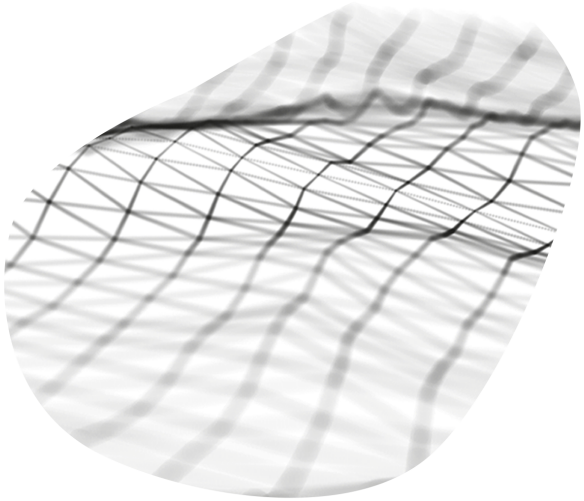
# The Shelf in 2024



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# Summary

"Since the transport of gas from Russia through Ukraine ended at year-end, gas from Norway has become even more important," says Torgeir Stordal, Director general of the Norwegian Offshore Directorate.

Gas production reached a record-high in 2024. A total of 124 billion standard cubic metres ($Sm^3$) was sold. In comparison, 122.8 billion $Sm^3$ of gas was sold in 2022.

"Electricity exports are a hot topic these days. Energy content of our gas exports are nearly 100 times larger than net electrisity export," he says.

## Summarising the year on the shelf

"The Shelf in 2024" is a summary of activity on the Norwegian continental shelf (NCS) over the past year: Exploration results and annual production figures, and investment and production forecasts for the next five years.

Overall production will remain at a high and stable level. In 2024, it reached about 240 million standard cubic metres of oil equivalent (mill scm o.e. - 1510 barrels o.e.). This is the highest level since 2009.

Moving forward, production is expected to remain at a stable, high level before a gradually decrease toward the end of the 2020s.

Exploration activity was also high in 2024. Most of the discoveries are small, but several are being considered for development tied back to existing fields.

"We've seen that even small discoveries can generate substantial values. Our analyses of exploration activity on the NCS also show that exploration is highly profitable for the community," Stordal says.

The investment level on the NCS is still high, and the Norwegian Offshore Directorate expects a number of new development plans in the upcoming years.

## Exploration and investments are needed

The Directorate expects overall production to decline in the later 2020s. In order to slow this decline, exploration will need to take place close to infrastructure and in more frontier areas, in addition to more investments in fields, discoveries and infrastructure. Failure to invest will lead to rapid dismantling of the petroleum activities.

There is significant and rising interest in secure storage of $CO_2$ on the NCS. A total of 11 licences have been awarded; 1 exploitation licence and 10 exploration licences. Offers for two additional exploration licences were published in December, with awards expected in 2025.

In 2025 the Norwegian Offshore Directorate will continue mapping mineral resources on the seabed and the environmental conditions in relevant areas. The authorities want this to be an incremental development and have adopted a precautionary approach to the activity. Acquiring additional knowledge is an important part of this effort.

# Production, operating fields and investments

Read about:


- Record-high gas production
- Investments remain high
- Awards in pre-defined areas (APA)
- Several projects and developments are expected
- Production start-up and continuation
- Emissions are coming down


## Record-high gas production

Gas production from the NCS reached a record-high level in 2024. A total of 124 billion standard cubic metres ($Sm^3$) was sold. In comparison, the previous record of 122.8 billion $Sm^3$ of gas was set in 2022. The high production in 2024 was caused by high regularity on the fields and increased capacity following upgrades in 2023.

Gas constitutes more than half of all production on the shelf. Most of the oil and gas is exported to Europe.

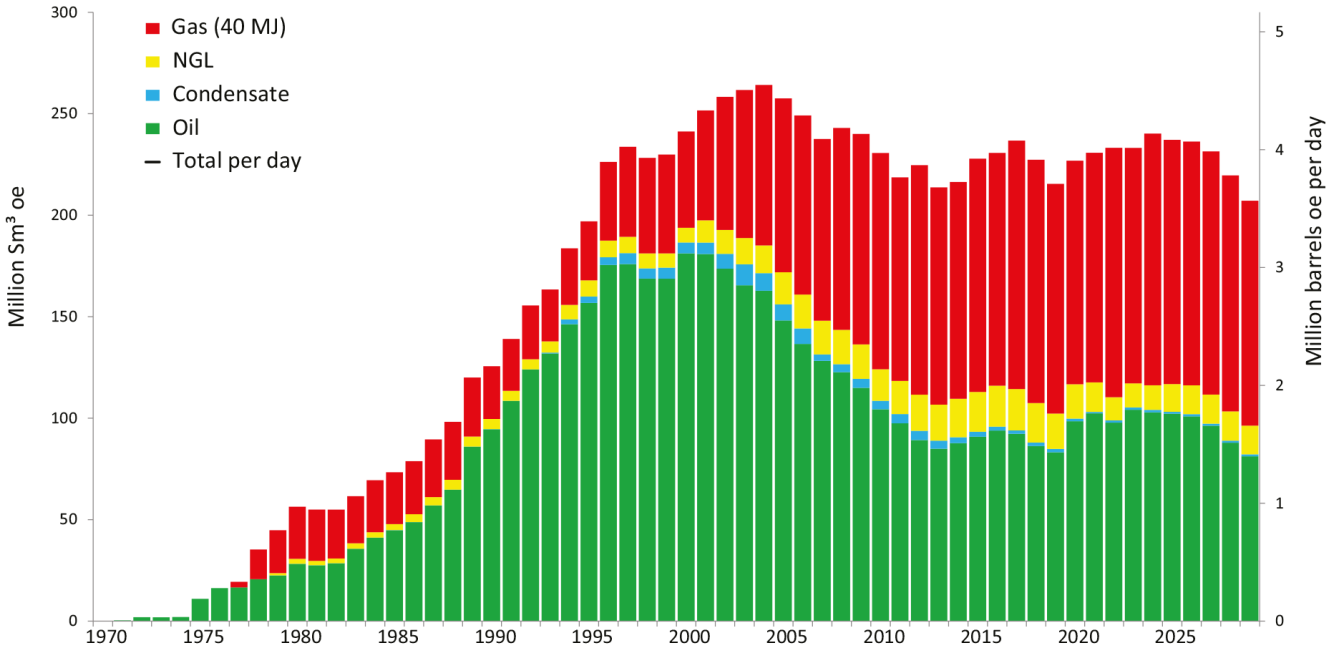
Overall production will remain at a high and stable level. In 2024, it reached about 240 million standard cubic metres of oil equivalent ($MSm^3$ o.e.). This is the highest level since 2009. Production from the Troll and Johan Sverdrup fields in the North Sea contributes about 37 per cent of overall production from the NCS.

### High and stable total production

Production on the shelf is expected to remain at a stable, high level over the next two-to-three years, and will then gradually decline towards the end of the 2020s.

At year-end 2024, there were 94 fields in operation on the Norwegian shelf. The Hanz and Tyrving fields in the North Sea came on stream, and no fields were shut down over the previous year.

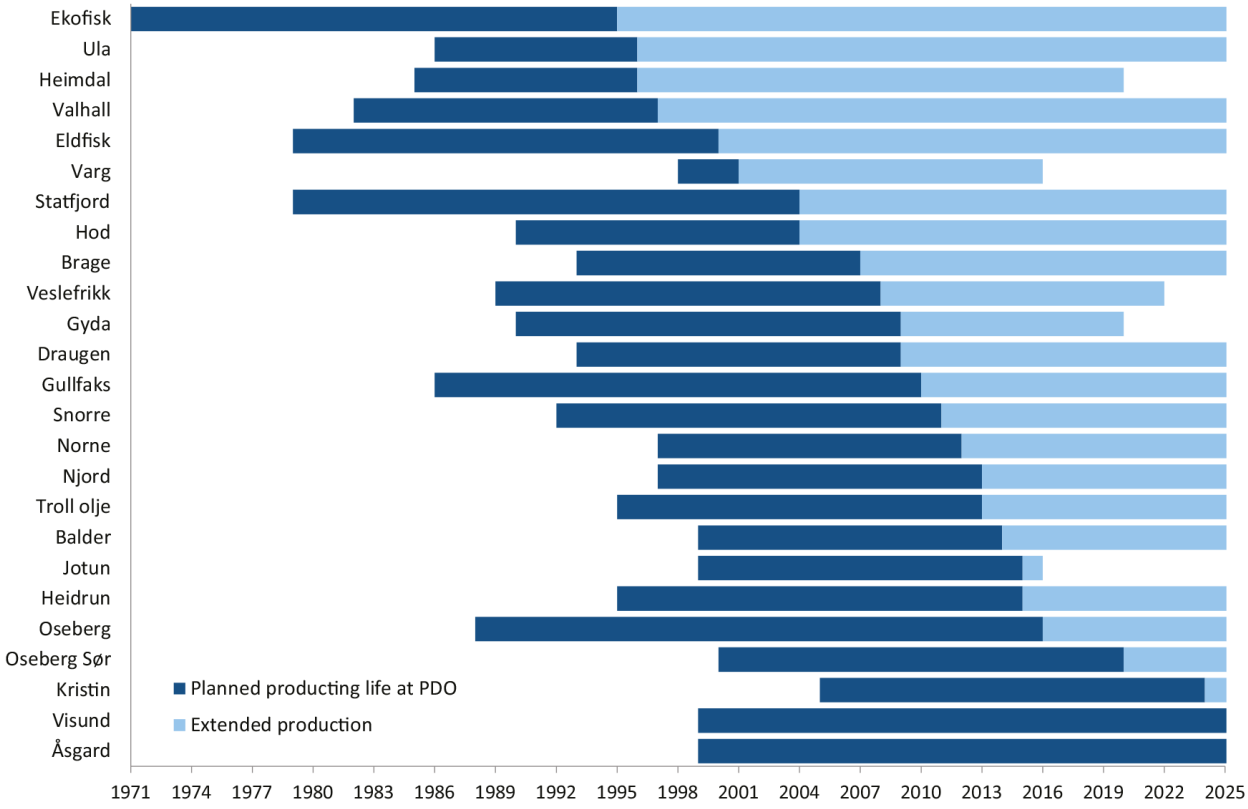
The Castberg field in the Barents Sea is expected to come on stream in the first quarter. This will be important for oil production and further development of the Barents Sea as a petroleum province. Several new fields are expected to come on stream over the next few years, but many will also shut down.




Some previously shut-down fields are now being considered for redevelopment with a simpler development solution.

One important reason why production remains at such high levels is that the fields are producing for longer than originally planned. New and improved technology has allowed us to continuously improve our understanding of the subsurface. This has enabled the industry to further develop the fields. New development projects, more production wells and exploration in the surrounding area have helped extend the lifetimes of most fields.

The figure below shows a number of fields that are producing between 10 and 30 years longer than originally planned. Several of these fields will continue to produce until 2030, and some even to 2040. This provides a significant contribution to production and value creation on the shelf.




The Norwegian Offshore Directorate publishes preliminary production figures on a monthly basis.

## Investments remain high

In 2025, the Norwegian Offshore Directorate is expecting investments on the NCS totalling NOK 264 billion. This is an increase of 2.5 per cent from the previous year.

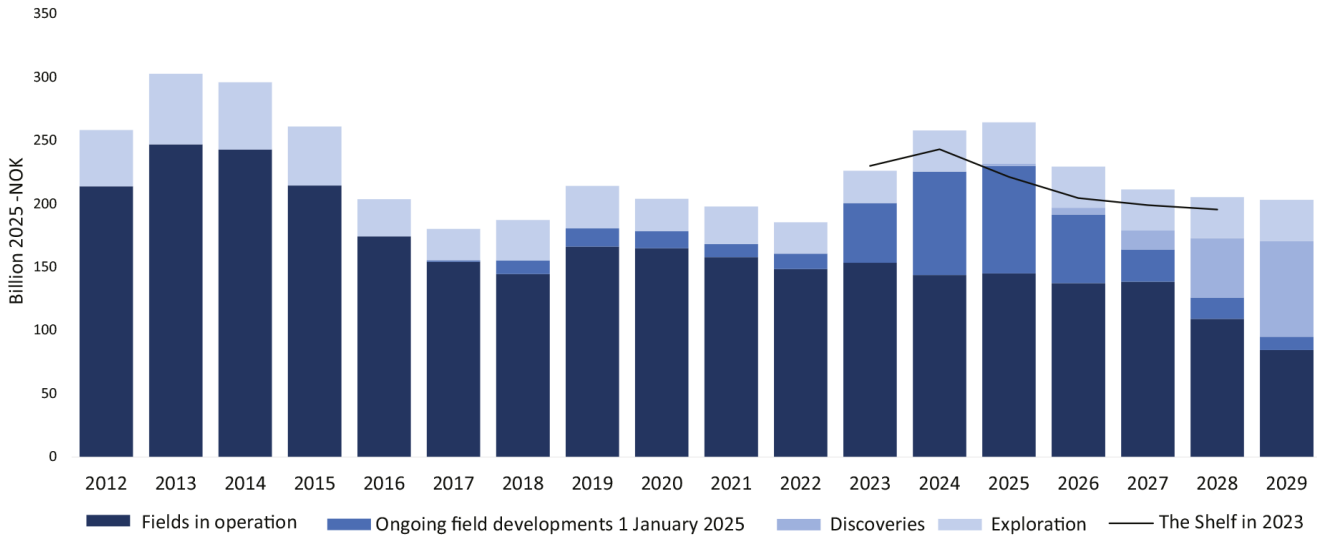
Significant activity and scarce capacity in parts of the supplier industry, a weakened Norwegian currency and growth in costs have led to higher cost and investment projections for 2024–2026 in particular, compared with what was presented at the end of 2023. Higher drilling costs per development well also contributes to a higher level of investment.

Projected investments for certain ongoing developments have also increased (Norwegian only) (Prop. 1 S, 2024 –2025, pdf).

We expect exploration activity and exploration costs to remain about the same as in 2024.

Measures to reduce emissions and discharges from petroleum activities on the NCS account for a substantial share of the investments leading up to 2030.

Despite the high level of activity in the industry, new investment decisions will be necessary to maintain activity in the future.




## Awards in pre-defined areas (APA)

In January 2024, 24 companies were offered ownership interests in a total of 62 production licences in the Awards in pre-defined areas (APA) 2023.

When the application deadline expired on 3 September, the authorities had received applications from 21 companies. In other words, all current licensees on the NCS have applied. This shows that the shelf remains an attractive province for exploration and long-term production. Offers of ownership interests in new production licences are expected to be made early this year.

## Several projects and developments are expected

The Plan for development and operation (PDO) for the Eirin field, which is located in the Sleipner area in the North Sea, was submitted in 2023 and approved in 2024. Investments in the project are estimated at about 4.2 billion 2024-NOK.

The Plan for development and operation (PDO) for the Bestla field, which is located in the Oseberg area, was approved in November 2024. Total projected investments are NOK 6.3 billion.

Several new development plans are expected over the upcoming years. Most of these are relatively small discoveries that are being developed with subsea templates or wells from existing subsea templates and tied back to existing infrastructure.

22 development projects or field developments with approved development plans were under way on the NCS at year-end (Norwegian only) (Prop. 1 S, 2024 –2025, pdf). Nine of the projects are in the North Sea, 11 in the Norwegian Sea and 2 in the Barents Sea. These projects will help keep the investment level high and slow

the underlying decline in production over the next decade. Additional development projects will also help extend lifetimes and thereby lead to improved recovery from existing fields.

The largest undeveloped discoveries are 7324/8-1 (Wisting) in the Barents Sea, 6406/9-1 (Linnorm) in the Norwegian Sea and 35/2-1 (Peon) in the North Sea. (see chapter "Resources and challenges in discoveries"). These discoveries are all being considered for development and could contribute considerable resources and values over the next few decades.

## Production start-up and continuation

The consent system (pdf) is how the authorities follow up to ensure that licensees conduct their activities in line with the regulations and previous decisions. The consent entails a verification to the effect that assumptions in the Plan for development and operation (PDO), Plan for installation and operation (PIO) and disposal decisions are fulfilled.

The table below shows consents for start up and continuation issued in 2024.

| **Field** | **Consent to** | **Commencement** |
|---|---|---|
| Troll | Commencement power from shore to Troll Vest | 7 September 2024 |
| Åsgard | Commencement Smørbukk Nord | 28 November 2024 |
| Hanz | Commencement/utilise Hanz facilities | 20 April 2024 |
| Kristin | Commencement and continuation of Kristin Sør | 7 July 2024 |
| Tyrving | Commencement and operations | 2 September 2024 |
| Johan Castberg | Commencement and continuation | First quarter 2025 |

## Emissions are coming down

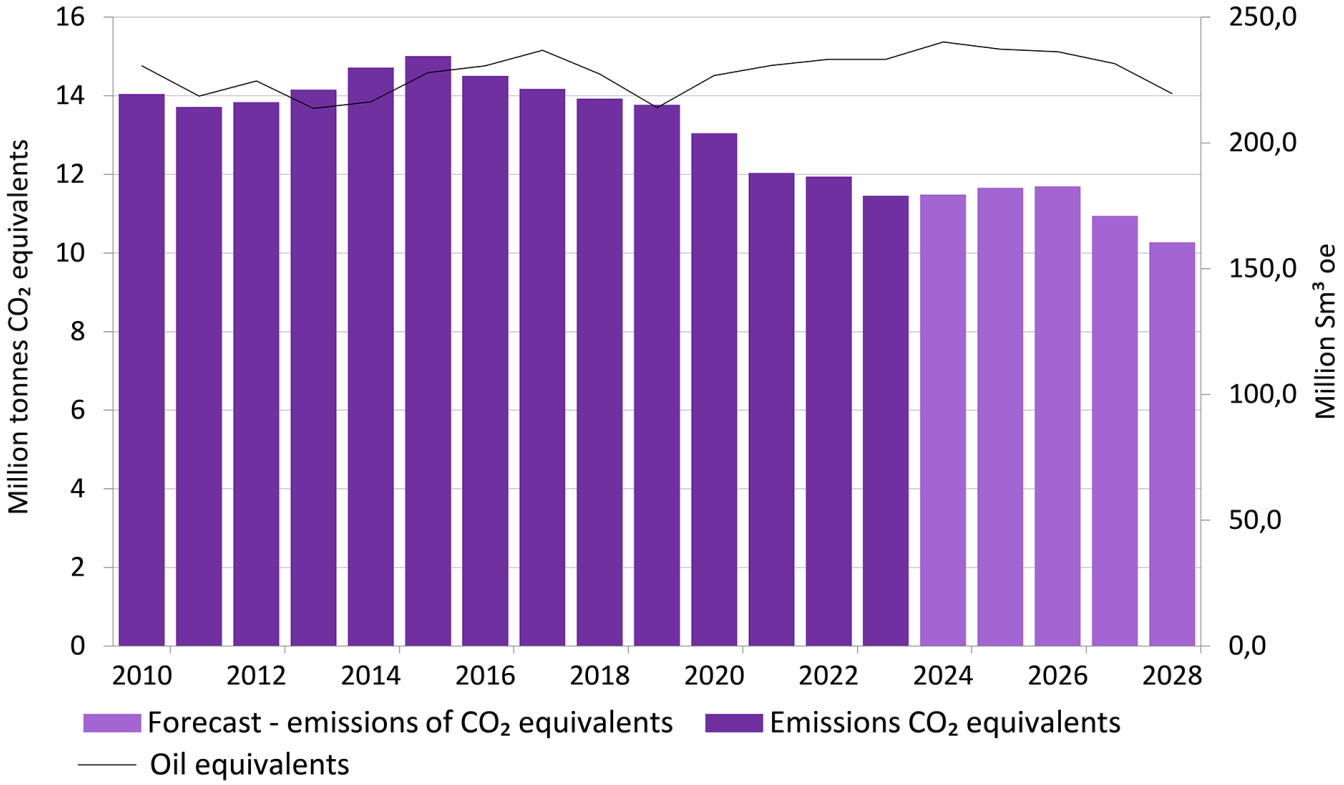
$CO_2$ emissions from petroleum activities on the NCS have been on the decline since 2015, despite relatively stable production. This is mainly caused by transitioning power solutions to power from shore.

Three projects were under development in 2024 leading up to a potential decision on power from shore. These projects cover the Tampen area and the Balder and Grane fields in the North Sea, as well as the Halten area in the Norwegian Sea, where Heidrun will serve as a hub for multiple platforms.

Emissions per produced unit are expected to decline somewhat over the next few years, despite the slight increase in production over the short term.

The emissions are derived from the combustion of natural gas and diesel in turbines, motors and boilers, from safety flaring of natural gas, venting and fugitive emissions of gas, as well as from the storage and loading of crude oil.

The figure below is based on data from the national budget 2015.




**Download:** Background data (Excel)

# Oil and gas on the shelf moving forward

Read about:


- What will it take to realise the resources?
- High exploration activity

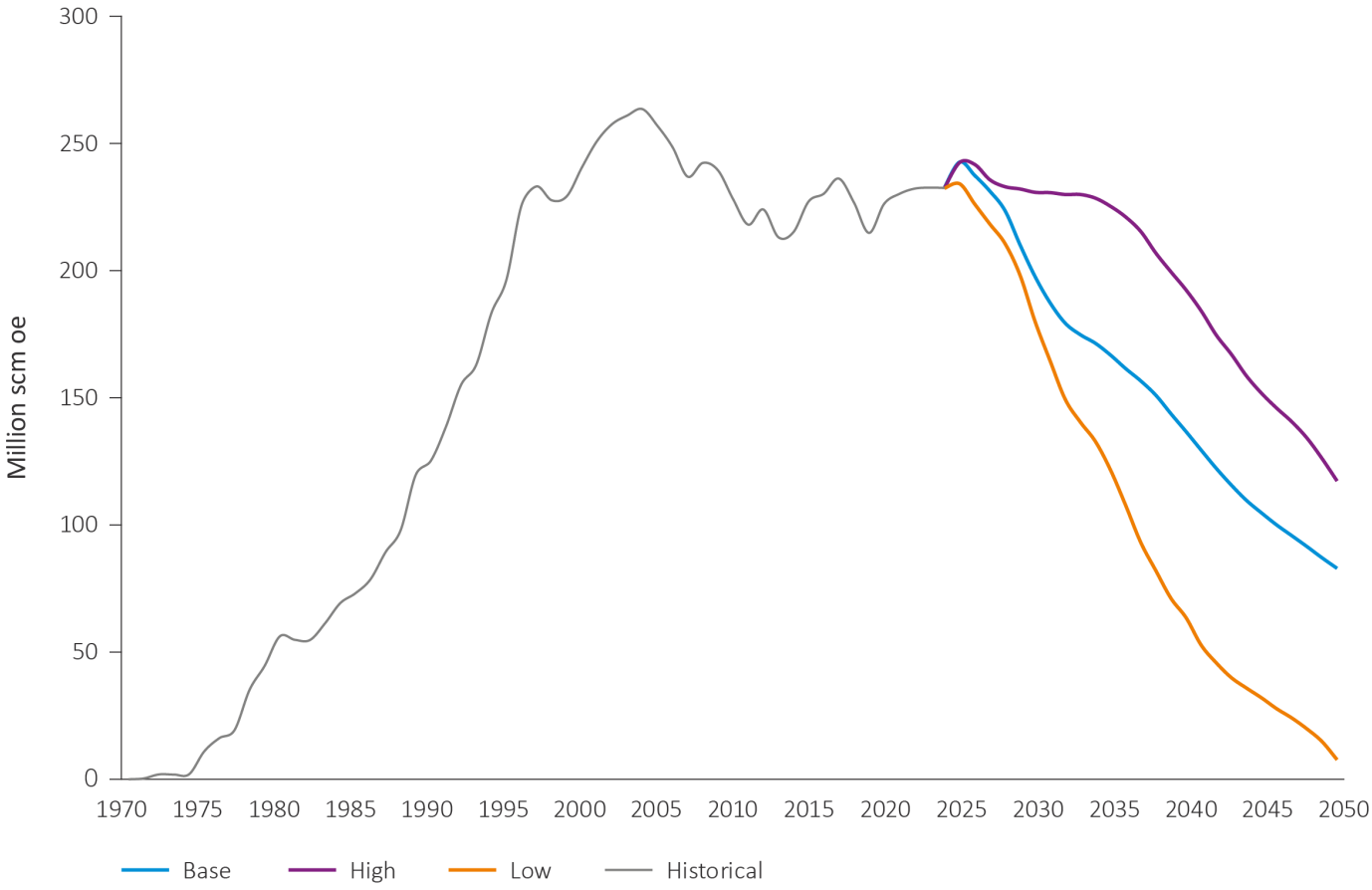

## What will it take to realise the resources?

Norway still has extensive oil and gas resources on the NCS. These resources can provide a basis for high levels of production, export and value creation for society for many years to come. However, this potential future will not simply materialise on its own.

The Directorate expects overall production to decline in the later 2020s. In order to slow this decline, exploration will need to take place close to infrastructure and in more frontier areas, in addition to making more investments in fields, discoveries and infrastructure. Failure to invest will lead to rapid dismantling of the petroleum activities.

The Directorate has prepared three potential scenarios for the overall production of oil and gas leading up to 2050. All these scenarios indicate a decline in production. How fast that will unfold depends on a number of factors, such as the pace of exploration activity and technological development. Increased knowledge, better data coverage, fresh work methods and emerging technology open up new exploration opportunities and could result in more profitable discoveries in the years to come.

You can read more in the Resource Report, which the Norwegian Offshore Directorate published in August 2024.



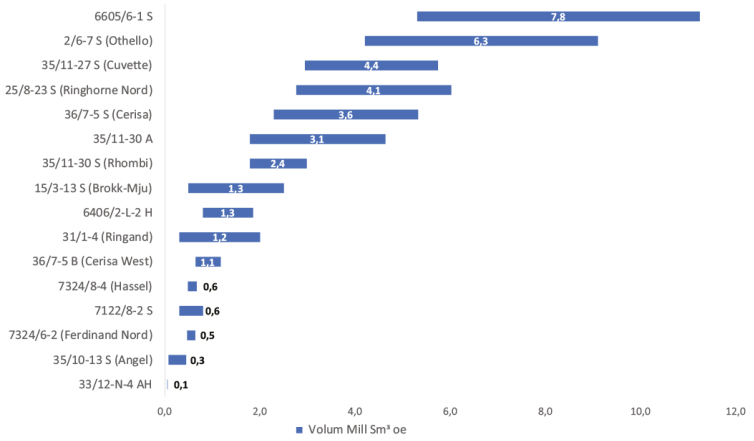

## High exploration activity

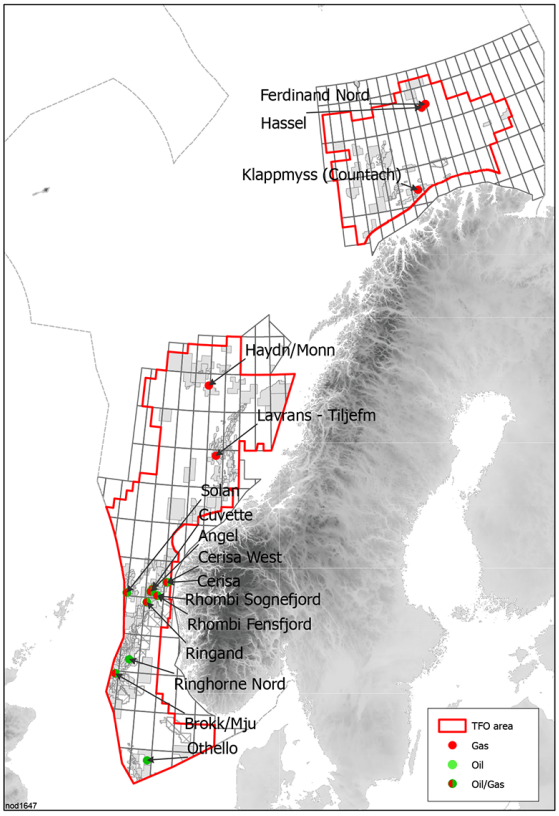
2024 saw higher exploration activity than in 2023. 42 exploration wells were terminated and 16 new discoveries were made on the NCS. The preliminary overall estimate for these discoveries is 38 million standard cubic metres of recoverable oil equivalent (251.6 million bbl o.e.). This yields a resource growth which is somewhat lower than the previous year. Gas and liquids were fairly equally represented in the discoveries.

Most of the discoveries are small, but several are being considered for development tied back to existing fields.

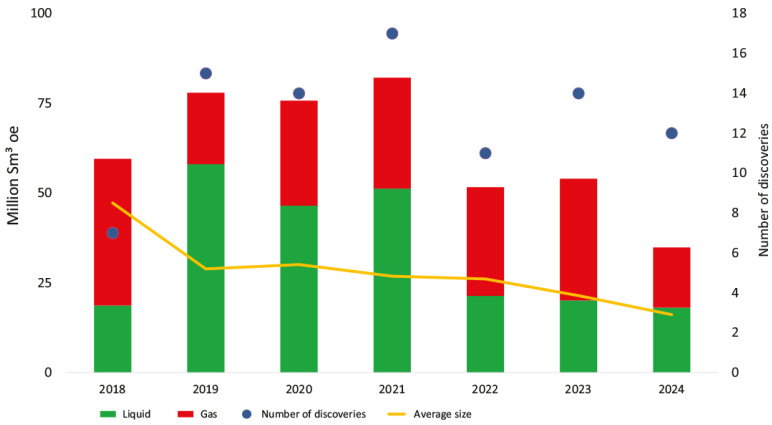
We've seen that even small discoveries can generate substantial values. A Norwegian Offshore Directorate analysis of exploration activity over the last 20 years (2004-2023) shows that the discoveries are valued at three times the costs expended. Exploration activity has been profitable in all ocean areas.

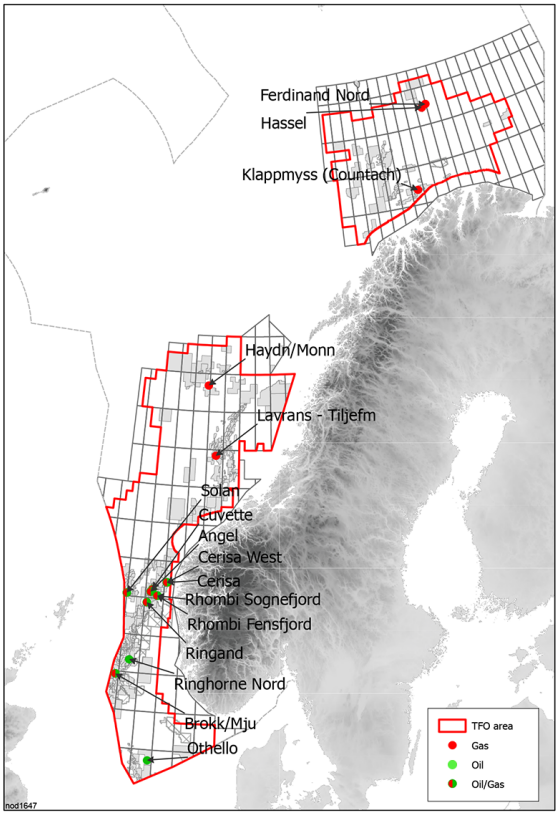
The figure under shows exploration results in 2024:




This figure shows resource growth from discoveries 2018 to 2024 (note that RC 6-discoveries are not included):




In 2025, the Norwegian Offshore Directorate expects a total of about 40 exploration wells, where 20–25 will be in the North Sea, 10–12 in the Norwegian Sea and 4–6 in the Barents Sea.

At the end by 2024, there were 78 discoveries still awaiting a potential development decision. They comprise certain larger discoveries and several minor ones in all ocean areas on the shelf. Most discoveries are in the North Sea.

The Norwegian Offshore Directorate expects that nearly two-thirds of the undiscovered resources on the NCS are located in the Barents Sea. This is why we are concerned with sharing knowledge surrounding opportunities in the Barents Sea. Among other things, this manifested in our organisation of a seminar in October on the latest developments in this ocean area.

It is worth noting that, without increased gas export capacity, vast gas resources and values may remain locked away for quite some time. That is why developing more infrastructure in and around these waters is of utmost importance for the realisation of already proven oil and gas resources. Greater export capacity will also provide incentives for gas exploration.

| **Ocean area** | **Prospect name** | **Wellbore** | **Production licence** | **Operator** | **Content** | **Size, million $Sm^3$ oe** |
|---|---|---|---|---|---|---|
| Barent Sea | Hassel | 7324/8-4 | 1170 | AKER BP | Gas | 0,5-0,7 |
| Barent Sea | Klappmyss (Countach) | 7122/8-2 S | 229 | VÅR ENERGI | Oil | 0,3-0,8 |
| Barent Sea | Ferdinand Nord | 7324/6-2 | 1170 | AKER BP | Gas | 0,5-0,6 |
| North Sea | Othello | 2/6-7 S | 1086 | DNO | Oil | 4,2-9,0 |
| North Sea | Cuvette | 35/11-27 S | 248 | WINTERSHALL DEA | Oil and gas | 2,9-5,7 |
| North Sea | Ringhorne Nord | 25/8-23 S | 956 | VÅR ENERGI | Oil | 2,8-6,0 |
| North Sea | Cerisa | 36/7-5 S | 636 | VÅR ENERGI | Oil and gas | 2,3-5,3 |
| North Sea | Rhombi Fensfjord | 35/11-30 A | 090 | EQUINOR | Oil and gas | 1,8-4,6 |
| North Sea | Rhombi Sognefjord | 35/11-30 S | 090 | EQUINOR | Gas | 1,8-3,0 |
| North Sea | Brokk/Mju | 15/3-13 S | 25 | EQUINOR | Oil and gas | 0,5-2,5 |
| North Sea | Ringand | 31/1-4 | 923 | EQUINOR | Oil and gas | 0,3-2,0 |
| North Sea | Cerisa West | 36/7-5 B | 636 | VÅR ENERGI | Oil | 0,6-1,2 |
| North Sea | Angel | 35/10-13 S | 827 SB | EQUINOR | Oil and gas | 0,1-0,4 |
| North Sea | Solan | 33/12-N-4 AH | 50 | EQUINOR | Oil | 0,05-0,06 |
| Norwegian Sea | Haydn/Monn | 6605/6-1 S | 1194 | OMV | Gas | 5,3- 11,2 |
| Norwegian Sea | Lavrans - Tiljefm | 6406/2-L-2H | 199 | EQUINOR | Gas | 0,8-1,9 |

## New technology creates values

Continuous technology development is a necessary contribution towards generating the greatest possible value for society. This is why the Norwegian Offshore Directorate must be a driving force for developing new technology, including digitalisation, throughout the value chain.

In 2024, we have studied the potential in so-called tight reservoirs and how they can be realised, as well as gathering dynamic data (including testing exploration wells to collect reservoir information). In October, we organised a seminar to highlight how we can improve recovery using hydraulic fracturing. This effort will be followed up in 2025.

The Norwegian Offshore Directorate has organised an annual technology day over the last three years. This is primarily aimed at licensees on the NCS. The objective is to share experience from implementing new technology, in line with our technology strategy. This is a popular event, and the next one is scheduled for 5 June 2025.

A selection of technology initiatives on the shelf in 2024:

**Ekofisk:** It has proven difficult to carry out pilots on the fields, but the licensees on Ekofisk are currently conducting a major EOR (enhanced oil recovery) pilot to explore how low salinity water injection affects oil recovery.

**Gullfaks Sør**: New method for hydraulic fracturing applied in a subsea well.

**Fram Sør:** Decision process for implementing electric X-mas trees. If this moves forward, it will be the first installation on the NCS.

**Edvard Grieg/Johan Sverdrup:** Use of DAS/fibre in connection with seismic acquisition (PRM).

**Yggdrasil:** Use of horizontal appraisal wells with ultra-deep resistivity log.

## Improved Recovery Award

The Norwegian Offshore Directorate's Improved Recovery Award was given to the licensees, Aker BP and Pandion Energy, on the Valhall and Hod fields in the North Sea. These fields have produced nearly four times more oil and gas than what was estimated in the development plans.

The 2024 award winners have ambitious plans to implement cutting-edge technology to improve production from tight reservoir formations. Their ambition is to produce one billion additional barrels of oil equivalent from the fields over the next 40 years.

Read more: Valhall – Aker BP

**Download:** Background data (Excel)

# New industries

Read about:

- Significant interest in $CO_2$ storage
- Mapping of seabed minerals continues
- Subsurface surveys for offshore wind

## Significant interest in $CO_2$ storage

Interest in storing $CO_2$ on the Norwegian Continental Shelf (NCS) is significant and rising.

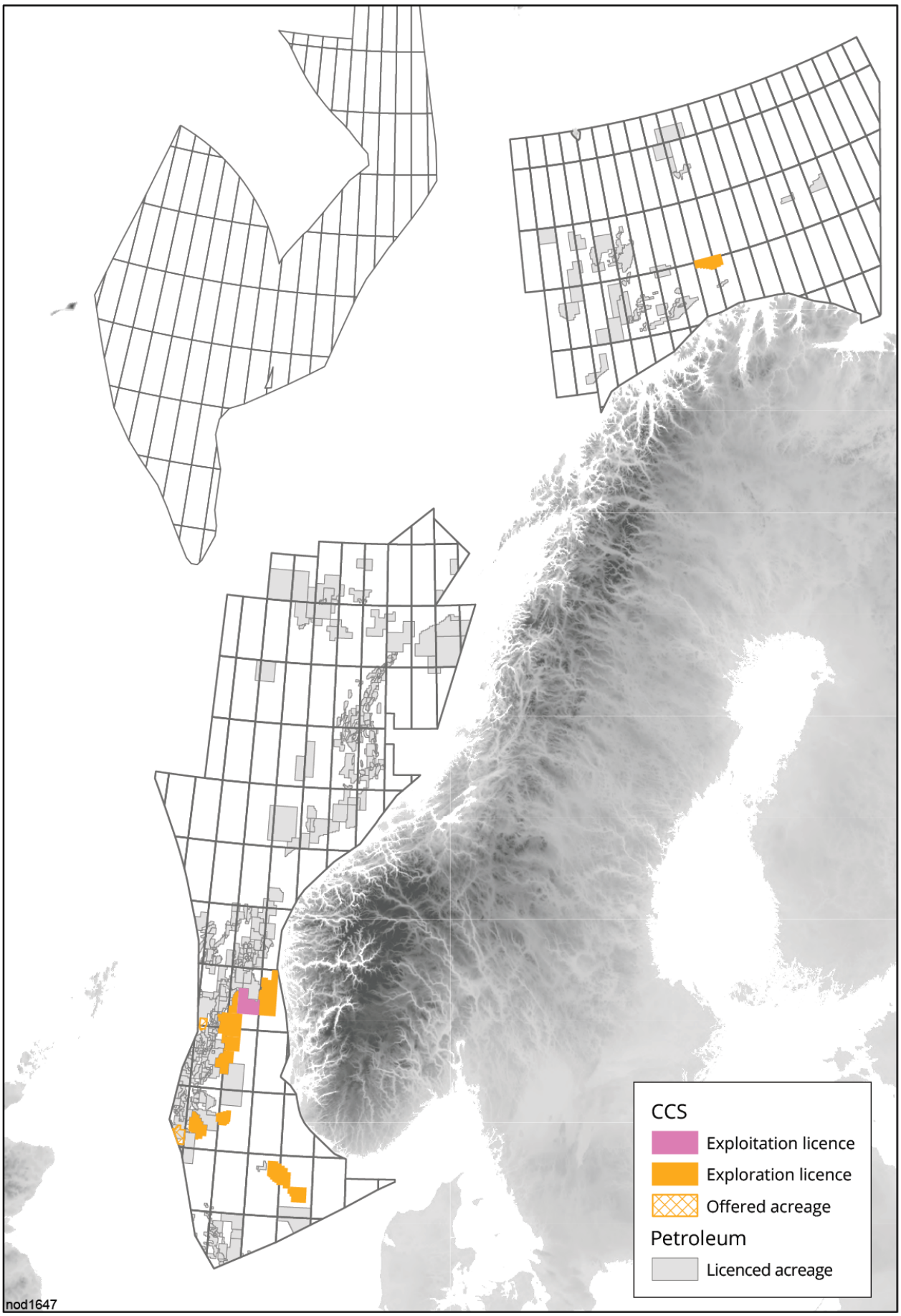
The theoretical storage capacity exceeds 80 billion tonnes of $CO_2$, the equivalent of about 2000 years of Norwegian $CO_2$ emissions at current levels.

Under the current plans for projects in the awarded licences, a total of between 1.5 and 2 billion tonnes of $CO_2$ could be stored on the NCS. These areas have a storage potential of up to ten billion tonnes. How much can actually be stored will depend on several factors, including information from further mapping, access to $CO_2$ in the market and which development solution the project ultimately chooses.

Two licencing rounds were held in 2024. In September, four licences were awarded pursuant to the Regulations relating to exploitation of subsea reservoirs on the continental shelf for storage of $CO_2$ and relating to transportation of $CO_2$ on the continental shelf. A total of 11 licences have been awarded; 1 exploitation licence and 10 exploration licences. Offers for two additional licences were issued in December; with awards expected in 2025. The authorities have received proposals for new acreage announcements, and these are currently being assessed.

Thirteen companies are licensees in these licences, and several of these are not associated with the petroleum industry.

Learn more about $CO_2$ storage and the different types of licences in Resource Report 2024.




The projects are considering multiple types of development solutions:

Onshore facilities where ships transport $CO_2$ to onshore plants for intermediate storage and further transport via pipeline out to the storage location, direct injection from ships, as well as a pipeline from Europe.

26 September was the opening of the Northern Lights receiving terminal in Øygarden.
This means that the world's first commercial facility for transport and storage of $CO_2$ across national borders is now complete and ready to receive and store $CO_2$. Start-up is scheduled for 2025.

In 2024, the Norwegian Offshore Directorate reviewed about 800 wells and revised the top and bottom for the Utsira Group and the Skade Formation in the North Sea, to ensure consistency. This can be useful in plans for $CO_2$ storage.

The figure shows the potential storage volume on the NCS per year for the awarded licences.

## Mapping of seabed minerals continues

The Norwegian Offshore Directorate has been gathering data in deepwater areas in the Norwegian Sea and Greenland Sea along with the University of Bergen (UiB) and University of Tromsø (UiT) since 2011.

In 2024, we conducted four mapping expeditions along with UiB and UiT. Depth and video data from three of these expeditions have been made available. Expedition number four was carried out in December, and this data will be released as soon as it has been quality-assured.

The Directorate has also contributed information for the EU project to compile information associated with raw materials such as seabed minerals (GSEU).

The Norwegian Offshore Directorate will continue mapping resources and the environment in 2025. The authorities want this to be an incremental development and have adopted a precautionary approach to the activity. Acquiring additional knowledge is an important part of this effort.

The administrative responsibility for seabed minerals has been assigned to the Ministry of Energy. The Norwegian Offshore Directorate has assisted the Ministry in conducting the impact assessment and coordinating the academic study efforts. The Directorate's resource assessment for the seabed minerals on the NCS concludes that there are substantial resources in place.

The Seabed Minerals Act entered into force on 1 July 2019. This statute facilitates exploration for and extraction of mineral deposits on the Norwegian shelf. On 9 January 2024, the Storting (Norwegian parliament) decided to open an area in the Norwegian Sea and Greenland Sea for mineral activities on the seabed. This acreage was formally opened by the King in Council on 12 April.

# Subsurface surveys for offshore wind

The Ministry of Energy has tasked the Norwegian Offshore Directorate with carrying out subsurface surveys for offshore wind in two areas in the North Sea.

The first phase of these surveys in Sørlige Nordsjø II (eastern part) started in autumn 2022 and was completed in 2023.  Surveys started on Utsira Nord in summer 2023 and were completed in spring 2024.

We are also participating in a broad group of directorates led by the Norwegian Water
Resources and Energy Directorate to prepare impact assessments (Norwegian only) for the areas that may be technically suitable for offshore wind and where there are relatively few conflicts of interests.

The group has delivered an impact assessment for three of the areas (Sørvest F, Vestavind B and Vestavind F). The other areas will be completed leading up to the summer of 2025.

**Download:** Background data (Excel)

# Data management, digitalisation

The Norwegian Offshore Directorate is responsible for collecting, storing and publishing data from the Norwegian shelf.

Each year, it is our job to collect information about projects and resource volumes, as well as forecasts for production, costs and emissions/discharges from the operators. We quality- assure this data, make our own assessments and create consistent forecasts for production, costs and emissions/discharges. This effort is an important part of the revised national budget (RNB), which is presented in May.

Extensive efforts are under way alongside the industry to establish a reporting solution for RNB data. The ambition is for this to be implemented in autumn 2025. This will simplify reporting from the operators as well as improve data accuracy and accessibility. This initiative follows up Norway's strategy to be the world's most digital country by 2030.

In 2024, the Norwegian Offshore Directorate published about 3700 seismic data sets and 3,827,300 well data sets. This means that the companies will have access to data, which in turn will contribute to increased value creation on the NCS.

The industry is reporting an increasing volume of data to Diskos. Reported data has increased by nearly 4.5 petabytes; from 16 in 2023 to 20.5 in 2024.

You can learn more about public access to data here.

**Download:** Background data (Excel)