reduce emissions

2.1.3 Company emission forecasts continue to improve

This year's emission forecast is the fifth projection prepared in connection with KonKraft's annual status reports. Figure 11 illustrates a comparison between the annual emission forecasts since 2021 and the actual emissions from petroleum production on the Norwegian continental shelf. The comparison provides insight into how accurately previous forecasts have predicted actual emissions and illustrates how expectations for future emissions have evolved over the past five years.

Previous forecasts have consistently proved to be too high in the short term. Company emission forecasts continue to improve, as the discrepancy has gradually narrowed. The discrepancy can be attributed to operating companies underestimating the impact of delays, unplanned production shutdowns, or other unforeseen incidents that occur throughout the year.

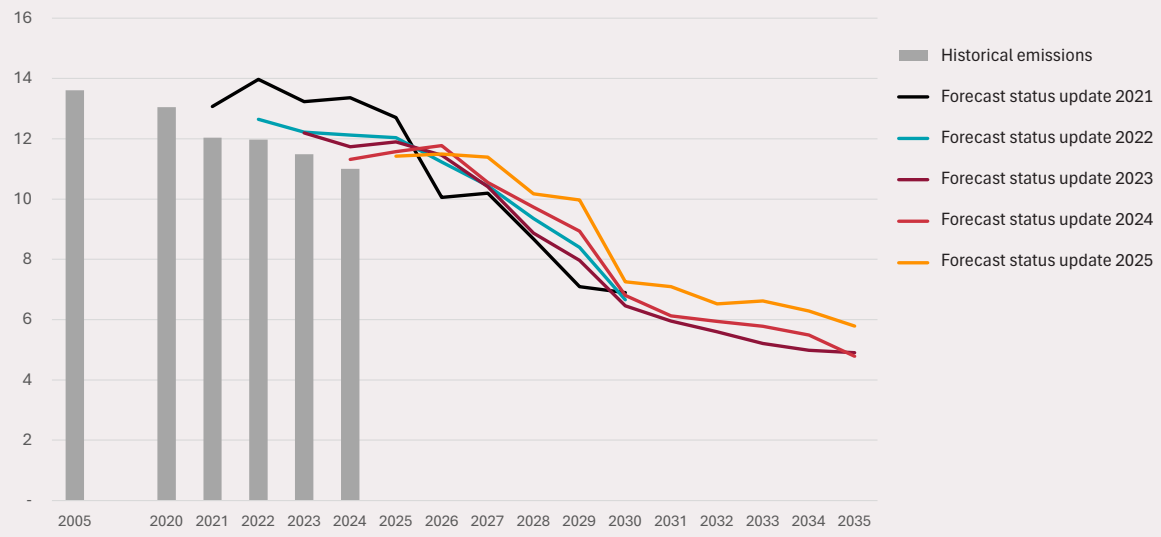
Furthermore, Figure 11 shows that identified emission reduction measures to achieve the 2030 target are being pushed ever closer to the target year. This development is partly due to delays in some of the major electrification projects. This year's forecast indicates a higher level of emissions in 2035 with an emission reduction of just under 60 per cent, assuming that all planned and identified projects in the portfolio are implemented.

2.1.4 Emissions from mobile rigs and units continue to decrease

The target of a 50 per cent reduction in emissions from offshore installations and onshore facilities also includes emissions from mobile rigs and units performing operations related to offshore installations within the EU ETS quota obligation and operators' scope 1 emissions. For the industry to reach the emission target, emission reductions related to the use of mobile rigs for production and exploration drilling, as well as other units and vessels used for operations such as well intervention operations are essential. In this chapter, we have separated emissions associated with the use of mobile rigs and units, as illustrated in Figure 12.

FIGURE 11 COMPARISON OF ANNUAL EMISSION FORECASTS SINCE 2021 AND ACTUAL EMISSIONS FROM THE NORWEGIAN PETROLEUM INDUSTRY (Mt CO_2e)

Source: KonKraft



Measures from mobile rigs can provide significant emission reductions but face challenges such as high costs, lack of technological maturity, and the need for infrastructure and access to alternative fuels

Emissions associated with the use of mobile rigs and units on the Norwegian continental shelf have fallen significantly in recent years. Since peaking at 0.78 Mt CO_2e in 2020, emissions have fallen by over 30 per cent to 0.53 Mt CO_2e in 2024. Emissions are closely linked o the activity on the NCS/ Norwegian Continental Shelf and vary according to the extent of drilling activity, both for production and exploration wells. This means that emissions can vary significantly from year to year. The decrease since 2020 can therefore be partly attributed to lower activity levels, but energy efficiency, operational improvements and other emission-reducing measures have also contributed. Connecting to fields with power from shore enables emission-free drilling. One example is the Martin Linge field, where the semi-jack-up rig Askepott drills wells with zero emissions, enabled by power supply from shore via the platform.

Going forward, energy efficiency measures and switching to low-emission fuels are among the most important measures to cut emissions from mobile rigs, according to DNV's report which contains recommendations on how Norway can combine the goal of near-zero emissions in 2050 with continued active development of the NCS oil and gas industry[5]. The measures can provide significant emission reductions but face challenges such as high costs, lack of technological maturity, and the need for infrastructure and access to alternative fuels.

2.2 Long-term emission forecast for offshore installations and onshore facilities towards 2050

KonKraft's climate strategy for the Norwegian continental shelf from 2020 set a long-term goal of near-zero emissions by 2050. Both Norwegian authorities and industry players clearly want to develop, not phase out, activities on the Norwegian continental shelf. The preparation of annual long-term forecasts for offshore installations and onshore facilities towards 2050 show the need for long-term emission reductions and contribute to the discussion about what it will take to achieve KonKraft's long-term goal.

5 DNV (2024), Mot nettonull

FIGURE 12 DEVELOPMENT IN OPERATORS' EMISSIONS RELATED TO THE USE OF MOBILE RIGS AND UNITS 2020–2024 (tCO_2e)

Source: Footprint

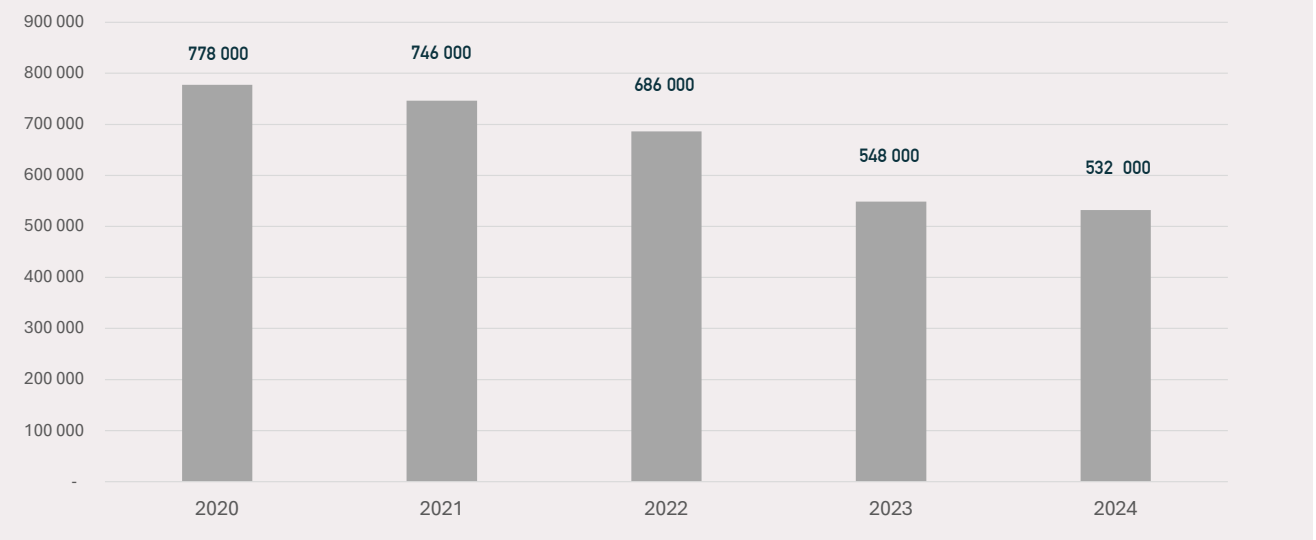


Figure: The extraction of data for mobile rigs and units from the Footprint database includes mobile units categorised as "jack-up," "semisub," "drilling rig," and "vessel."

In last year's status report, a long-term emissions forecast towards 2050 was prepared for the first time. The aim is to provide a more realistic picture of long-term NCS developments, taking greater account of lifetime extensions, increased recovery from existing fields, and new discoveries than the picture given in the short-term forecast.

To compile the long-term forecast, the operating companies have provided their best estimates of long-term activity and emissions towards 2050, including expectations relating to exploration, new discoveries, increased recovery, and decommissioning of fields. There is great uncertainty associated with the forecast, but it is nonetheless important for assessing the industry's transition needs towards near-zero emissions in 2050.

2.2.1 Continued focus on climate measures is crucial for substantial long-term emission reductions

As of spring 2025, the long-term forecast shows that the oil and gas industry can achieve significant emission reductions whilst also maintaining the goal of continued activity development, see Figure 13. The red shaded area shows the opportunity space in this year's forecast. The upper trajectory represents the emissions pathway towards 2050 if only already sanctioned measures are implemented, while the lower trajectory shows the emissions pathway for the NCS assuming that all identified climate measures are implemented. Similarly, the light blue shaded area shows the opportunity space reported last year. The left-hand side of the figure also shows emissions in 2005 and 2024, as the reference year and the last year of reported emissions data, respectively.

This year's forecast shows that emissions can be reduced by almost 70 per cent by 2040, which is in line with the projections in the Norwegian parliament's *White Paper No. 25 (2024–2025): Climate Report 2035 – Towards a Low-Emission Society*. During the period leading up to 2050,

FIGURE 13 LONG-TERM EMISSION FORECAST TOWARDS 2050
Emissions in Mt CO_2e/year

Source: KonKraft

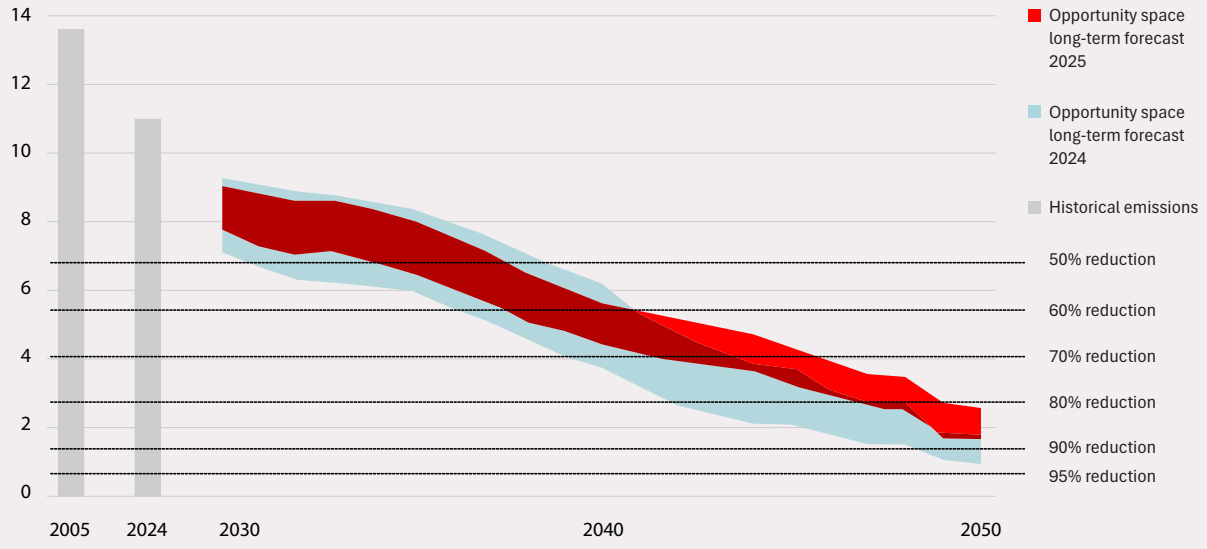


Figure: NCS emission forecast 2030–2050 Comparison of opportunity spaces in the 2024 and 2025 forecasts

emissions reductions of up to 90 per cent are expected, if all identified climate measures are implemented. As in last year's projection, a significant decline in emissions is expected towards 2050. However, after 2040, this year's forecast shows a higher level of emissions than last year's. This is primarily due to lifetime extensions, combined with the assumption that additional fields will come on stream.

In this year's forecast, the emissions trajectory with only sanctioned measures starts at 9.1 Mt CO_2e in 2030, while the emissions trajectory with all climate measures starts at 7.7 Mt CO_2e. Emissions in the long-term forecast with all measures are slightly higher than in the short-term forecast because it includes less mature resource classes. The discrepancy between the short-term and long-term forecasts grows from 2030 towards 2035 since the current expectation for production from sanctioned or likely production volumes decreases in the short-term forecast, while higher production from more uncertain resources is considered in the long-term forecast.

The long-term emission forecast emphasises the importance of implementing all identified climate measures, as well as the importance of continuously working to identify and implement new measures. In this year's forecast, the emissions trajectory with only sanctioned measures is on average 1.5 Mt CO_2e higher per year compared to the trajectory where all identified measured are realised in the 2030–2050 period. As a result, cumulative emissions will be approximately 27 Mt CO_2e higher during the period if only those measures that are already sanctioned are implemented. It is important to emphasise that there is great uncertainty associated with long-term emission forecasts, including those related to future framework conditions and oil and gas prices.

2.2.2 Carbon credits as a potential addition to direct emission reductions

Operators are currently investing substantial resources in measures aimed at achieving the 2030 target. Going forward, the companies will also pursue more targeted efforts to reduce emissions to near zero by 2050. Achieving near-zero emissions while sustaining high activity levels on the Norwegian continental shelf will require the petroleum industry to implement additional climate actions. Carbon credits may offer a way to offset residual emissions that cannot be eliminated.

Over the past year, significant progress has been made to establish a global carbon market. During the UN Climate Change Conference COP29, an agreement was reached relating to Article 6 of the Paris Agreement, which regulates global carbon markets. Article 6.2 defines rules for bilateral and multilateral carbon trading agreements between countries, whereas Article 6.4 paves the way for a centralised carbon credit market, overseen by the United Nations. Carbon credits will be allocated to countries and companies. These credits can be traded in a global market by companies seeking to offset their emissions. The aim of the global market is to promote investment in climate measures and support countries and companies in achieving their climate target.

Commissioned by OG21 (the national technology strategy for the oil and gas industry), DNV presented a report in 2024 with recommendations on how Norway can combine the goal of near-zero emissions by 2050 with continued ambitious development of the oil and gas industry on the Norwegian continental shelf[6]. The report concludes that the climate target is achievable through a combination of existing and new technology. However, the report emphasises that achieving the goal requires significant expansion of new power generation capacity, substantial cost reductions through efforts to scale up and standardise emission-reducing technologies, as well as further maturation of new technology through research and development.

6 DNV (2024), Mot nettonull

In its report, DNV addresses several challenges in dealing with residual emissions in 2050, and points to carbon removal credits as a possible addition to direct emission cuts. The report highlights how such credits should be designed to work effectively, with particular emphasis on three main factors:

- **Regulatory adaptation:** In order for carbon removal credits to be recognised as a complement to direct emission reductions, amendments to frameworks such as the EU ETS are required. A common certification system for carbon removal is essential to ensure credibility, consistent standards, and verifiability.

- **Long-term carbon storage and additionality:** Technologies that offer permanent carbon storage should be prioritised to ensure real and lasting emission reductions. Carbon credits must fulfil additionality requirements. This means that it must be possible to document that the measures would not have been implemented without the support of the carbon market, and that they contribute to emission reductions beyond what is already comprised by national climate targets.

- **Targeted financial incentives:** To successfully scale up carbon removal projects, financial instruments are needed to make the investments financially attractive. This includes tax incentives, auction-based support schemes and direct investment support that reduce risk and enable companies to incorporate such projects into their decarbonisation strategies.

OG21 emphasises that achieving the goal requires significant expansion of new power, substantial cost reductions through efforts to scale up and standardisation of emission-reducing technologies

2.3 Electrification and power demand

2.3.1 Updated forecast for power from shore to the NCS

The updated forecast for power from shore to the Norwegian continental shelf in the spring of 2025 shows a gradual increase in power demand for the period leading up to 2029, see Figure 14. In 2030, several major electrification projects will result in a significant increase in power demand, and the forecast points to a total power demand of 17.9 TWh. The cancellation of several projects, including the further electrification of Troll, Oseberg, and Visund, along with downward power demand adjustments from projects with already approved grid connections, results in a 1.4 TWh decrease in total power demand for 2030 compared to last year. Power demand from Norwegian petroleum activities is projected to remain stable between 2030 and 2032, with a total power demand of around 18 TWh in 2032. Compared to the power forecast in the 2022 status report, total power demand has decreased by approximately 30 per cent.

During the last year, several electrified fields have come on stream, and several projects have received approved grid connections. Power demand for projects in operation, as well as installations with reserved capacity, is estimated at 17.2 TWh in 2030. For projects that have applied for grid connection but have not received reserved capacity, the power demand is estimated at 0.4 TWh in 2030. For identified projects that have not yet applied for grid connection, the power demand is estimated at 0.3 TWh in 2030.

The increase in power demand towards 2030 is linked to electrification projects intended to ensure that the oil and gas industry can deliver oil and gas with low production emissions, contributing to the fulfilment of the climate goals. Figure 15 illustrates the link between major electrification projects and emission reductions on the NCS. As reflected in the power forecast, the figure shows that several projects are expected to come into effect during the period 2027–2030. The large increase in power demand in 2030 is linked to the electrification of Tampen, Halten, Balder/Grane, as well as the electrification of the onshore facility at Melkøya.

FIGURE 14 POWER DEMAND FORECAST ON THE NCS
Power demand (TWh)

Source: Offshore Norge

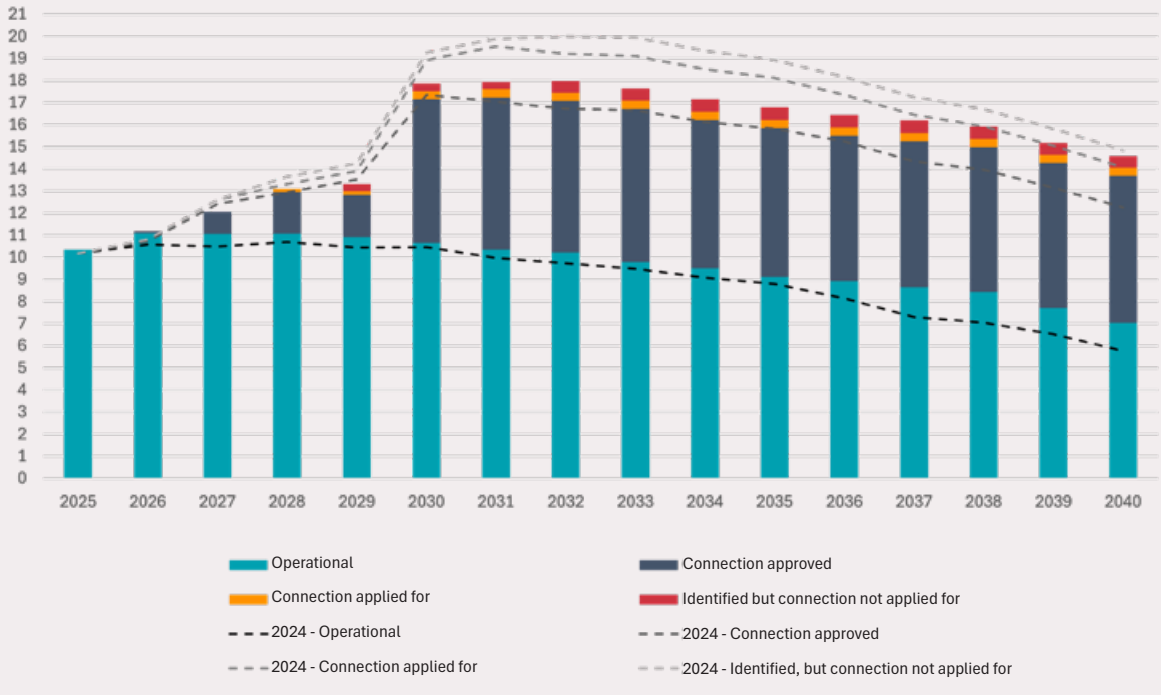
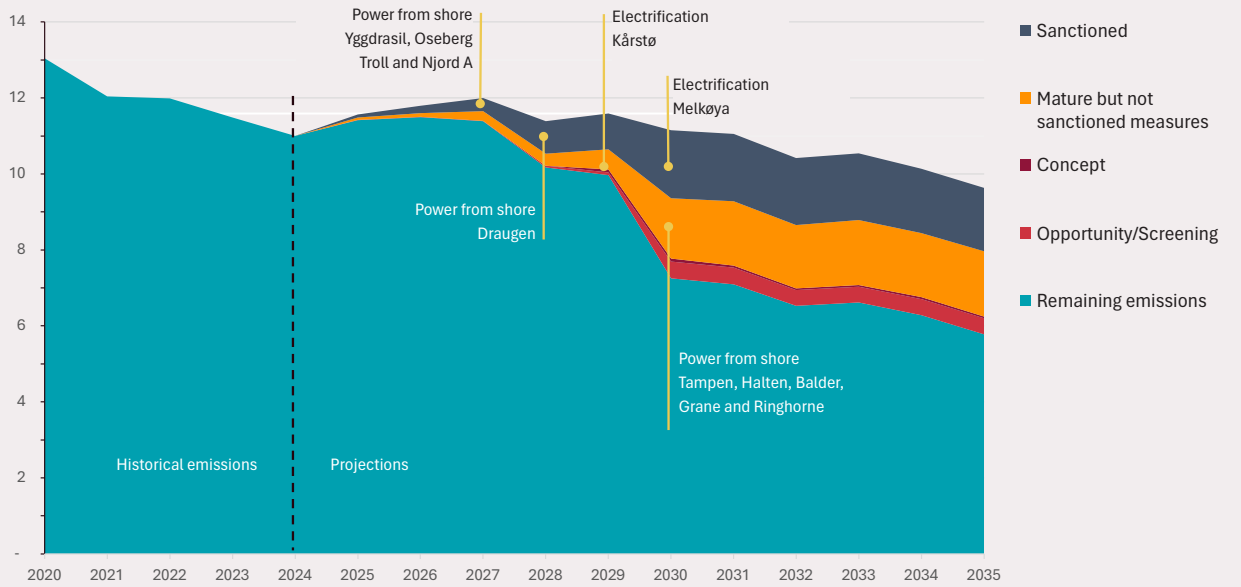


FIGURE 15 OVERVIEW OF VARIOUS ELECTRIFICATION INITIATIVES WITH SIGNIFICANT IMPACT ON TOTAL GREENHOUSE GAS EMISSIONS (Mt CO_2e/year)

Source: KonKraft



2.3.2 Growing demand for power in all sectors

Electrification across sectors, combined with ambitions to develop new power-intensive industries, is driving a significant increase in demand for new power capacity in Norway. An overview of consumer enquiries for grid connection at Statnett[7], categorised by sector, is shown in Figure 16. Demand for grid connection in the oil and gas industry is low compared to other industries and virtually the entire volume has been allocated reserved capacity.

Going forward, power consumption is expected to increase in almost all sectors, see Figure 17. According to Statnett's baseline forecast[8] , consumption will increase from 139 TWh in 2024 to 163 TWh in 2030 and then to 220 TWh in 2050. For petroleum activities, Statnett estimates a more gradual growth in power demand than KonKraft's forecast, with an expected power demand of 16 TWh in 2030 increasing to 20 TWh in 2035. For other sectors, Statnett expects increased consumption related to hydrogen production and data centres in particular, with an increase from 0 to 27 TWh and from 2 to 17 TWh respectively during the period 2024–2050.

2.3.3 A predictable power policy and continued access to power from shore are important for the NCS transition

Power from shore remains the measure with the highest potential to reduce emissions for the oil and gas industry. Implementation of identified electrification projects will be crucial to achieving KonKraft's climate goals. Timely access to power will also be important to safeguard current investments in the long-term development of the Norwegian oil and gas industry with low production emissions, and ultimately the establishment of low and zero-emission value chains.

There is ongoing debate in Norway about the electrification of the Norwegian continental shelf and who should have access to power.

Several parties in the Norwegian parliament have expressed support for reversing the administrative decision to electrify Melkøya. This is Norway's largest climate initiative, which, as of May 2025, is about 36 per cent complete. All contracts have been awarded, extensive

7 Statsnett (2025) Statistics – Connection Cases

8 Statnett (2024), Statnett's Long-term Market Analysis

engineering work has been carried out, and construction work has started at all project locations.

KonKraft finds it deeply concerning that uncertainty is being raised about a measure that has been lawfully adopted. Furthermore, it creates uncertainty for the planning and implementation of remaining power-from-shore projects and other investments on the NCS. The sector depends on predictable climate and energy policy framework conditions to enable companies to invest in continued production and emission reduction measures for the long-term development of the offshore industry.

In connection with most developments on the Norwegian continental shelf in the 2000s, authorities required operator companies to consider power from shore as an energy solution. The first project to be electrified at start-up was Troll A in 1996. Since then, the industry has worked systematically to transition to electrified operations, resulting in significant technological development and emission reductions. The Norwegian parliament's increase of the climate target for the petroleum sector from 40 to 50 per cent in 2020 contributed to reinforcing this need. Given the high carbon costs on the Norwegian continental shelf, linked to both the EU ETS and the Norwegian carbon tax, power from shore has, in many cases, been a profitable emission-reducing measure. Other measures, such as offshore wind combined with CCS, have turned out to be much more expensive.

Electrifying the entire Norwegian continental shelf has never been a goal per se. Rather, the objective is to eliminate emissions from key hubs on the shelf that will have long-term production to strengthen the industry's future competitiveness. The Norwegian oil and gas industry is part of the European Emission Trading System (EU-ETS), where emission allowances, given the current reduction factor, are expected to approach zero around

FIGURE 16 STATUS OF CONSUMER ENQUIRIES ABOUT GRID CONNECTION IN THE TRANSMISSION GRID AS OF Q1 2025

MW

Source: Statnett

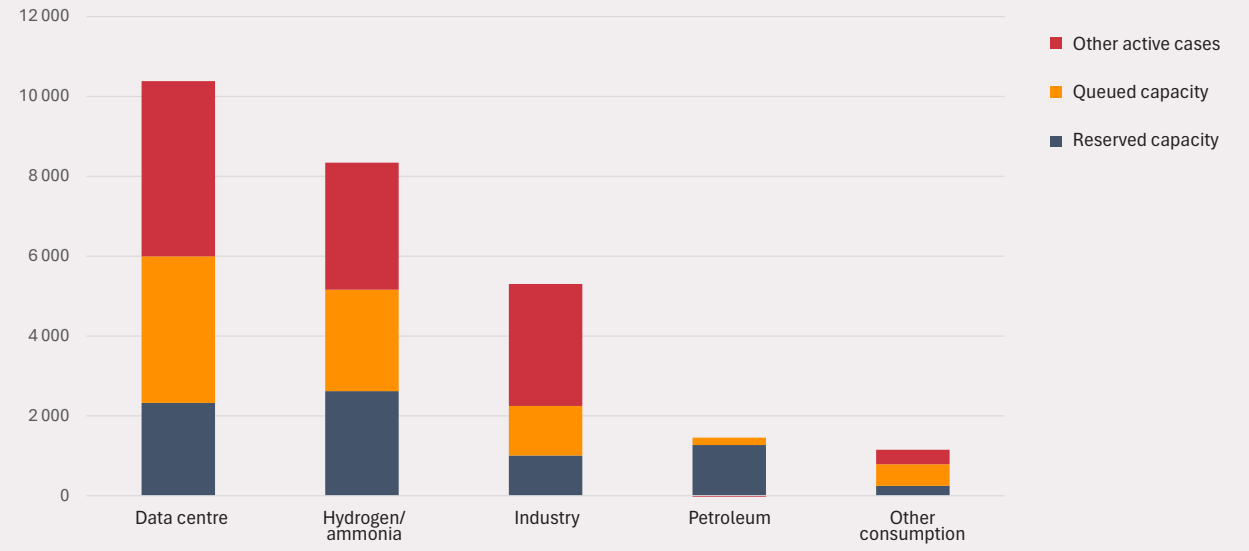


Figure: Statistics on connection cases from selected sectors in Statnett as of Q1 2025. 180 MW to Tampen is included in both Queued and Reserved Capacity.

2040. Consequently, carbon costs will be higher going forward. It is important that the industry plans to cut emissions as much as possible, to ensure that Norwegian energy supplies have a place in the European market in the long term. If emissions are not reduced at the installations that will continue production in the future, companies will face significant additional costs through the purchase of European emission allowances. These are payments to the EU, which reduce the companies' earnings, as well as revenues to Norway.

FIGURE 17 FORECAST FOR POWER CONSUMPTION TOWARDS 2050 BY SECTORS AND SCENARIOS MW

Source: Statnett

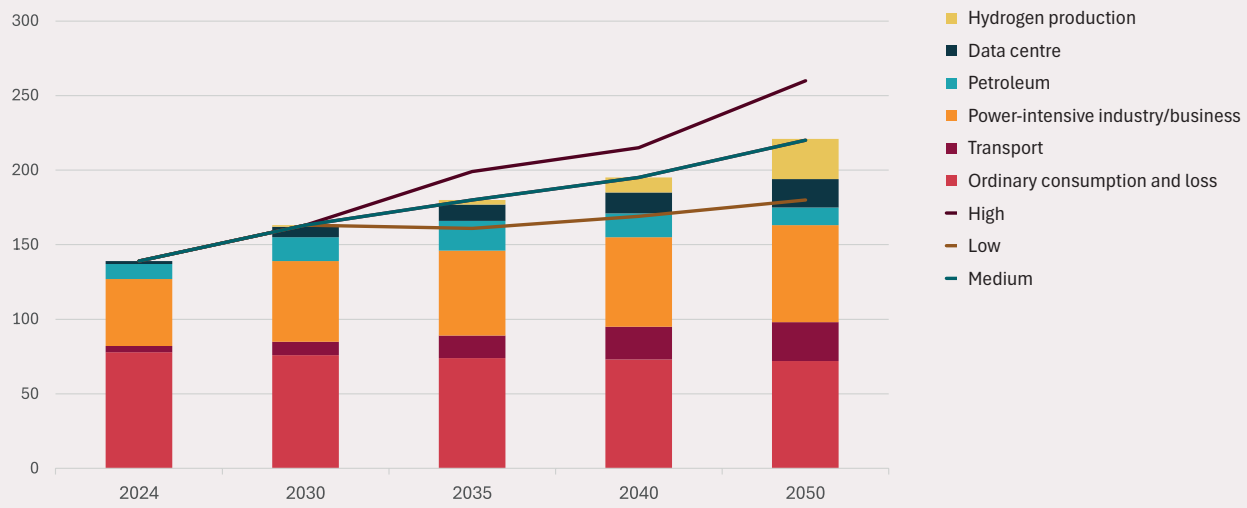


Figure: Forecast for power consumption towards 2050 from Statnett's Long-term Market Analysis.

Electrifying the entire Norwegian continental shelf has never been a goal per se. Rather, the objective is to eliminate emissions from key hubs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This year's analyses show that significant emission reductions have already been achieved since 2008 across all vessel segments, through the implementation of various measures related to operational improvements, energy efficiency, shore power, and battery hybridisation

3

REDUCED EMISSIONS FROM MARITIME OPERATIONS

Emissions from offshore maritime activity in 2024 are estimated at 1.05 Mt CO_2, a decrease of 6 per cent from 2023. For offshore vessels in particular, this year's analysis shows reduced emissions, while activity hours are on a par with 2023 levels, indicating more efficient operations and higher capacity utilisation.The number of shore power hours for offshore vessels increased since last year, while the share of shore power usage remains stable at around 60 per cent. For oil and gas tankers, emissions remain stable.

As part of KonKraft's climate strategy, it was decided in 2020 to set a quantitative target for emission reductions from oil and gas operators' maritime activities. KonKraft has continued to work on this in this year's climate report. VPS's analysis of greenhouse gas emissions from maritime activity in offshore operations within the Norwegian economic zone extends beyond the oil and gas industry. The method that is applied makes it difficult to determine which vessels have been contracted by the oil and gas industry, and for how much of the year. As the authorities work to develop requirements targeting reduced maritime emissions from the oil and gas industry, it is important to distinguish more clearly between these activities, vessel types, and emissions. Consequently, in this year's report, efforts have been initiated to map which vessels operating companies on the NCS have contracted, along with their associated emissions. This year's analyses show that significant emission reductions have already been achieved since 2008 across all vessel segments, through the implementation of various measures related to operational improvements, energy efficiency, shore power, and battery hybridisation. The use of low and zero-emission fuels will be particularly important for further and greater emission reductions towards 2035.

The primary aim of these two analyses is to highlight the following: (i) Vessels contracted by operators account for only part of the offshore activity in the Norwegian economic zone and (ii) It is also important to highlight other emissions in the Norwegian economic zone, i.e. emissions from vessels not contracted by operators. The formulation of the announced low and zero-emission requirements for offshore vessels will be crucial for establishing a sector-specific quantitative climate target. Further clarification related to the authorities' formulation of the requirements is expected during 2025. For KonKraft, it is important that the requirements are aligned with other international regulations affecting offshore maritime activities, such as the EU MRV Regulation, FuelEU Maritime, and IMO.

3.1 Objective for emissions from maritime operations

The Norwegian government's action plan for green shipping has set a goal of a 50 per cent reduction in emissions by 2030 in domestic sea transport and fishing, where maritime activities in the petroleum industry are included. In 2020, the Norwegian Shipowners' Association also launched its own climate goals, targeting a 50 per cent reduction in emissions per unit by 2030 compared to 2008 and a climate-neutral fleet from 2050.[9] As part of KonKraft's 2020 climate strategy, it was decided that the Norwegian oil and gas industry, together with shipowners and rig owners, will be a driving force for ensuring that vessel categories within offshore maritime activities contribute to achieving the goal in the government's action plan for green shipping of a 50 per cent emission reduction. The Norwegian government has also announced that it will introduce national low and zero-emission requirements for offshore vessels. The government has not yet taken a final position on the scope and organisation of the requirements, but the Norwegian Environment Agency and the Norwegian Maritime Authority have been tasked with exploring how such requirements can be formulated. For the industry, it is important that the requirements are aligned with the EU MRV Regulation, FuelEU Maritime, and IMO, that will be phased in over the coming years.

3.2 This year's report contains new analyses and methodological improvements

The methods for the compilation of offshore maritime emissions in this year's report have been further developed from last year and consist of two separate analyses. The analyses differ from each other in terms of which vessels are included, the time period covered, the source base and the choice of method.

The first analysis covers offshore vessels and oil and gas tankers operating in the Norwegian economic zone. This is an update of the analysis done for KonKraft in the previous year, with some methodological improvements and 2024 figures. It is not limited to the activities of the oil and gas industry but looks at all relevant vessels within a selection of segments that were active in the Norwegian economic zone.

The second analysis looks in detail at a selection of vessel segments in the oil and gas operators' maritime operations. The analysis is part of an effort to establish quantitative targets for emission reductions in offshore maritime activities in the oil and gas industry, focusing on vessel segments under contract with operators. The segments included in the analysis account for a substantial share of total offshore maritime emissions and operate under patterns and contract structures that offer operators greater opportunities to influence the selection and implementation of future emission-reducing measures.

The analyses illustrate the complexity of the issue and show that introducing special national requirements is not a straightforward process. They also highlight the importance of considering this in the context of regulations from the EU and IMO.

The methodology, scope and data basis for the two analyses are summarised in the following subchapters.

9 The Norwegian Shipowners' Association's climate strategy (2020)

3.2.1 Greenhouse gas emissions for maritime activities related to offshore activities in the Norwegian economic zone

As in previous years, VPS has been tasked to estimate CO_2 emissions from maritime offshore activities in the Norwegian economic zone for the period 2019 to 2024. The analysis shows the development of emissions measured against the 2008 reference year.

Over the past two years, important methodological improvements have been made. For offshore vessels, the results are now based on detailed real-time data from VPS's Maress software, which is installed on board and used to analyse operating profiles, fuel consumption and emissions. For oil and gas tankers, DNV has conducted a separate analysis, which is included in VPS' overall assessment.

Several methodological changes have been made in the 2025 report. Compared to previous years' analyses, the most important changes are:

- Emissions from mobile rigs and units have been moved to and described in chapter 2, as they are included in the target of a 50 per cent reduction in emissions from fixed installations and onshore facilities.
- DNV updated its methodology for estimating greenhouse gas emissions from oil and gas tankers for this year's report. The updated method also has a retroactive effect, resulting in a downward adjustment of emission figures for oil and gas tankers for the years 2019–2023.
- VPS excluded vessels that spent less than 24 hours in the Norwegian economic zone in 2024. This has little impact on the overall emissions estimate but affects the number of vessels within the various segments.

The methodological changes increase the quality of the figures. However, this means that the numbers are not directly comparable to previous years' reports. This year's analysis now includes two main vessel segments:

- Offshore vessels: Supply, anchor handling, seismic and other offshore vessels (e.g. construction and diving vessels)
- Oil and gas tankers: Shuttle tankers, crude oil tankers, crude/oil product tankers, LNG/CNG/LPG and combined gas tankers

In this year's report, the number of offshore vessels with directly reported data is around 60 per cent. VPS has additionally developed data tools to analyse the remaining vessels by matching movement patterns, ship type, and operational profile. Data quality improves continuously, and some adjustments have been made to previous years' data where updated figures are available. The quality of the data for the years 2019–2024 is significantly better than for the reference year 2008, which is associated with greater uncertainty due to the lack of historical emissions monitoring data. The estimate of 1.45 Mt CO_2 in 2008 is still considered the best available estimate.

3.2.2 Greenhouse gas emissions from the oil and gas industry's core maritime segments

As part of KonKraft's climate strategy, it was decided to set a quantitative target for emission reductions from oil and gas operators' maritime activities. Last year, a working group was established in collaboration with several of the operating companies to explore how such a target could be formulated. Some initial assessments and results were reported in last year's status report.

Following further work over the past year, the analysis has focused on five vessel segments that account for a significant share of the oil and gas industry's maritime emissions, and where the operating companies have greater opportunity to influence additional emission-reducing measures. Key assessments, methods, data sources and preliminary results of this work are summarised in chapter 3.4.

3.3 Emissions from offshore vessels in the Norwegian economic zone decrease slightly

This year's emissions analysis by VPS and DNV shows that domestic emissions from offshore maritime activity[10] have decreased by six per cent from 2023 to 2024.

Figure 18 shows the trend in total emissions in recent years. Compared to 2008, emissions from offshore maritime activity are now 27 per cent lower. In 2024, offshore vessels account for 88 per cent of total emissions from offshore maritime activity, while oil and gas tankers account for the remaining 12 per cent.

The results in this chapter show a clear trend: Fewer vessels are performing the same or more work than previously, which indicates increased operational efficiency. This may be due to reduced idle time and fewer harbour stops, as well as improved route planning and possibly higher average speeds.

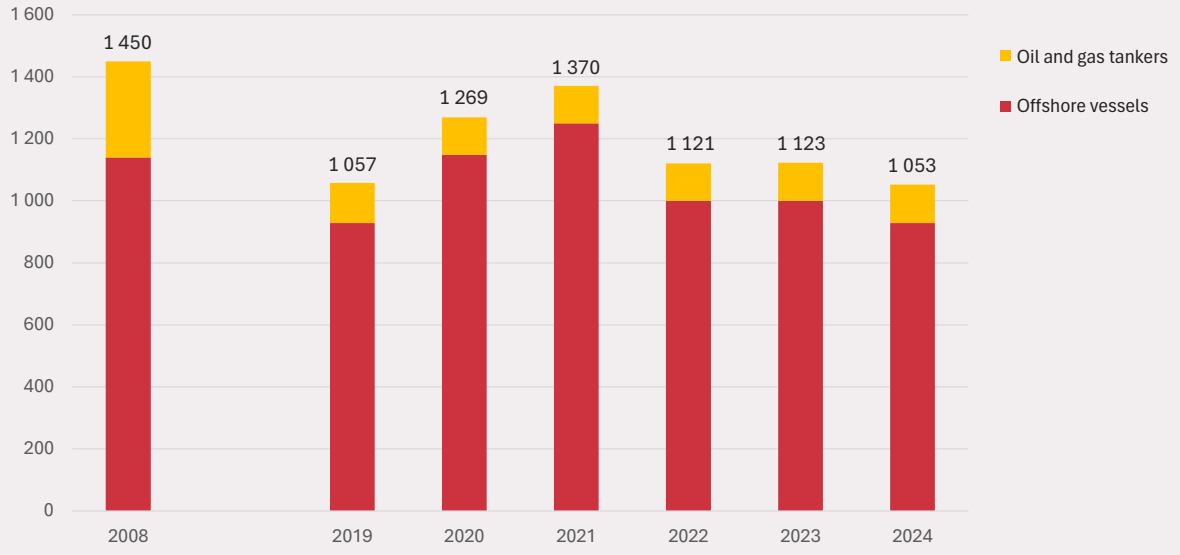
Figure 19 shows the development in domestic emissions in the Norwegian economic zone (NØS) for the various vessel segments in the period 2019–2024. The decrease in total emissions of six per cent from 2023 to 2024 was mainly driven by a reduction in emissions from offshore vessels, as shown in the figure below. Emissions from oil and gas tankers have remained relatively stable over the past six years, while emissions from offshore vessels have steadily declined during the same period, including over the past year.

Offshore vessels accounted for 88 per cent of total emissions from the offshore maritime sector in 2024. The vessel segment consists of various vessels with very different missions and operational profiles. Detailed user data from VPS provides better insight into emissions and activity. Emissions from offshore vessels can be broken down into three subgroups:

10 Domestic maritime activities related to the Norwegian oil and gas industry are defined as traffic between Norwegian ports and/or offshore installations on the Norwegian continental shelf. This includes sailings between ports in Norway, between offshore installations, between ports and offshore installations, as well as stays in port or at offshore installations.

FIGURE 18 DEVELOPMENT IN EMISSIONS FROM OFFSHORE MARITIME ACTIVITY – HISTORICALLY (2008) AND THE LAST SIX YEARS (2019–2024) PER VESSEL SEGMENT, NORWEGIAN ECONOMIC ZONE.
1000t CO_2

Source: VPS and DNV



- Supply vessels (PSV)
- Anchor handling and seismic vessels
- Other offshore vessels, including construction, support, standby, cable-laying, and well intervention vessels.

Figure 20 shows the distribution of the 317 offshore vessels that were active domestically in the Norwegian economic zone in 2024.

Of these, 134 were classified as other offshore vessels, 102 as supply vessels and 81 as anchor handling and seismic vessels.

In 2024, offshore vessels accounted for a total of 1.28 million activity hours, generating approximately 930,000 tonnes of CO_2 emissions. Activity hours are on a par with the 2023 level. However, emissions were reduced, indicating more efficient operations and higher capacity utilisation

FIGURE 19 DEVELOPMENT IN CO_2 EMISSIONS PER VESSEL SEGMENT IN THE NORWEGIAN ECONOMIC ZONE, 2019–2024
1000t CO_2

Source: VPS and DNV

FIGURE 20 NUMBER OF VESSELS PER OFFSHORE SUBSEGMENT
1000t CO_2

Source: VPS

Figure 21 shows the distribution of activity hours and emissions per vessel category. Supply vessels accounted for the highest share of CO_2 emissions, primarily due to their high number of activity hours. Other offshore vessels represented around one-third of both emissions and activity hours, whereas anchor handling and seismic vessels accounted for one-quarter of emissions and approximately one-fifth of activity hours.

3.3.1 Increased use of shore power contributes to offshore vessel emission reductions

The use of shore power has increased significantly in recent years. Figure 22 shows the development in the use of shore power as a proportion of total hours in port for this vessel group. The development since 2019 has been tremendous, with an increase in shore power use for the offshore fleet from just 10,000 hours in 2019 to 225,000 hours in 2024. Over the past year, the total number of hours offshore vessels spend in port has increased moderately, from 351,000 hours in 2023 to 383,000 hours in 2024. From 2023, the share of shore power hours has remained relatively stable. The VPS estimates that the utilisation of shore power is at 59 per cent of the hours the vessels spend in port.

Several shipowners report a strong desire to use shore power where available, which indicates a great potential for increased use. Further development of shore power facilities at offshore bases and alternative quay facilities will be crucial to increasing the use of shore power and realising this emission reduction potential. Standardised and effective connection procedures, as well as operational stability, will also increase the use of shore power in the years ahead.

FIGURE 21 DISTRIBUTION OF ACTIVITY HOURS AND CO_2 EMISSIONS PER VESSEL CATEGORY WITHIN OFFSHORE VESSELS

Source: VPS

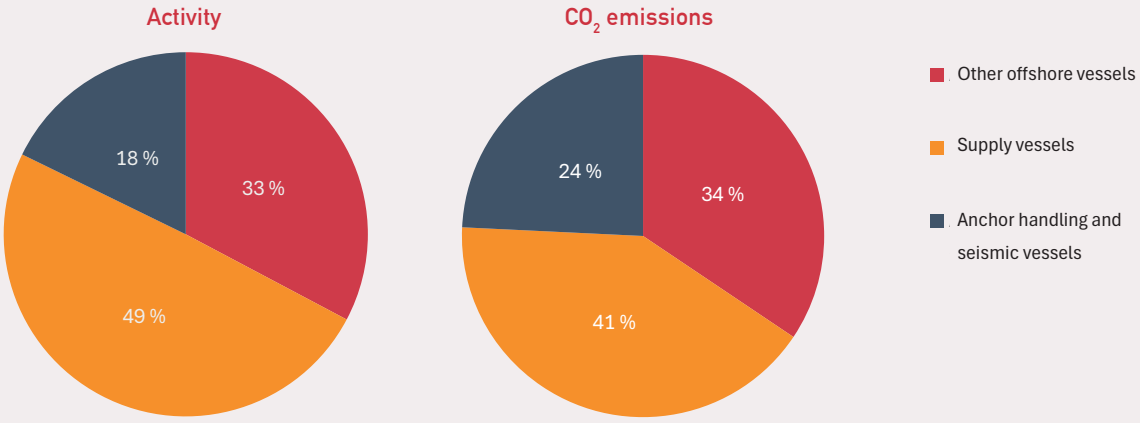
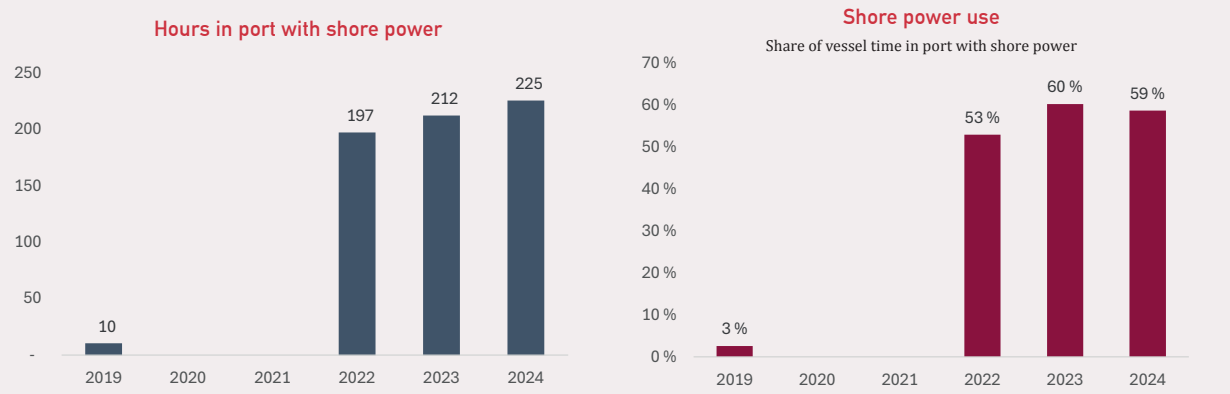


FIGURE 22 HOURS IN PORT WHERE VESSELS ARE CONNECTED TO SHORE POWER AND UTILISATION OF SHORE POWER HOURS IN PORT FOR OFFSHORE VESSELS USING MARESS (1000 hours)

Source: VPS



3.4 New forecast for core maritime segments in the oil and gas industry

3.4.1 Background and status of progress towards achieving the offshore maritime climate goals

As part of KonKraft's 2020 climate strategy, the oil and gas industry, together with shipowners and rig owners, committed to supporting the Norwegian government's target of 50 per cent emission cuts in domestic shipping and fishing by 2030. As a follow-up, it was decided to establish separate, industry-specific and quantitative targets for offshore maritime emissions associated with Norwegian petroleum activities. To further develop this effort, a working group was established in 2024, comprising representatives from several of the largest NCS operators, with expertise in maritime operations, logistics, and climate reporting. The group has clarified the delineation and methodology for the target work, and has collected relevant data from its own companies, other operators and exploration operators. The group will continue to work on a maritime objective in the coming year.

A robust and verifiable climate target is important both to strengthen the industry's own climate efforts and to demonstrate to authorities and other stakeholders that the industry is working systematically and purposefully to reduce emissions. It is important that the target assessments are considered in light of the upcoming Norwegian low and zero-emission requirements for offshore vessels, as well as the FuelEU Maritime and IMO climate regulations.

Emission forecasts for both 2030 and 2035 have been developed based on KonKraft's overall goal of a 50 per cent reduction in emissions by 2030. This work has encompassed mapping and quality assurance of historical emissions, development of a baseline forecast without additional climate measures, and an assessment of the potential for emission reductions during the same period. Before the work can be finalised, further quality assurance, supplementary data, and methodological improvements are required. The forecasts will be important for further efforts to reduce maritime emissions on the Norwegian shelf.

3.4.2 Extensive pioneering work for a consistent and verifiable methodology for maritime emissions from the oil and gas industry

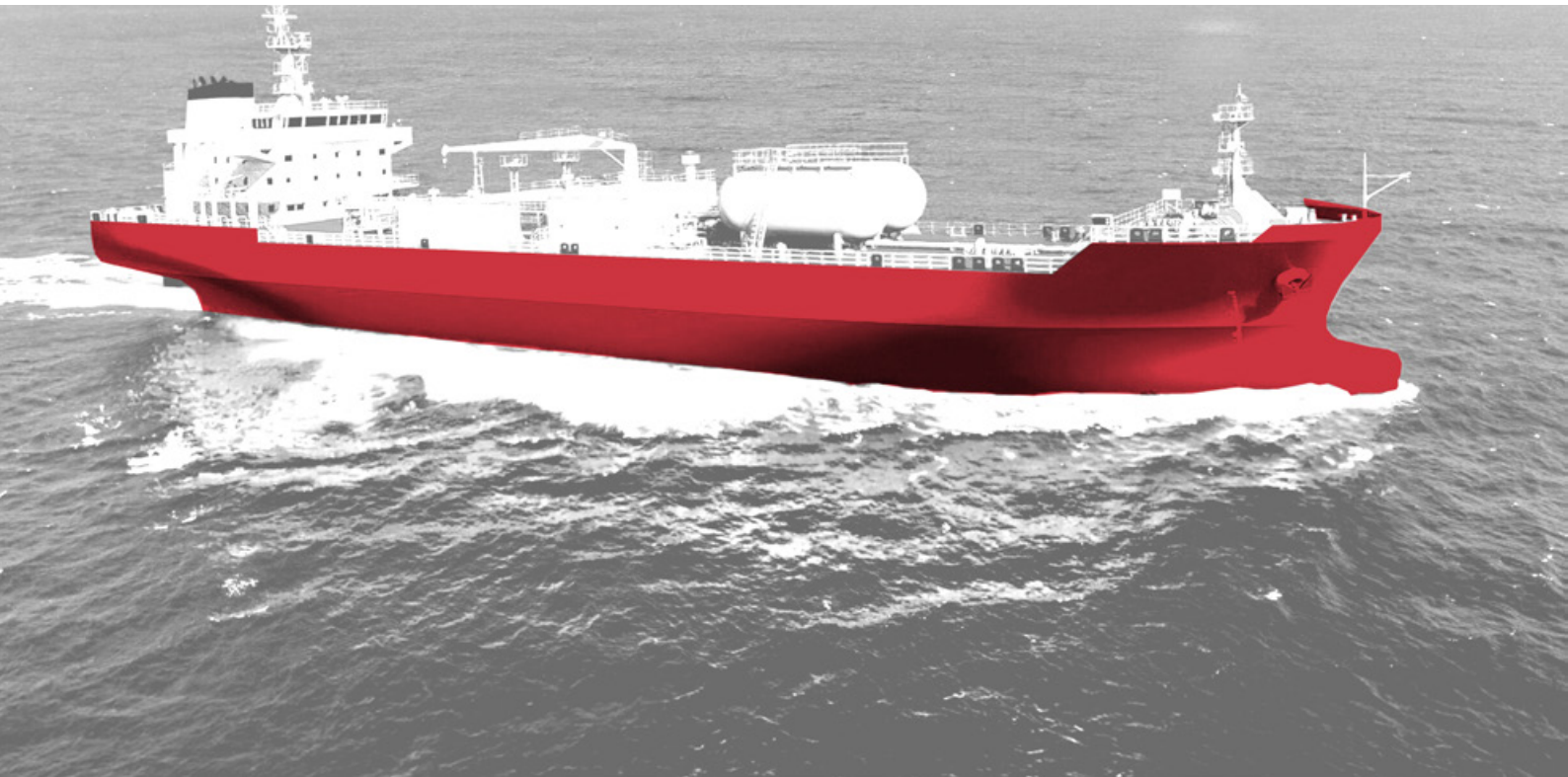
There is currently a lack of consistent overviews and statistics on offshore maritime emissions, as different industry players use varying geographical areas, vessel categories, data sources, and methodologies. Moreover, ships are categorised differently, making it difficult to compare efforts across the industry. Operator companies have the greatest opportunity to influence emissions from vessels contracted on a long-term basis, with the Norwegian continental shelf as their primary area of operation. To establish a sufficient data basis, it has been necessary to obtain or estimate data from operators on the Norwegian continental shelf.

Offshore maritime activity within the oil and gas industry includes a wide range of vessel categories and operations, with significant variation in contract types, durations, and opportunities for influence. Consequently, the oil and gas operators' working group has decided to focus on five key segments representing significant emission sources, where operators have greater opportunities to impact the implementation of climate measures and the trajectory of future emissions.

The year 2008 was chosen as the reference year for emission reductions when the climate strategy was established in 2020. The year was chosen based on the available data quality and coincides with the IMO's reference year for maritime climate targets. Emissions data are collected using a bottom-up approach, where operators report historical data and activity-based forecasts. Where the data basis has been insufficient, it has been supplemented with assumptions and upscaling methods to provide as accurate a representation of emissions as possible.

The analysis focused on supply vessels, standby vessels, IMR vessels[11] and anchor handling vessels – hereafter referred to as the core segments. The seismic segment has been temporarily excluded from the analysis due to limited data availability, which results in increased uncertainty. The working group will continue to focus on the seismic segment to improve the data foundation for this vessel category.

11 IMR is short for Inspection, Maintenance and Repair.



3.4.3 Offshore vessels contracted by operating companies

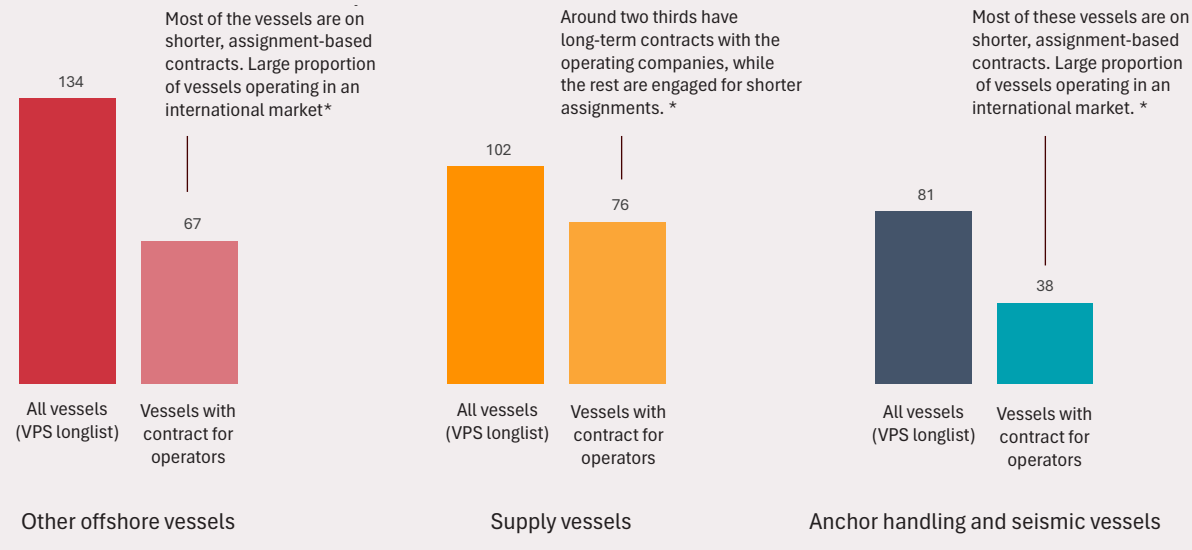
VPS's analysis of greenhouse gas emissions from maritime activity in offshore operations within the Norwegian economic zone extends beyond the oil and gas industry. The method that is applied also makes it difficult to determine which vessels have been contracted by the oil and gas industry, and for how much of the year.

As the authorities work to develop requirements targeting reduced maritime emissions from the oil and gas industry, it is important to distinguish more clearly between these activities, vessel types, and emissions. Consequently, in this year's report, efforts have been initiated to map which vessels operating companies on the NCS have contracted. The preliminary overview is based on information from eleven of the largest operating companies on the Norwegian shelf. This is the first time such an overview has been compiled. It should be noted that it is not yet complete, and that further work could improve it.

Figure 23 compares the total number of vessels from VPS's analysis with the number of vessels confirmed to have been contracted by oil and gas operators. The preliminary overview shows that a total of 181 of 317 vessels on the VPS list have been confirmed by operators as contracted in 2024. It is important to note that many vessels reported as being under contract are chartered for short assignments and operate within an international market, frequently entering and leaving the Norwegian economic zone. The type of contract, operating pattern, and extent of a vessel's involvement on the Norwegian continental shelf can influence how easily emission-reducing measures can be implemented.

FIGURE 23 CONTRACTED VESSELS IN THE OIL AND GAS INDUSTRY LISTED BY VPS. THE VESSEL SELECTION WAS COMPILED BY OFFSHORE NORGE.

Source: Offshore Norge



*Overall estimates based on input from the Offshore Norge working group for maritime emissions

3.4.4 Significant emission reductions have been achieved in the core maritime segments of the operating companies

The collected overview of vessels under contract with the operating companies (181 vessels) encompasses a broader range than the core segments for which emission forecasts have been prepared. The core segments are limited to selected vessel segments that are used regularly and occasionally on longer contracts, which facilitates the operating companies' ability to influence decisions regarding the implementation of emission-reducing measures. The overview of vessels contracted by the operating companies also includes other segments, such as project vessels, which often operate in Norwegian waters for only a year in connection with a single operation. This makes it more challenging for the operating companies to implement emission-reducing measures.

Based on collected and estimated data, it is estimated that emissions across the four core segments[12] decreased by 31 per cent during the period 2008–2023. (Figure 24). In comparison, the total production volume of oil and gas on the Norwegian continental shelf fell by only 3.7 per cent during the same period.

Emissions have been reduced across all vessel categories. Several measures have been implemented, including operational improvements, energy efficiency initiatives, shore power, and battery hybridisation. Emission reductions have been particularly significant among standby vessels, with a decrease of 57 per cent. Operators cite operational measures, technological improvements, and logistics cooperation as the primary reasons for the significant emission reductions.

The baseline forecast for offshore maritime emissions from the four core segments shows a significant range in emissions from 2023 to 2030 and 2035. This variation depends on the level of activity on the continental shelf (see Figure 25). Future activity levels on the NCS will have a major impact on the development of emissions from maritime operations, and the operating companies have therefore also reported estimated emissions given a high

12 Supply, stand-by, IMR and anchor handling vessels.

FIGURE 24 PRELIMINARY RESULTS FOR HISTORICAL MARITIME GREENHOUSE GAS EMISSIONS
Work is ongoing on method development and updating data foundation
(1000t CO_2)

Source:Offshore Norge

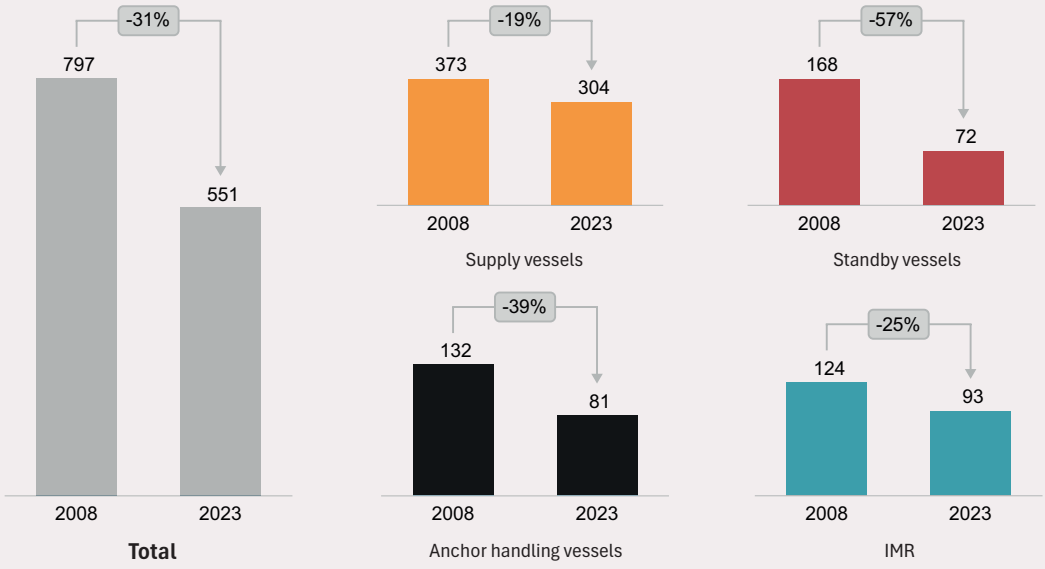


Figure: historical development in emissions from 2008 to 2023, in total and per offshore core segment. The impact of the biofuel blending requirement introduced in October 2023 is not included in the calculations.

level of activity in 2030 and 2035. The baseline forecast does not account for the implementation of additional climate measures beyond those already in place, and the impact of the biofuel blending requirement is not included.

Depending on the level of activity, the baseline forecast indicates that greenhouse gas emissions from offshore maritime vessels in the core segments could be reduced by 46 per cent by 2030 and 55 per cent by 2035, relative to 2008 levels. In a scenario with a higher level of activity, emission reductions in the same year are estimated to be 28 per cent and 31 per cent.

FIGURE 25 PRELIMINARY BASELINE FORECAST – OFFSHORE MARITIME GREENHOUSE GAS EMISSIONS

Ongoing work to develop method and data

($1000t CO_2$)

Source: Offshore Norge

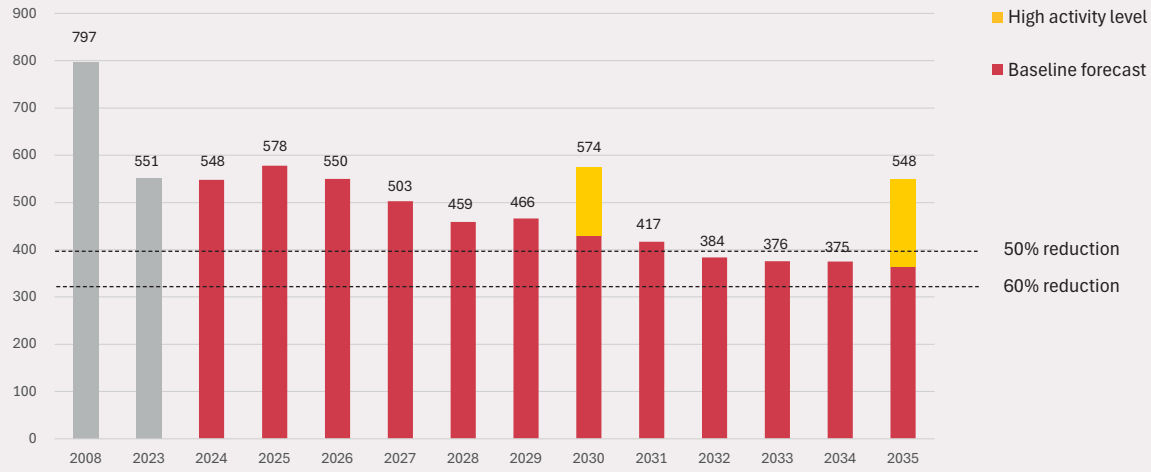


Figure: Baseline forecast for emissions from supply vessels, standby vessels, anchor handling and IMR vessels towards 2030 and 2035

Emissions have been reduced across all vessel categories. Several measures have been implemented, including operational improvements, energy efficiency initiatives, shore power, and battery hybridisation

3.4.5 Low and zero-emission fuels are essential for achieving substantial emission reductions in the long term, but face significant barriers to adoption in the medium term

The total emission reduction potential for the four core segments towards 2030 and 2035 is based on scenarios for both baseline and high activity development, as well as the operator companies' assessments of the reduction potential of various climate measures. It is estimated that emissions could be reduced by 38–54 per cent by 2030, compared to the reference year 2008, if additional climate measures are implemented. The range depends on whether a baseline or high activity level is assumed, as shown in Figure 26. For 2035, corresponding emission reductions are estimated at 71 per cent in the baseline forecast and 51 per cent in the high activity scenario.

Through systematic efforts to reduce emissions over many years, the oil and gas industry has already realised much of the potential for energy efficiency, operational improvements and the use of shore power. Towards 2030, there is therefore limited further reduction potential associated with the implementation of such measures (see Figure 27). The potential emission reductions from identified climate measures total 61,000 tonnes of CO_2 by 2030, doubling to 124,000 tonnes by 2035. The emission reduction potential increases significantly from 2030 to 2035 due to expected phasing-in of low and zero-emission fuels.

Significant future percentage reductions will depend on the progressive replacement of fossil fuels with low and zero-emission alternatives. High mitigation costs, regulatory uncertainty, and limited demand for fleet renewal are key constraints on a faster transition to low and zero-emission fuels, and thereby on further emission reductions in offshore maritime operations.

FIGURE 26 PRELIMINARY RESULTS FOR TOTAL OFFSHORE MARITIME EMISSIONS AND THE POTENTIAL FOR EMISSION REDUCTIONS COMPARED TO 2008 LEVELS.
Ongoing work to develop method and data
(1000 TCO_2).

Source: Offshore Norge

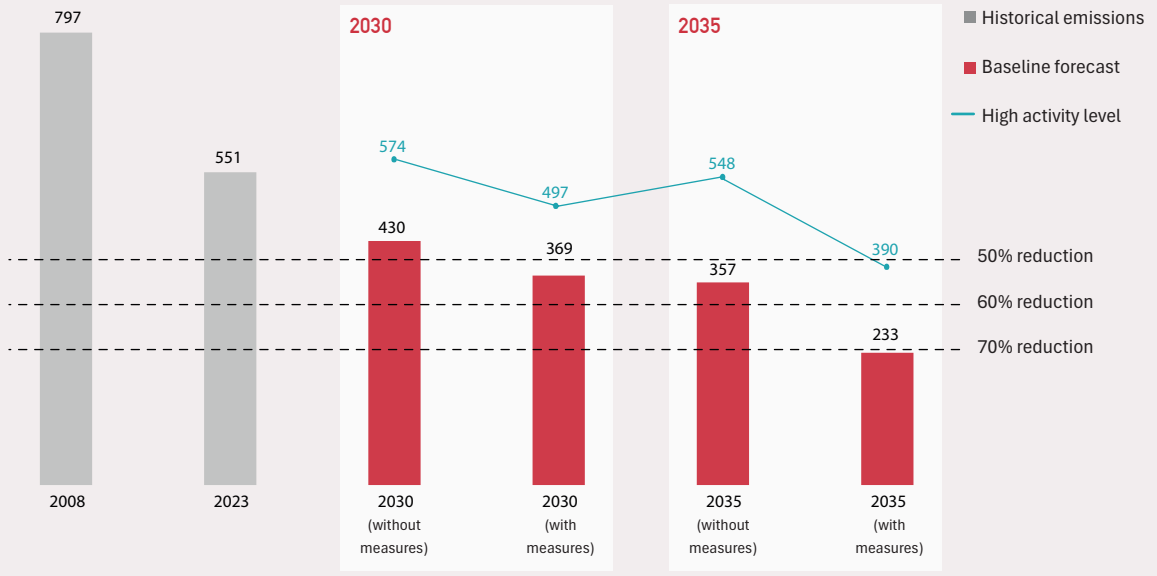


Figure: Projections for emission reductions towards 2030 and 2035. Based on operator companies' identified potential for emission-reducing measures. Emissions and potential for emission reduction measures given a high level of activity are also illustrated.

Significant future percentage reductions will depend on the progressive replacement of fossil fuels with low and zero-emission alternatives

FIGURE 27 PRELIMINARY RESULTS OF CLIMATE MEASURE POTENTIAL AND DISTRIBUTION BY CATEGORY
Ongoing work to develop method and data
(1000 tCO_2)

Source:Offshore Norge

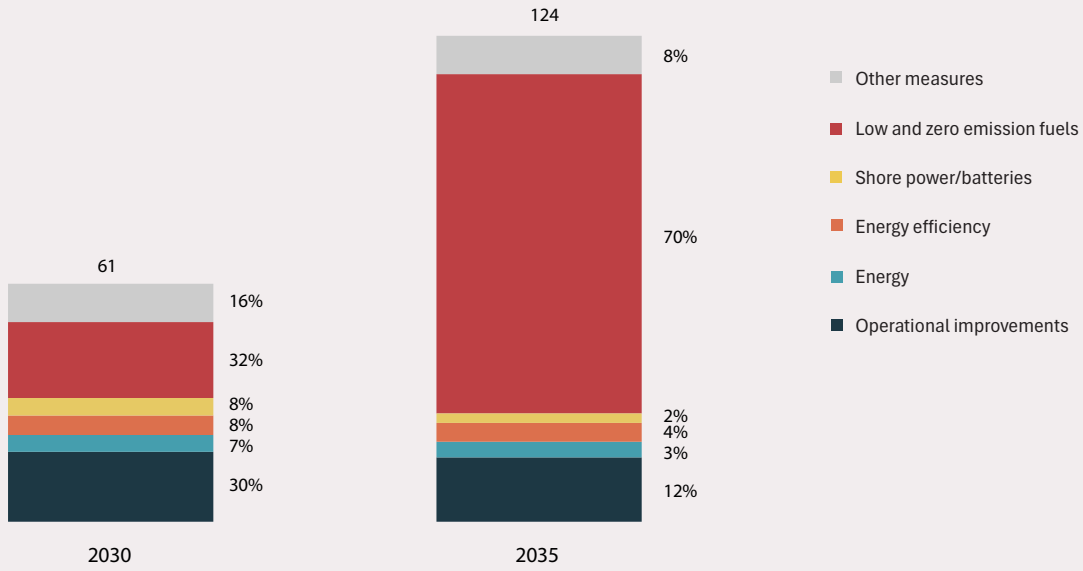


Figure: Reduction potential for climate measures within offshore maritime vessel segments 2023–2030/2035, by measure category.

FuelEU Maritime establishes requirements for the gradual reduction of greenhouse gas intensity in the energy consumption of ships operating in European waters. The goal is to reduce emissions from energy consumption by 2 per cent in 2025 and up to 80 per cent by 2050

3.4.6 The way the biofuel blending requirement is implemented will shape offshore maritime emissions going forward

The biofuel blending requirement for shipping, introduced on 1 October 2023, mandates that biofuels make up 6% by volume of the total annual sales of liquid fuels and other liquid combustibles. On 1 April 2025, the Norwegian Environment Agency submitted a consultation proposal presenting several alternatives for increasing the biofuel blending requirement for shipping during the period leading up to 2027. The primary alternative proposed entailed increasing the biofuel blending requirement for shipping from 6 per cent to 10 per cent in 2026, and further to 13 per cent in 2027. Furthermore, the Norwegian government's 2024 Climate Status and Plan (Green Book) has made provision for an increase in the biofuel blending requirement to 18 per cent in 2030.

Operators bear the cost of biofuels through higher fuel expenses when refuelling in Norway, and the impact of the blending requirement is reflected in the national greenhouse gas inventory. Figure 28 shows the effect of different levels of the biofuel blending requirement on emissions from offshore maritime activities in 2030 and 2035. The span of possible outcomes shows how different versions of the requirement could affect future offshore maritime emissions, in a context marked by significant uncertainty.

In 2030, reportable emissions with a six per cent by volume blending requirement could be reduced by 56 per cent compared to 2008 levels.

With a blending requirement of 18 per cent by volume in the same year, the reduction is estimated at 62 per cent. In 2035, the corresponding blending requirements will result in reductions of 72 per cent and 76 per cent respectively.

FIGURE 28 PRELIMINARY RESULTS OF CLIMATE MEASURE POTENTIAL AND DISTRIBUTION BY CATEGORY

Ongoing work to develop method and data (1000 tCO_2)

Source:Offshore Norge

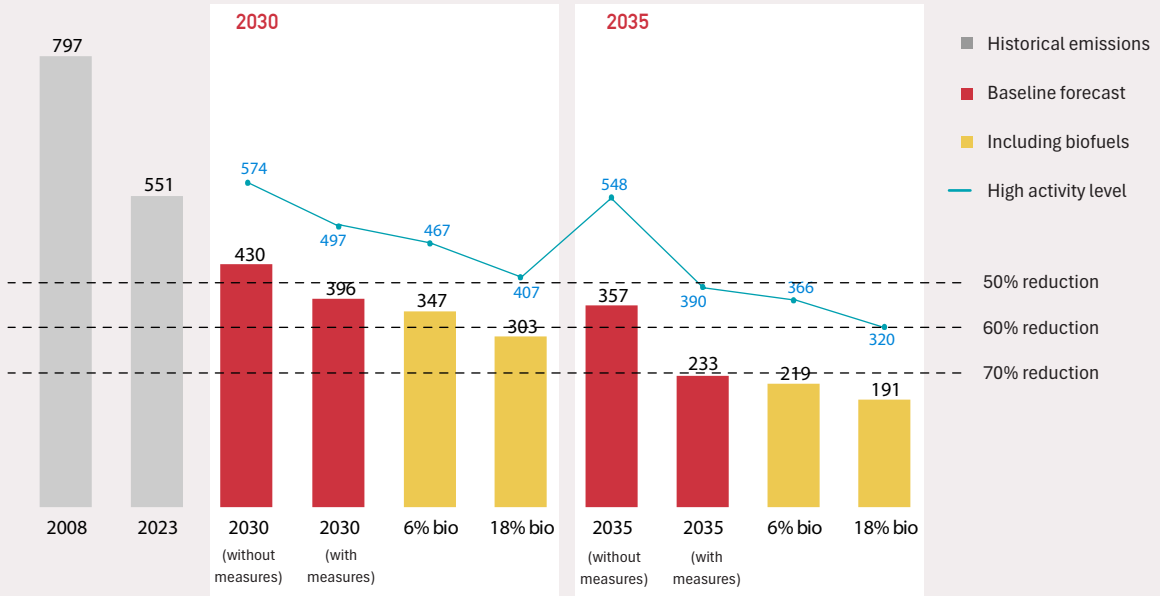


Figure: GHG emissions from core offshore maritime segments in 2008, 2023, 2030 and 2035, with/without further climate measures, the biofuel blending requirement, and for basic/high activity levels.

3.5 Measures and policies for emission cuts in the offshore maritime sector

3.5.1 National low and zero-emission regulations for offshore vessels are in the pipeline in 2025

The Norwegian government has announced the introduction of low and zero emission requirements for offshore vessels. The Norwegian authorities are currently assessing how the requirements can best be formulated – both regarding which vessels should be covered and which technological and operational solutions should qualify. Further clarifications are expected during 2025.

3.5.2 EU climate regulations for the maritime sector – EU ETS and FuelEU Maritime include offshore vessels

Shipping was included in the EU ETS from 1 January 2024. The introduction takes place in stages with regard to which emissions and vessels are covered. The offshore fleet will be subject to reporting obligations in the EU's MRV emissions database from 2025, and quota obligations will be introduced from 2027 for offshore vessels over 5,000 gross tonnes, which applies to many vessels used by the oil and gas industry. Whether smaller vessels will also be included will be decided by the end of 2026.
There is reason to believe that the quota obligation will become an important driver for maritime emission reductions, and mandatory MRV reporting will provide new insight and improved data for future KonKraft status reports.

In addition, the FuelEU Maritime Regulation entered into force on 1 January 2025. These regulations mandate a gradual reduction in the greenhouse gas intensity of energy consumption for vessels operating in European waters and include requirements for the use of shore power from 2030 for certain types of vessels. Offshore vessels are initially excluded, but it is possible that they will be included in the future. The goal is to reduce emissions from energy consumption by 2 per cent in 2025 and up to 80 per cent by 2050.

3.5.3 The International Maritime Organization introduces new global climate regulations

In April 2025, the UN's International Maritime Organization (IMO) approved a new global regulatory framework that builds on the revised climate strategy from 2023. The regulations aim to make international shipping emission-free by 2050 and mandate a gradual reduction in the emission intensity of the energy consumed on board. Vessels that do not fulfil the minimum requirements must pay a surcharge for emissions in excess of set levels. Financial incentives encouraging the use of net-zero fuels and technologies are being introduced concurrently. The regulations apply to all ships over 5,000 gross tonnes, with some exceptions. The regulations will come into effect on 1 March 2027, with the first reporting year in 2028. A final decision is expected in October 2025.

3.5.4 Ensuring alignment between EU ETS and IMO regulations

The combined effect of the EU ETS and the IMO's upcoming fuel requirements is expected to be a strong driver for emission reductions in the offshore segment as well. The EU ETS reduces the financial attractiveness of fossil fuels and strengthens incentives for electrification, alternative fuel use, and energy-efficient operations. At the same time, the IMO's global requirements for reduced carbon intensity will promote greater harmonisation across regions and help mitigate the risk of competitive distortion. Together, these regulations will facilitate an efficient, market-based transformation of the offshore fleet.

3.5.5 Policy instruments and support schemes

The offshore service segment reports a lack of willingness to pay in the market and uncertainty regarding technology choices as barriers to further investments in climate and environmental technology. Public investment support can play a crucial catalytic role in this respect. Enova has supported maritime projects in initial stages over time, but the support is perceived to halt before solutions are commercially viable at a larger scale. A positive development is that Enova got a new management agreement and mandate in 2025, enabling support to be targeted towards projects in later phases. For the support framework to work effectively, it is essential that it fosters scalable solutions, encompasses support for a broad range of alternative fuels, and encourages increased investment in energy efficiency measures.

The NOx agreement between the Norwegian government and industry was established in 2008. Since then, more than 1,500 projects have received funding through the NOx Fund. Alongside achieving all NOx targets, annual CO_2 emissions have decreased by about 2 million tonnes. The NOx agreement expires in 2027 but should be extended until the end of 2030 to remain an effective tool for further reducing NOx and CO_2 emissions.

> The Norwegian authorities are currently assessing how the low and zero emission requirements for offshore vessels can best be formulated – both regarding which vessels should be covered and which technological and operational solutions should qualify

Despite progress, the development of low and zero-emission value chains in both Norway and Europe remains too slow to meet the transition and emission reduction targets.

4

NEW VALUE CHAINS ON THE NCS

Multiple projects within emerging value chains on the Norwegian continental shelf are under development and implementation. Northern Lights plans to begin injecting CO_2 captured at Heidelberg Materials' cement plant in Brevik in the second quarter of 2025. Within offshore wind, the Ventyr consortium is actively developing the Sørlige Nordsjø II project area. In May, new areas were announced in Utsira Nord, opening up for the use of floating offshore wind technologies.

Despite progress, the development of low and zero-emission value chains in both Norway and Europe remains too slow to meet the transition and emission reduction targets. Increased focus on energy security, combined with rising costs for the development of offshore wind and key low-carbon technologies, has contributed to slower progress. The development of the European hydrogen market has almost come to a halt due to uncertainty associated with demand, incomplete regulatory frameworks, and high prices, compared to fossil alternatives. In Norway, virtually all production projects for blue hydrogen have been put on hold or cancelled over the past year.

4.1 Climate strategy objectives

By investing in new value chains that facilitate the transition to a zero-emission society in Norway and Europe, KonKraft will develop a forward-looking energy industry on the Norwegian continental shelf. KonKraft's climate strategy specifically emphasises value chains in offshore wind, hydrogen, and carbon capture and storage. In recent years, seabed minerals have also been identified as a potentially important new value chain in the long term. The expertise and experience of operators, suppliers, and the shipping industry in Norway will be leveraged to develop these value chains, ensuring continued value creation and employment opportunities.

In its 2020 climate strategy, KonKraft decided to work towards realising the following ambitions related to new value chains:

	KonKraft's ambitions	Status
	"Production of 1 million tonnes of blue hydrogen per year in Norway by 2032, increasing to 2 million tonnes from 2035. A pipeline for hydrogen export between Norway and the EU will be built by 2030. At least five European industrial companies will utilise hydrogen from natural gas with carbon capture and storage in their production by 2030. At least two gas power plants will use hydrogen as fuel in Europe by 2030"	 3 out of 4 Norwegian projects for the production of blue hydrogen have been cancelled due to lack of demand and market infrastructure. The remaining project – Barents Blue, with a planned production equivalent to approximately 200,000 tonnes of hydrogen – has postponed its expected start-up until after 2031. Following the completion of a feasibility study, the pipeline project for exporting hydrogen from Norway to Germany has been discontinued due to insufficient demand and high costs. Equinor is collaborating with RWE on the construction of two "hydrogen-ready" power plants in Germany before 2030 and is also pursuing hydrogen projects in the UK and Belgium.
	"Two carbon capture plants in Norway, Heidelberg Materials in Brevik and Fortum energy recovery plant in Klemetsrud, transport infrastructure for CO_2 and carbon storage on the Norwegian continental shelf, and Northern Lights operational by 2024."	 Heidelberg Materials' carbon capture facility in Brevik is expected to commence operations, with subsequent storage, in summer 2025. The first shipment from Heidelberg Materials sailed from Brevik to Northern Lights on 8 June. The carbon capture facility at Klemetsrud was put on hold in 2023 due to cost overruns. In January 2025, Hafslund Oslo Celsio announced the final investment decision to continue the project, with an expected start-up in Q3 2029.
	"CO_2 to be sent for storage on the Norwegian continental shelf from at least five European companies by 2030."	 Northern Lights has contracts with three European companies and is expected to enter into at least two new contracts for phase 2 (in addition to Stockholm Exergi and Hafslund Celsio).
	"The oil and gas industry will work to further develop Norway's strong position in renewable energy from offshore wind."	 Development in Norway is progressing more slowly than planned, but Sørlige Nordsjø II has been awarded, and the Ministry of Energy has announced Utsira Nord. Escalating costs and supply chain constraints present significant challenges for offshore wind projects.

4.2 Offshore wind power

4.2.1 Overall development over the past year

Offshore wind power development has been twofold on the Norwegian continental shelf over the past year. On the one hand, Norway's first offshore wind auction in Sørlige Nordsjø II represented a significant milestone in the development of the country's offshore wind industry. The Ventyr consortium won the auction and is currently developing what will become Norway's largest power plant. In May 2025, areas in Utsira Nord were announced as potential sites for what could become the world's first large-scale floating offshore wind project. On the other hand, increased offshore wind power costs and uncertainty about the framework conditions have sparked greater debate about the need for offshore wind in Norway. Several players have already withdrawn from the tender process for Utsira Nord. This reluctance persists despite recent reports from the Norwegian Water Resources and Energy Directorate, Statnett, and DNV highlighting the importance of offshore wind power in meeting future power demand and keeping electricity prices low over the long term.

4.2.2 Utsira Nord

On 19 May 2025, the Ministry of Energy launched a tender process for three project areas for floating offshore wind in Utsira Nord. Each area has an installed capacity of 500 MW. The selection and allocation will take place in two stages, with a maturation phase between the first and second stages.

In the first step, three project areas will be awarded to the industry players that score highest in the tender process based on objective and non-discriminatory, qualitative criteria:

- Cost level, realism and maturity
- Innovation and technological development
- Implementation ability
- Sustainability
- Positive ripple effects

The application deadline for participation in the first phase is 15 September.

Following the initial award phase, a maturation period will follow in which the selected players will further develop their respective projects. Participation in the second-phase tender process for state aid requires submission of a licence application and the provision of a bank guarantee as a condition for participation in the auction. The auction will only be conducted if at least two players fulfil the requirements.

State aid will then be awarded to one participant, with the winning bid being the one that demonstrates the lowest level of required aid to realise the project. Bids exceeding the support cap of NOK 35 billion, as set by the Norwegian parliament, will not be permitted. Operators that do not receive state aid may still apply for extended exclusive rights to the project area under the Marine Energy Act.

Calculations by Volt Power Analytics[13] indicate that the initial 500 MW development at Utsira Nord will, on average, reduce electricity prices in NO_2 by more than NOK 0.02 per kWh, corresponding to at least NOK 14 billion in lower electricity costs over the first decade.

4.2.3 Implementation and results of strategic impact assessments

The Norwegian parliament and government aim to allocate areas for 30 GW of offshore wind power by 2040, and work is ongoing to open up new areas for offshore wind power. In November 2024, the Norwegian Water Resources and Energy Directorate (NVE) delivered a strategic impact assessment (SKU) for the areas Sørvest F, Vestavind B, and Vestavind F, as the first stage of the assessment of the 20 areas previously identified by the NVE as suitable for offshore wind production on the Norwegian continental shelf. The delivery deadline for the remaining 17 areas has been set for the end of June 2025.

The strategic impact assessment for the Vestavind F, Vestavind B, and Sørvest F areas provides a solid foundation for prioritising offshore wind areas and for continued work on area opening and announcements. It is positive that the authorities are planning a phased

13 Analyse: Havvind fra Utsira Nord kan spare strømkunder i sør for milliardbeløp hvert år

approach, allowing for knowledge-building as areas and projects mature. At the same time, it is essential to keep up the pace in facilitating new offshore wind areas, while also building knowledge alongside the maturation of areas and projects.

4.2.4 Ventyr is moving forward with the development of Sørlige Nordsjø II

In, March 2024, the first offshore wind auction was conducted on the Norwegian continental shelf in the Sørlige Nordsjø II area, and the Ventyr consortium won the auction. Ventyr is a partnership between Parkwind and Ingka Group. Parkwind is a Belgian company that develops and operates offshore wind farms globally. Parkwind is owned by the Japanese energy company JERA. As a partner, they have Ingka Investments, the investment arm of Ingka Group, the largest owner of IKEA. The consortium has a strategic partnership with NorSea, which owns strategic port infrastructure and provides port services, bases, and logistics solutions to customers across various industries, including offshore wind.

Following NVE's presentation of the impact assessment programme for the project and grid connection in October 2024, Ventyr is now fully engaged in developing the project area. The offshore wind farm will consist of 80–100 wind turbines with a total capacity of 1,500 MW. Annual power production will be 7–8 TWh, which is roughly equivalent to the entire power consumption of the Agder region. The offshore wind farm is estimated to reduce the average electricity price in the area by approximately NOK 0.10 per kWh. Ventyr plans to commission the wind turbines by 2031.

4.2.5 The second phase of Sørlige Nordsjø II has been put on hold

The Ministry of Energy has decided not to initiate a tender process in 2025 for phase 2 of Sørlige Nordsjø II, now referred to as Sørvest F, for offshore wind development. Instead, the Ministry wants to focus on floating offshore wind with radial connections, meaning that the power from offshore wind is transmitted only to Norway. In a study of potential grid solutions for the Sørvest F area, Statnett concluded that hybrid grid solutions offer the greatest socio-economic benefits. However, government support will still be needed due to high grid costs, and Statnett emphasises that further technology development is required before a larger, interconnected North Sea grid towards Europe becomes feasible. The study provides updated insights into the potential development of Sørvest F, demonstrating that both radial and hybrid grid solutions could contribute to reducing Norwegian electricity prices. Both Statnett and several research institutions expect the costs of offshore wind and grid solutions to decline over time, potentially making hybrid grid solutions relevant for future offshore wind developments on the Norwegian continental shelf.

4.2.6 GoliatVIND

In December 2024, GoliatVind submitted a licence application for the floating offshore wind project that will supply renewable electricity to the Hammerfest region via the Goliat platform in the Barents Sea. The consultation deadline for the licence application was 20 March, and a licensing decision is expected by late 2025. In March 2024, the project was awarded up to NOK 2 billion in funding, contingent upon the demonstration plant being realised by 2029.

GoliatVIND is owned and supported by three partners: Odfjell Oceanwind, Source Galileo, and Kansai Electric Power Company. The offshore wind farm will have an installed capacity of 75 MW, distributed across five wind turbines of 15 MW each. The annual energy production is estimated to be 320 GWh.

4.2.7 The EU is raising its ambitions for renewable ocean energy during the period leading up to 2050, while also introducing stricter requirements for the supply chain

In December 2024, EU member states reached a non-binding agreement to install 88 GW of renewable ocean energy capacity by 2030. The new target is over 20 per cent lower than the previous target of 111 GW set in 2022. Simultaneously, the target for installed capacity by 2050 has been raised to 360 GW. The North Sea is the primary

area, with targets of 56.6 GW by 2030 and 220 GW by 2050. Marine renewable energy includes offshore wind, wave and tidal energy. During the period leading up to 2030, offshore wind power is expected to constitute the majority of the installed capacity.

In parallel with revising the targets, the European Commission is working to introduce stricter requirements for the supplier industry to ensure sustainable and strategic development of European value chains. Through the Clean Industrial Deal and the Affordable Energy Action Plan, the EU aims to accelerate licensing processes, increase support, and enhance cooperation on the North Sea grid, which is described as a flagship project.

4.2.8 Constraints and needs

Most of the constraints identified in last year's report persist in this year's report, and the industry's input regarding the development of offshore wind and framework conditions has only been partially addressed. The lack of clarification regarding key framework conditions constitutes time-critical factors for the Norwegian offshore wind initiative. It is also crucial that the grid and market design are organised to ensure that offshore wind development benefits Norwegian consumers, whilst being both commercially and socio-economically viable.

Key constraints

Like many other renewable technologies, offshore wind power has experienced cost increases in recent years. Although analyses indicate significant cost reductions for offshore wind over the coming decades, particularly for floating offshore wind, the costs associated with offshore wind development remain a challenge.

There is currently no overall plan outlining how 30 GW of offshore wind capacity can be realised by 2040. Regular licence awards are required, along with a plan for grid connection which encompasses how a hybrid grid solution can be established with appropriate market and grid design. This will ensure predictability for offshore wind developers and suppliers looking to invest in Norway.

Lack of capacity and investments in shipyards and ports for the construction, assembly, and completion of floating offshore wind turbines. Lack of an overall plan and predictability regarding future offshore wind volumes and grid development constrain investments ahead of capacity requirements and make it risky to invest in industrial capacity.

Slow-moving processes mean that Norway is lagging behind its neighbours and failing to gain full benefits from its advantage in offshore operations.

Industry's desires for offshore wind development and framework conditions

The Norwegian government must announce 5 GW of offshore wind in two licensing rounds by 2029 and set a production target for 2040. Regular, predictable and efficient opening and allocation processes must be established. A commercial framework that supports the development of offshore wind must be established.

Strengthen the commitment to research and innovation related to industrialisation and upscaling of offshore wind. The government should prioritise high Norwegian HSE standards and allocate bases to Norway in order to ensure regional and national value creation. Facilitate grid development in the North Sea to enhance value creation and support a commitment to offshore wind in Norway with an efficient and integrated power market in the North Sea countries.

Licensing and application processes and administrative capacity must be adjusted to ensure shorter lead times for offshore wind projects on the Norwegian continental shelf.

Norwegian authorities, including the Ministry of Energy and Petroleum (ED), the Norwegian Water Resources and Energy Directorate (NVE), and Statnett, must continue to play an active role in EU's efforts to develop frameworks for hybrid projects and a potential future offshore grid in the North Sea. Furthermore, Norwegian authorities must actively engage with countries that could be involved in connecting a hybrid project. It is particularly important that Norway is an active partner in the regional collaboration bodies planning coordinated infrastructure development in the North Sea, such as the North Seas Energy Cooperation (NSEC). A clarification of the relationship to the TEN-E Regulation is crucial in this context. If offshore wind farms in hybrid projects are not to receive direct subsidies, they must be given a share of the congestion revenues to strengthen project profitability.

4.3 Carbon capture and storage

4.3.1 Overall NCS development over the past year

A number of players on the Norwegian continental shelf are working to establish carbon storage as a separate business area on the Norwegian continental shelf. The Ministry of Energy began allocating areas for carbon storage in 2018. Since then, one exploitation licence (EL) and 12 exploration licences (EXL) have been granted for carbon storage. In addition, Equinor was awarded an exploration licence north-east of Ekofisk on 13 June 2025.

Since last year's status report, three companies have been awarded exploration licences in two new areas: Harbour and Equinor were awarded an exploration licence south of the Sleipner area, while Equinor and Aker BP were awarded an exploration licence north of the Frigg area. There have also been changes in the ownership structure of several licences:

- Sval sold its interest in the Trudvang licence to INPEX and Vår Energi, and the operatorship was acquired by Vår Energi.
- Orlen Upstream Norway has withdrawn from the Polaris licence.
- Yinson Production has acquired Stella Maris's interest in the Havstjerne licence.

As of today, interests in exploration licences on the Norwegian continental shelf are held by a total of 13 companies. The most important players with interests in more than one licence are Equinor (5 licences), Harbour Energy (3 licences), Aker BP (3 licences), Vår Energi (2 licences) and OMV (2 licences).

Northern Lights, which holds the first exploitation licence on the Norwegian continental shelf, is expected to begin injection in the third quarter of 2025, receiving CO_2 from Heidelberg Materials' cement plant in Brevik. Furthermore, Northern Lights is expected to receive CO_2 from Yara in Sluiskil and Ørsted in Kalundborg in 2026. The total annual injection volume from the three plants is estimated at approximately 1.5 Mt CO_2.

A number of players are working to establish carbon storage as a separate business area on the Norwegian continental shelf

4.3.2 Carbon storage site development in Europe – five large-scale storage projects have made investment decisions

The development of value chains for carbon management, including capture, utilisation, transport, and storage, has been identified by the EU as crucial for achieving the goal of net zero emissions by 2050. Over the past year, the EU has continued efforts to develop a European market for carbon management, and since the previous status report, investment decisions have been made for three new carbon storage projects. This means that a total of five large-scale carbon storage projects in Europe have now reached this milestone. No other projects are currently at a level of maturity that allows an investment decision to be made in the near future. Investment decisions have been made for the following projects:

- **Northern Lights (NO)** made an investment decision for phase 2 in April 2025. The project is scheduled to begin injection in the second quarter of 2025 and will gradually scale up injection volumes. The injection volume is expected to reach 2.3 Mt CO_2 per year in 2028. The project transports CO_2 by ship from industrial customers to a receiving terminal at Øygarden, near Bergen, for onward pipeline transport to a reservoir beneath the Troll field.

- **Greensand (DK)** is expected to begin operations in late 2025 or early 2026. The project will capture CO_2 from biomethane producers for injection into depleted petroleum fields, with a capacity of up to 0.3 Mt CO_2 per year. CO_2 will be transported by ship and injected directly from the vessels to the storage site.

- **Porthos (NL)** expects to start operations in 2026 and will collect CO_2 from several industrial sources near the port of Rotterdam. The project plan is to inject approx. 2.5 Mt CO_2 per year for 15 years in depleted petroleum fields 20 km from shore.

- **East Coast Cluster/Northern Endurance Partnership, NEP (UK)** plans to commence operations in 2028, with an injection capacity of up to 4 Mt CO_2 per year from multiple sources into an aquifer (Endurance). The project has significant scale-up potential, with the possibility of increasing capacity to up to 23 Mt CO_2 per year. Equinor is a partner in NEP and is involved in the Net Zero Teesside gas-fired power project (860 MW with CCS), which has reached an investment decision and will supply CO_2 to the Endurance storage facility.

- **HyNet in Liverpool Bay (UK)** is scheduled to start up in 2028, with an injection capacity of up to 4.5 Mt CO_2 per year from multiple sources in depleted gas fields. The project has significant potential for upscaling, with indications that injection capacity could increase to approximately 10 Mt CO_2 per year.

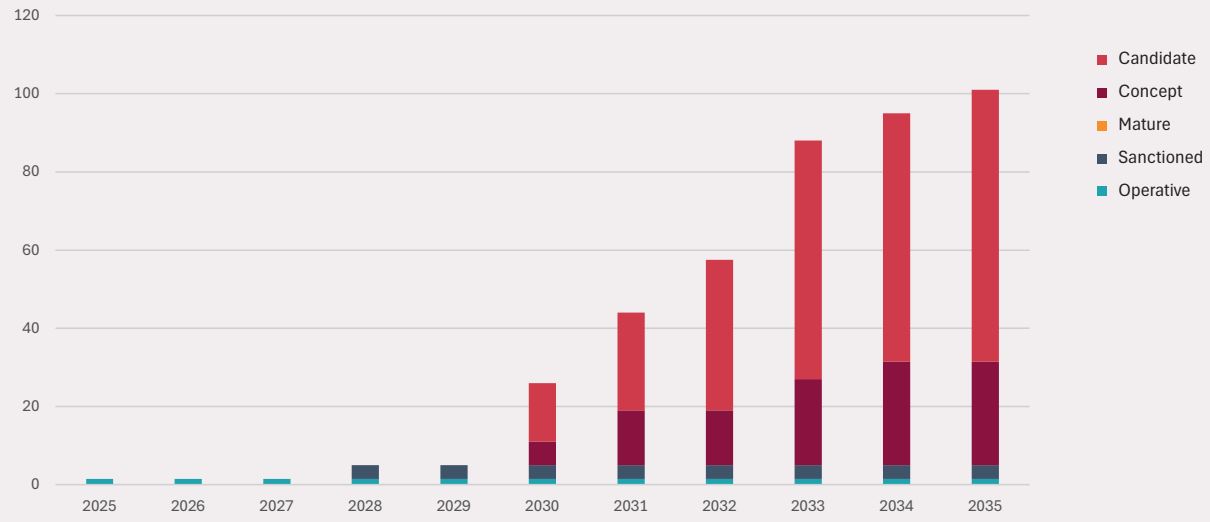
Over the past year, the EU has continued to work on developing a European market for carbon management

4.3.3 The forecast for injection capacity on the NCS shows an annual feasible potential of 25 Mt CO_2 by 2030

Figure 29 presents a summary of the potential annual injection capacity on the Norwegian continental shelf up to 2035. The forecast is based on planned injection capacity associated with awarded storage licences. Prior to 2030, Northern Lights is the only project expected to commence injection operations, with a total injection capacity of 5 Mt CO_2 per year. The other licences aim to start injection in the period 2030–2034, with a gradual increase in capacity in the subsequent years. If CO_2 injection is realised for all awarded licences according to schedule, the licences have the potential to achieve a total injection capacity of approximately 25 Mt CO_2 per year by 2030 and around 100 Mt CO_2 per year by 2035. However, it should be noted that all 12 exploration licences are currently at the *Candidate* or *Concept* maturity levels, indicating considerable uncertainty regarding how many of the projects will ultimately be realised.

FIGURE 29 FORECAST FOR FEASIBLE INJECTION CAPACITY IN PLANNED LICENCES FOR CO_2 STORAGE ON THE NORWEGIAN CONTINENTAL SHELF[14] (Mt CO_2)

Source:KonKraft



14 This report utilises a different project maturity categorisation than previous status reports. The updated categorisation aligns with the maturity categories used by the Norwegian Offshore Directorate in the PDO/PIO guide and provides a more verifiable indication of project maturity. Forecasts from KonKraft's previous status reports will therefore not be directly comparable with this year's forecast. In this report, we have used the following definitions to assess project maturity – listed from the most to the least mature projects:
Operational – Injection has commenced in the licence area.
Sanctioned – Milestone where the licensees make an investment decision that results in the submission of a PDO or PIO.
Mature – Milestone where the licensees decide to continue studies for one concept, leading to an implementation decision.
Concept – Milestone where the licensees have identified at least one technically and financially feasible concept, forming the basis for initiating studies leading to concept selection.
Candidate – An exploration licence has been granted, and feasibility studies indicate no significant obstacles to proceeding with further assessments to confirm the geological suitability of the reservoir and the commercial viability of the project.

4.3.4 Constraints and needs

Key constraints

Investments in maturing storage and infrastructure on the Norwegian continental shelf currently entail high risks compared to uncertain and moderate expectations of future returns.

In the short term, the expected development of quota prices and carbon removal credit prices is too low to form the basis for commercial value chains for carbon management. Without assurances of instruments that secure profitability, emitters are reluctant to make investment decisions and enter into contracts for the delivery of CO_2 to storage operators.

A limited domestic market for carbon capture in Norway, combined with factors such as long distances to emitters and support mechanisms tied to storage facilities in the EU designated as strategic net-zero projects, contribute to weakening the competitiveness of storage facilities on the Norwegian continental shelf.

There remains a lack of clarity regarding the applicable tax regime for the activities, requirements for financial security, and acceptance criteria for leakage risk.

Industry needs

The support framework should be tailored to help reduce financial risk and facilitate maturing solutions to ensure necessary scale, learning, and cost reductions for both carbon capture and storage. The focus should be on the entire CCS value chain, implementing measures to strengthen the business foundation for emitters that provide incentives for capture and storage.

Carbon capture and infrastructure projects in Norway must mature concurrently towards investment decisions, and storage operators must be offered contracts of an acceptable duration. This may require public-private cooperation. If the government coordinates procurement of storage services, a guaranteed minimum annual income must be ensured for the duration of the storage capacity reservation.

The tax framework for carbon storage on the Norwegian continental shelf should, in accordance with the tax ability principle, be based on actual profits and reflect the revenue and cost profile of the storage facilities.

Acceptable risk criteria for carbon storage in suitable reservoirs should be evaluated in light of the actual risk of environmental impact and balanced against the broader societal benefits of carbon storage. Similarly, the requirements for financial security should be proportionate to the financial exposure associated with the storage facility's risk profile.

The support framework should be tailored to help reduce financial risk and facilitate maturing solutions to ensure necessary scale, learning, and cost reductions for carbon capture and storage

4.4 Seabed minerals

4.4.1 Trade conflicts and the dominance of certain countries call for urgent action to secure the supply of critical minerals

An escalation in trade policy conflicts has clearly influenced mineral markets over the past year. In December 2024, China restricted exports of three key minerals for semiconductor production to the US (gallium, germanium, and antimony). Simultaneously, China introduced additional export controls on graphite, requiring exporters to obtain authorisation to ship graphite materials, including those critical to electric vehicles and battery production. In February 2025, Chinese authorities imposed export controls on an expanded list of materials, including tungsten, tellurium, bismuth, indium, and molybdenum — minerals primarily used in the defence sector and high-tech applications. In April 2025, in response to major uncertainty regarding the introduction of US tariffs, China implemented reciprocal tariffs on US goods and imposed strategic export restrictions on rare earth elements, permanent magnets, and other finished metal products that are challenging to substitute.

In its February 2025 analysis, the International Energy Agency (IEA) highlights the importance of accelerating measures to ensure the long-term security of supply for critical minerals. The IEA Critical Minerals Security Programme was established in 2022 to support governments in strengthening critical mineral security, providing a platform for countries to share best practices, coordinate actions in response to risks and emergencies, and develop strategies to promote supply diversification. As part of the programme, the IEA held a first-of-its-kind critical minerals security exercise in December 2024. The exercise focused on enhancing emergency preparedness, expediting diversification and accelerating the implementation of strategic policy measures to mitigate critical mineral supply risks.

4.4.2 Increased extraction of metals and minerals is crucial for the energy transition

To achieve the objectives of net zero emissions, society must undergo a comprehensive transformation that entails large-scale development and widespread deployment of low and zero-emission technologies. A diverse range of minerals and metals is essential for everything from wind turbines, solar panels, electric vehicles, fuel cells, and battery storage systems. The type and quantity of minerals required vary across different technologies and within specific technologies (e.g., battery chemistries in electric vehicles), as illustrated by the International Energy Agency's compilation in Figure 30.

In addition to the increasing demand for minerals and metals driven by the climate transition, the defence industry's need for many of the same raw materials has risen due to rearmament amid heightened geopolitical tensions. Global mineral value chains are frequently dominated by a few countries, and the value chains are vulnerable to abrupt shifts in trade policies or emerging conflicts.

4.4.3 Norwegian seabed minerals can help strengthen the security of supply for strategically important raw materials

The EU is highly dependent on imports for several mineral and metal value chains. Due to rising trade policy tensions in recent years, the EU has identified key vulnerabilities and implemented targeted measures to mitigate their impact. The EU has identified minerals essential for societal development, industry, technological advancement, and the energy transition.
It regularly publishes two lists of key minerals: one for critical raw materials, with a higher risk of supply disruption, and a shorter list for raw materials of strategic importance. Norwegian waters contain 17 of the 22 minerals listed as strategic raw materials by the EU, including four of the six rare earth elements used in permanent magnets essential for climate technologies and defence applications. Norway is also Europe's largest producer of primary aluminium, which appears on both lists.

FIGURE 30 MINERALS REQUIRED BY DIFFERENT ENERGY TRANSITION AND LOW EMISSION TECHNOLOGIES

Source: IEA

	Copper	Cobalt	Nickel	Lithium	Rare earth minerals	Chromium	Zinc	Platinum Metals	Aluminium
Solar panel (PV)	●	●	●	●	●	●	●	●	●
Wind	●	●	●	●	●	●	●	●	●
Hydropower	●	●	●	●	●	●	●	●	●
Bioenergy	●	●	●	●	●	●	●	●	●
Geothermal energy	●	●	●	●	●	●	●	●	●
Nuclear energy	●	●	●	●	●	●	●	●	●
Power grid	●	●	●	●	●	●	●	●	●
Electric vehicles/ battery	●	●	●	●	●	●	●	●	●
Hydrogen	●	●	●	●	●	●	●	●	●

Importance: High ● Medium ● Low ●

Through initiatives such as the *Critical Raw Materials Act* and the *Net Zero Industry Act*, the EU wants to prioritise European projects for mineral activities, both extraction and processing. As regards mineral activities on the seabed, the European Commission has expressed a need for more research and knowledge about the effects of extraction on the environment, biodiversity, and socio-economic conditions before such activities can proceed, in order to limit harmful impact on the marine environment. Norway has initiated preparatory efforts to map the resource potential and evaluate environmental impact. The development of the seabed minerals industry in Norway may help strengthen the security of supply of key value chains. In collaboration with the universities of Bergen and Tromsø, the Norwegian Offshore Directorate participated in three research expeditions in 2024. The expeditions provided an improved overview and knowledge of the Mohns Ridge and the Greenland Sea, indicating higher potential for sulphide deposits and prospective manganese crust areas.

So far, the resource potential of sulphide deposits has been estimated at about 40 per cent of the crusts, although they contain a variety of minerals. The sulphide deposits contain some cobalt but are primarily composed of copper and zinc, whereas the manganese crusts mainly consist of manganese, magnesium, and titanium. The results help to identify and confirm areas of interest for mineral exploration by providing a better understanding of the geological processes shaping the sea areas within the opening area.

4.4.4 Several regulatory frameworks must be in place before seabed mineral extraction can begin

Seabed mineral activities are currently limited on a global scale, and mineral extraction from the seabed requires the formulation of appropriate regulations and frameworks. Based on Report to the *Storting No. 25 (2022–2023) Mineral Activities on the Norwegian Continental Shelf* of June 2023, the Norwegian government formally decided, in April 2024, to open up an area in the Norwegian Sea and the Greenland Sea for mineral activities. The next steps in the opening of mineral activities on the Norwegian continental shelf will be to conduct the first licensing round, continue the state mapping of mineral resources, and establish the relevant regulations. As early as June 2024, the first licensing round was submitted for consultation, with the aim of awarding the initial licences in the first half of 2025. The government's mapping of the areas in question has continued, while the actual licensing process has been postponed during this parliamentary term.

15 IEA (2022), The Role of Critical Minerals in Clean Energy Transitions.

When the first licensing round for mineral activities on the Norwegian continental shelf resumes, a work programme must be established for the licences granted. In connection with the Norwegian Offshore Directorate's preparation of a proposal for a work programme, the Ministry of Energy has requested input from other government agencies, including the Norwegian Environment Agency and the Norwegian Institute of Marine Research. The initial plans for seabed mineral extraction will be submitted to the Norwegian parliament as a proposition before the Ministry approves the extraction plan. The government will present the initial extraction plans to the parliament before the Ministry of Energy approves any such plans.

In parallel with preparing a work programme for the licensing process for seabed mineral activities, the Norwegian Offshore Directorate and the Ministry of Energy have introduced regulatory proposals that must be in place to support industry development. In February, the Norwegian Offshore Directorate issued a proposal for new regulations on data collection and documentation of mineral activities on the NCS under the Petroleum Act. The proposed regulations are therefore largely based on corresponding provisions in regulations established under the Petroleum Act.

- Regulations pursuant to the Seabed Minerals Act
- Regulations pursuant to the Seabed Minerals Register
- Regulations pursuant to the Seabed Minerals Act, Chapter 8 regarding compensation to Norwegian fishermen

The draft regulations pursuant to the Seabed Minerals Act propose delegating authority to the Norwegian Offshore Directorate to issue more detailed regulations in specific areas. A fifth regulation, currently under consultation until mid-May, has been submitted by the Norwegian Ocean Industry Authority and concerns safety and working environment in offshore mineral activities.

The Ministry of Energy states in the consultations on the three regulations above that: "The potential extraction of mineral deposits is still some time away from realisation and is contingent on technological development and a thorough assessment of the environmental impact of extraction. The Ministry will therefore, through regulations, establish the provisions necessary for the initial phase of the activity, during which licences will be granted and surveys and data collection conducted. This reflects the phased approach to the development of the seabed mineral industry."

4.4.5 Offshore industry experience and technology are essential to developing a leading offshore minerals industry

In line with the Storting report on mineral activities, the government has established a targeted and comprehensive programme to strengthen knowledge of deep-sea environmental and natural assets, as well as the prerequisites for the sustainable extraction of seabed minerals. There is significant potential for transferring knowledge and technology from the oil and gas industry, which will play a key role in both exploration and extraction. Further research is needed across the entire value chain — from geological surveys to efficient and sustainable extraction — including studies on the impact on the external environment and the ecosystem.

In their geological surveys and mapping of the seabed, the Norwegian Offshore Directorate and Norwegian universities have utilised technology developed by the oil and gas industry, including remotely and autonomously operated subsea vehicles, drilling technology, echo sounding equipment, and vessels equipped for the deployment of such advanced equipment.

4.4.6 Constraints and needs

Key constraints

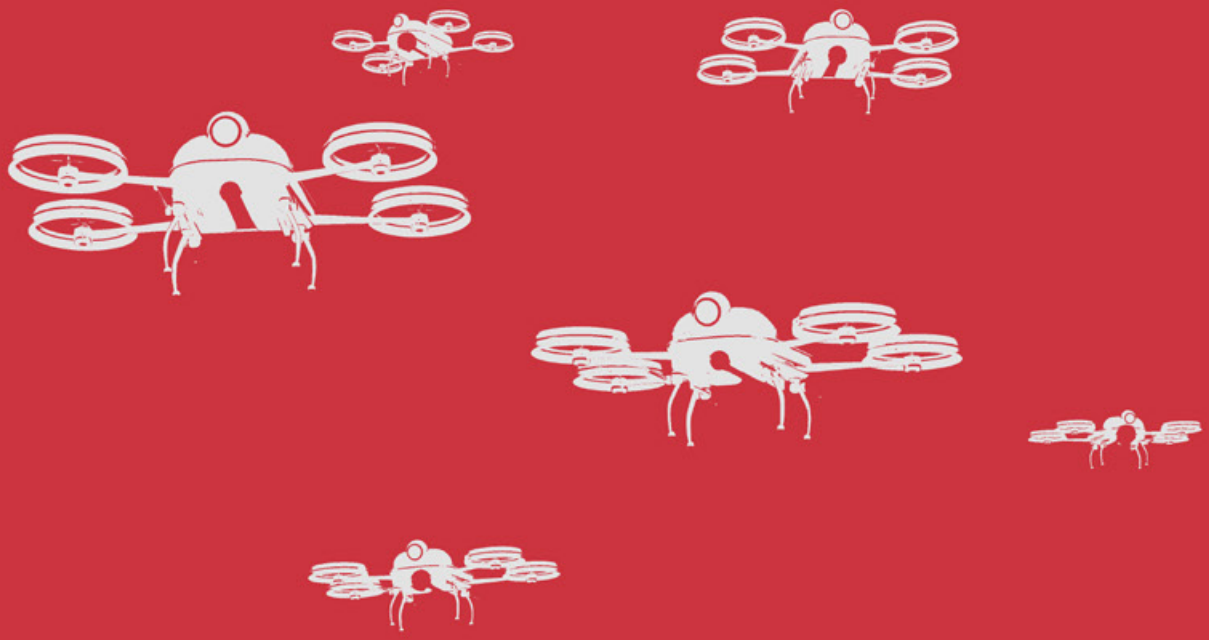
Experience from the establishment of mineral activities on the mainland shows that the processes can take a long time. It is concerning and increases uncertainty for stakeholders wishing to invest in seabed minerals that the annual government budget processes cast doubt on the authorities' efforts to expedite project licensing and facilitate seabed mineral activities.

Industry needs

The authorities are making good progress in establishing the regulations necessary to conduct seabed mineral activities, although considerable work remains on certain parts of the regulatory framework. It is essential that the authorities maintain the current pace of framework development.

Predictability is important, and the industry evaluates the activities over a longer-term horizon than the survey and data collection phase. Consequently, the process of establishing regulations for the next phase should commence immediately.

The immediate establishment of a working group, consisting of public authorities and industry representatives, is proposed to examine opportunities and challenges in aligning the value chains for mined and landed ore.



The significant geopolitical changes over the past five years have had profound consequences for the prioritisation of European energy policy

5

TROUBLED WATERS

5.1 Geopolitical developments are putting pressure on European energy supply – new priorities are needed

The significant geopolitical changes over the past five years have had profound consequences for the prioritisation of European energy policy. The first von der Leyen Commission of 2019, made climate its flagship cause, introducing the European Green Deal alongside ambitious targets to reduce emissions and transform the European economy. Although climate ambitions remain steadfast, there is now an equally strong emphasis on security, self-sufficiency, military capacity, and economic competitiveness. There are three key reasons for this shift in priorities at the EU level:

- **Gas crisis and high energy prices**. Russia's invasion of Ukraine caused a sharp reduction in gas deliveries to the EU and consequently high prices. The gas crisis highlighted the unacceptably high risk linked to the EU's dependence on energy imports. In response to this crisis, the Commission launched the REPowerEU plan, which aims to phase out Russian gas through accelerated renewable energy development, improved energy efficiency, and diversification measures.

- **Reduced confidence in global supply chains.** In an increasingly tense geopolitical context, the risks associated with value chains that rely on a well-functioning international trade regime have intensified, and uncertainty surrounding the framework conditions for international trade has increased. Consequently, the EU considers it important to strengthen security of supply and enhance its own capacity across the entire value chain for strategic raw materials and related products.

- **Weakened innovation capacity and competitiveness.** The Draghi Report, published in the autumn of 2024 and authored by Mario Draghi, the former Italian Prime Minister and European Central Bank Governor, was commissioned by the European Commission to assess Europe's competitive position and identify measures needed to strengthen competitiveness, particularly against China and the US. The report identifies high energy prices and excessive regulation as key obstacles to growth for European companies, and points to a significant innovation gap in Europe. Strengthening European innovation and competitiveness will be essential to securing employment opportunities, driving economic development, and establishing low and zero-emission energy and industrial value chains for the net-zero transition.

Moreover, increased investment in the defence industry may limit public funding for low-emission solutions.

In energy policy, this is often referred to as the "Energy Policy Trilemma", where a balance must be struck between three overarching dimensions:

- Energy equity: An efficient and affordable energy system that ensures low energy costs for consumers, businesses, and industry.
- Energy security: An energy system characterised by a high quality of supply and resilience to external pressure or actions.
- Environmental sustainability: An energy system with minimal adverse effects on climate, the environment, and other sustainable development targets.

There are examples of measures that can help strengthen all three dimensions, but in most cases, trade-offs are necessary. For example, coal-fired power can be affordable but has significant negative environmental impact, while imported gas, although also an affordable energy source, can increase dependence on the exporting country.

In recent years, a greater focus on security of supply and enhanced competitiveness with the US and China has shifted energy policy priorities. For the Norwegian oil and gas industry, shifts in European priorities within the energy trilemma will present both risks and opportunities. The illustration below summarises some general risks and opportunities associated with the downgrading or upgrading of various considerations within the energy trilemma.

Examples of key risks and opportunities for stakeholders on the NCS, depending on whether the various considerations in the energy trilemma have higher or lower priority.

ENERGY EQUITY

Risks associated with lower priority

- **High costs and instability in grids enforcing implementation**
- **Lack of demand and willingness to invest in large-scale low and zero-emission infrastructure**
- **Lack of support for climate policy**

Opportunities associated with prioritisation

- **Increased acceptance for further utilisation of petroleum resources.**

ENVIRONMENTAL SUSTAINABILITY

Risks associated with lower priority

- **Downscaling and postponement of offshore wind, CCS and hydrogen projects**
- **Costs of acute and chronic climate effects**

Opportunities associated with prioritisation

- **Establishment of new low-carbon value chains on the NCS**
- **Larger market for energy efficient technologies and solutions**

ENERGY SECURITY

Risks associated with lower priority

- **Heightened risk to activity on the NCS**
- **Supply chain constraints and increased supply chain costs contributing to higher energy prices.**

Opportunities associated with prioritisation

- **Development and export of maritime and digital technologies for emergency preparedness and security applications.**
- **Seabed mineral extraction and value chain establishment**

5.2 As the Norwegian continental shelf becomes increasingly important for EU security of supply, the risk of foreign influence grows

Through its offshore gas production and pipeline deliveries, Norway has further strengthened its role as a key partner in ensuring the EU's energy security, while the EU remains Norway's primary energy customer. Increased unpredictability and rising geopolitical tensions have reshaped the threat landscape in recent years, presenting new challenges for the Norwegian continental shelf related to the protection of energy supply chains against security threats. This link is particularly evident for traditional energy carriers such as oil and gas, but it can also have implications for emerging low and zero-emission solutions such as blue hydrogen and offshore wind.

In the autumn of 2022, the Ministry of Energy decided that Equinor, Gassco and Petoro would be subject to certain provisions of the Norwegian Security Act. The decision was based on the companies' role in delivering the following fundamental national functions: "pipeline transport of natural gas to Europe" and "control over petroleum production on the Norwegian continental shelf". A complete or partial loss of these functions will have consequences for the state's ability to safeguard national security interests and its obligations as a reliable energy supplier.

Norway's location in the High North and its importance as an energy supplier to Europe, combined with its leading role in maritime technologies, mean that operators on the Norwegian continental shelf may face increased exposure to foreign intelligence, influence, espionage, and sabotage in the future.

5.2.1 International developments affect energy markets and the operating conditions for the Norwegian continental shelf as an energy supplier

In recent years, threat assessments related to Norwegian targets have shown a rapidly developing negative trend. In 2023, the Norwegian Police Security Service (PST) stated in its open threat assessment (NTV 2023) that sabotage against Norwegian targets was unlikely. In 2024, PST assessed that sabotage against Norwegian targets was possible, while in the 2025 assessment, PST considers it likely that Russian intelligence will attempt to carry out sabotage operations against targets in Norway during 2025. The purpose of any such operations will be to prevent Norwegian deliveries to Ukraine or to negatively influence public opinion in favour of continued support. The targets of potential actions in Norway are likely to be similar to those observed in Europe. Moreover, Norwegian-owned energy infrastructure may also be targeted for sabotage. In connection with the Norwegian National Security Authority's (NSM) 2025 risk assessment, the Director General of NSM stated that: "It is no longer a question of if, but when it happens." This represents a fairly dramatic development in the threat landscape over the past two years, with the petroleum industry at its centre.

Offshore energy infrastructure has been targeted in several sabotage incidents in recent years. The explosions at Nord Stream 1 and 2 in the Baltic Sea are a well-known example, but there have also been multiple incidents involving serious damage to communication and energy infrastructure.

According to PST's threat assessment, the Russian intelligence service has demonstrated an increased willingness to take risks in conducting sabotage operations over the past two years, and it is considered likely that they will initiate such operations against targets in Norway in 2025. Such acts of sabotage have often been carried out in support of Ukraine, targeting property and logistics infrastructure. However, PST also points out that Norwegian-owned energy infrastructure may likewise be targeted.

As Norway assumes an increasingly central role as an energy supplier to Europe, Norwegian energy infrastructure is becoming a more attractive target for foreign actors. The energy infrastructure on the Norwegian continental shelf comprises a network of more than 8,800 kilometres of pipelines, and several installations are powered from shore. Additionally, some complex industrial operation systems are controlled from onshore facilities via communication cables. These systems may be susceptible to hybrid threats, including cyber-attacks and sabotage.

Cyber-attacks can affect the operation of oil and gas installations and the implementation of new technologies offshore. According to NSM, cyber incidents in the petroleum industry accounted for only one per cent of the total registered cyber incidents in 2025, while businesses operating in advanced technology and commercial industries ("high technology and industry") such as IT companies, telecommunications, biotechnology, and the pharmaceutical industry accounted for 63 per cent.

5.2.2 The NCS is at the forefront of technological development – Norwegian companies may be exposed to foreign influence

Norwegian Police Security Service anticipates attempts to covertly acquire Norwegian goods, services, and technologies, potentially by state actors such as Russia, China, and Iran. Technologies and systems originally developed for civilian purposes may attract interest from foreign states seeking to utilise or further develop these solutions for military purposes. Russia, in particular, is under pressure to secure access to multi-use technologies following several years of sanctions and needs related to warfare.

The industry supplying the Norwegian continental shelf is an international leader in maritime technologies, with applications in areas such as communication, navigation, sensors, machine learning, and propulsion systems. Companies and individuals are increasingly attractive and vulnerable targets for foreign intelligence activities, including companies in the petroleum and energy sectors, electronic communications, marine technology, data centres, and research and education. Recent developments indicate that smaller companies and suppliers to larger firms are increasingly exposed to espionage, cyber operations, security-compromising acquisitions, insider recruitment, and influence operations.

5.3 Geopolitical independence and local value chains drive energy and transition costs

A number of events in recent years have contributed to heightened cost pressure in Europe. The phasing out of Russian gas following the invasion of Ukraine resulted in significantly higher energy costs and caused bottlenecks in several international value chains related to renewable power and grid infrastructure. At the same time, the EU has pursued increasingly ambitious climate and sustainability policies. Two developments that could put further pressure on the European economy in the future are military rearmament as a result of the war in Ukraine and a strategic desire to strengthen European military capacity.

An escalation of global trade conflicts will contribute to rising costs. Regardless of whether an escalation occurs, the increased uncertainty surrounding the stability of global trade, combined with climate considerations, has prompted the EU to strengthen and secure its own value chains, from raw materials to processing capacity. This will lead to higher costs, as new industrial capacity must be built and developed in areas that have not previously been competitive in the global market. For NCS players, this development could result in significantly higher supplier costs and increased uncertainty about the pace and direction of the energy transition.

5.4 A close Norwegian-European partnership for long-term development and value creation on the shelf

The EU aims to enhance self-sufficiency and resilience in response to an increasingly volatile and uncertain world. In this regard, it is critical for the EU to ensure access to affordable, low-emission energy, raw materials for existing and emerging industries and value chains that are less reliant on supplies from other geopolitical blocs. The increasingly tense security situation calls for greater focus on preparedness and security than in the past.

Against this backdrop, the Norwegian continental shelf and offshore industry can play a key role in helping the EU achieve its future ambitions in energy, raw materials, and security.

Norway can be a reliable supplier of low-emission energy. Norway's role as a reliable supplier of oil and gas has been significantly reinforced in recent years, as the NCS has increased gas production to help meet the EU's import needs in connection with the phase-out of Russian supplies. This role will be further strengthened in the coming years as the EU works towards a complete phase-out of Russian gas by 2027. Low upstream greenhouse gas emissions compared to other import sources will be an important competitive advantage going forward. So will Norway's political stability and predictable framework. Furthermore, the EU is facing a growing need for low or zero-emission energy. Norway is part of the European energy market and is connected to several EU countries through interconnectors.

Looking ahead, the EU highlights the North Sea as a key energy hub, with large-scale development of offshore wind power and a meshed offshore grid. This represents a significant opportunity for Norwegian–European cooperation in renewable energy.

Norwegian mineral extraction can strengthen security of supply for several critical raw materials. Amid growing pressure from escalating global trade tensions, the EU has identified vulnerabilities in the supply of several raw materials that are critical for succeeding with the green industrial development. Going forward, the EU will intensify its efforts to promote European extraction and processing of key metals and minerals for societal development, industry, technological advancement, and the energy transition. Several of the strategic raw materials are located in Norwegian waters, and the development of subsea mineral activities on the Norwegian continental shelf can help establish European value chains while securing new industries and jobs both offshore and onshore. The Draghi report identified offshore mineral extraction as an industry with significant growth potential. The European Commission has emphasised the need for further research on and knowledge about the potential impact of seabed mineral activities before extraction can begin – to minimise harm to marine life.

Norway can serve as a key partner in protecting maritime energy infrastructure. In an increasingly tense security situation, securing critical infrastructure remains a top priority for the EU. The EU is working on several initiatives, including new action plans with stricter procedures for services critical to society, such as energy, as well as enhanced public-private cooperation and a dedicated action plan for the protection of subsea cables. Players on the NCS have extensive experience in developing and applying maritime and digital technologies for monitoring, warning, and management, as well as in emergency preparedness routines. An increased European focus on emergency preparedness and cooperation regarding offshore infrastructure could therefore enhance opportunities to export Norwegian expertise and technology.

Close cooperation between the EU and Norway is key to success. To fully realise Norway's potential as a reliable supplier of energy, raw materials, and equipment, it is crucial that Norway and Norwegian industry players are regarded as part of the EU's single market and can compete on equal terms with other European players. This entails that Norway should be included and fully participate in new EU policy instruments aimed at stimulating the development and strengthening of European value chains through support schemes, targets, and regulatory requirements.

To fully realise Norway's potential as a reliable supplier of energy, raw materials, and equipment, it is crucial that Norway and Norwegian players are regarded as part of the EU's single market

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APPENDIX

Categorisation of fields/facilities for power consumption forecasting

Table 1 shows the individual projects included in the power forecast as shown in chapter 2.3.

Operational	Connection approved	Connection applied for*	Identified– not* applied for
Kårstø	Yggdrasil	Goliat satellites	New compressor at Kollsnes
Utsira	Oseberg gas capacity upgrade including partial electrification		Peon
Valhall	Melkøya CO_2 reduction		
Kollsnes	Njord and Draugen		
Troll A	Kårstø emission reduction measures		
Martin Linge	Halten Nord		
Gjøa, Vega, Nova, Duva	Balder-Grane fields		
Nyhamna, including Ormen Lange phase 3	Tampen		
Melkøya LNG			
Goliat			
Troll Vest			
Sture			

*Goliat satellites, new compressor at Kollsnes and Peon do not have emission profiles

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