NAALAKKERSUISUT
GOVERNMENT OF GREENLAND

Exploration and exploitation of hydrocarbons in Greenland

Strategy for licence policy 2009

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Greenland's location in the North Atlantic

1. Introduction

There is broad political consensus in Greenland to work towards developing the mineral resources sector into a sustainable industry which will make positive contributions to economic development and create new jobs. The objectives are an important part of the long-term economic policy to support development of alternative business sectors to fisheries, partly with the goal to reduce the large current dependence on the annual block grant from Denmark.

Development of the hydrocarbon sector should take place in a manner which provides the greatest possible benefits for the society in Greenland. The society must be secured a reasonable share of the surplus from exploitation, and local insight and knowledge about activities should be developed in order to, for example, ensure that local labour and local businesses are used as much as possible.

A clear political requirement for all oil and gas activities is that these are carried out safely and with due consideration for the environment. The Arctic environment is vulnerable, and the Greenland commercial basis and culture is very much linked to nature and the environment.

Therefore, hydrocarbon activities should be promoted aiming at increasing employment and earnings. One requirement for making commercially viable discoveries which can support local employment and increase earnings is that exploration activities are maintained at a sufficiently high level.

As a result of the high costs of exploration in Greenland, it is important that the oil industry is responsible for a large part of the overall exploration activities. Therefore, an important strategic goal is to encourage interest from the industry in investing in oil exploration in Greenland. In this regard it is important that the authorities publish clear objectives and targets for how, when and on what terms they intend to offer exploration and exploitation licences in Greenland.

There is fierce competition between a number of countries throughout the world to attract the attention of the oil companies. Because of this it is very important to provide, as a minimum: a) geological data and surveys substantiating the potential for commercially viable deposits of hydrocarbons in the subsurface, b) competitive licence terms, c) stable framework conditions, and d) efficient processing by the authorities.

This proposed strategy for future oil and gas exploration in Greenland addresses the need for long-term retention of the industry interests which have been successfully established within recent years.

Over recent years, Greenland has seen unprecedented international interest in the mineral resources potential of its subsurface. The result of the oil licensing round in the areas offshore Disko-Nuussauq could be decisive for Greenland's future. Some of the world's largest oil companies have been granted exploration and exploration licences in Greenland waters. Companies such as ExxonMobil, Chevron, Husky Energy, Cairn Energy, EnCana, DONG Energy and PA Resources are planning to invest billions in the development of Greenland's oil potential in the coming years.

So far the international financial/economic crisis has not caused the oil companies to lose their long-term interest in Greenland's oil potential. On the contrary, the KANUMAS companies (Exxon, Statoil, BP, Japan National Oil Corporation (now JOGMEC), Texaco, Shell, NUNAOIL) for example, have shown considerable interest in realising their preferential position for the areas offshore north-east and north-west Greenland. These are long-term investments, which means the companies do not expect to commence proper production within the near future. Similarly, these investment strategies do not fluctuate in the short run, e.g. with the current spot prices for oil and gas, but aim to ensure the oil companies' a long-term basis for reserves.

Oilexploration activities are characterised by considerable investments and, not least, considerable exploration risks. Ensuring a high level of exploration activity at all times in several different regions of Greenland is therefore central to the Hydrocarbon Strategy, which was introduced in 2003 and continued in the 2005 "Strategy on Social Aspects of Exploration and Exploitation of Oil and Gas in Greenland".

This is because the degree of success of exploration activities in the different regions of Greenland will probably vary. It is not possible to predict which region will first yield the desired breakthrough in oil activities. In other words, it is to be expected that not all of the current licence areas (south Greenland, central west Greenland, the Disko-Nuussuaq region) will yield commercial discoveries of hydrocarbons.

Following the successful licensing round for the Disko-Nuussuaq region offshore west Greenland, comprehensive development activities have been carried out over the last few years in Greenland's north-western and north-eastern offshore areas, i.e. Baffin Bay offshore north-west Greenland and the Greenland Sea offshore north-east Greenland. In the oil sector these areas are also referred to as: The KANUMAS areas.

Activities include:

- A comprehensive strategic environmental impact assessment of the areas offshore north-west and north-east Greenland carried out in collaboration between the Bureau of Minerals and Petroleum, the National Environmental Research Institute and the Greenland Institute of Natural Resources.
- A comprehensive analysis and assessment of all geo data from the Baffin Bay region carried out in collaboration between the Bureau of Minerals and Petroleum and GEUS (The Geological Survey of Denmark and Greenland).
- Comprehensive surveys of the changes in the region's ice conditions carried out in collaboration between the Bureau of Minerals and Petroleum, the Danish Meteorological Institute and Technical University of Denmark.
- An assessment of competitive models of taxation and fees in the oil sector in Greenland compared with a number of other countries, carried out with the internationally recognised consultant company IHS Energy.
- An updated assessment of the oil and gas potential in the sea offshore north-west and north-east Greenland carried out by the U.S. Geological Survey, USGS.

This has led to considerable long-term interest in carrying out exploration activities in these areas from the oil industry and the seismic industry. International oil companies and seismic companies have therefore carried out comprehensive data collection and prospecting in the KANUMAS areas in recent years.

Furthermore, the Bureau of Minerals and Petroleum has been in dialogue with the KANUMAS companies (some of the world's leading oil companies) on how to realise the preferential position that these companies hold with regard to participating in the first oil licensing round in these areas.

This strategy paper therefore focuses primarily on expansion of the licence policy to cover the northern areas of Greenland waters. However, this strategy also contains an assessment of the development of the areas offshore south-west Greenland (the Labrador Sea) and central west Greenland (the offshore areas between 63°N and 67°N), as well as other areas.

2. The Arrangement regarding Mineral Resources and the Act on Self-Government

With the implementation of the Act on Greenland Self-Government of 21'th of June 2009, the Self-Government obtained the right to take over an array of fields of responsibilities, including the field concerning mineral resources and the working environment.

With the new Act on the Greenland Self-Government, all revenues from activities in relation to mineral resources in Greenland belong to the Self-Government. This includes revenues to Greenlandic and Danish authorities in form of licences, taxation, ownership interests etc.

In the Self-Government Agreement, the following key elements are part of the economic relations between Greenland and Denmark:

- The grant from the Danish state will remain unchanged at 2007 level, i.e. DKK 3,202.1 mill. p.a., subject to annual adjustments based on changes to prices and pay.
- In the future, Greenland will itself finance the new fields of responsibility.
- Revenues from activities related to mineral resources in Greenland belong to the Greenland Self-Government.
- The Danish State's grant will be reduced with an amount corresponding to 50 % of the revenues from mineral resource activities which on an annual basis exceeds DKK 75 mill.

When the grant from the Danish State to Greenland is reduced to zero, negotiations between the Greenland Self-Government and the Danish Government will be commenced. The negotiations will include the question of the distribution of revenues from extraction of mineral resources from the Greenlandic underground.

In order for the Self-Government to have some substance, it was of utmost importance that the field of responsibility of mineral resources was one of the first areas to be taken over by the Greenland Self-Government. On 1'th of January 2010, the Inatsisartut Act no. 7 of 7'th of December 2009 on Mineral resources and activities affecting these (the Act on Mineral Resources) came into force and replaced the Danish Act on Mineral resources in Greenland, cf. Consolidation Act no. 368 of 18'th of June 1998.

The Act on Mineral Resources establishes the foundation and the framework for future control of mineral resources including activities affecting these. The Act states that such activities must be performed in accordance with best international practices for execution and control of such activities and that they must solely be executed with the permission of Naalakkersuisut (Greenland Government).

The Act on Mineral Resources continues the principle of a unified, integrated regulatory system in the field of mineral resources where considerations with regard to the environment, technical issues, safety, socio-economic issues and resources are included in the assessment of mineral resource activities.

Thus the administration of mineral resources is conducted on the basis of a unified and coordinated assessment of all relevant conditions and considerations with regards to mineral resource activities, utilisation of the underground for other purposes and all related energy activities. This also includes authorities processing the financial and economic issues concerning a.o. accounting of revenues from mineral resource activities in connection with assessment of the financial relations between the Self-Government and the Danish State under the Self-Government arrangement. The field of health and safety regarding off-shore activities is also included in the Act on Mineral Resources, which means that the political and administrative responsibility has been transferred from the Danish State to Naalakkersuisut.

3. Licence policy status for oil and gas

3.1 Licensing rounds until 2009

3.1.1 2002 and 2004

In 2002, a licensing round was carried out for an area offshore west Greenland between 63°N and 67°N. The licensing round resulted in the granting of a licence to the Canadian oil company EnCana Corporation, and NUNAOIL A/S as a carried partner, for the exploration and exploitation of hydrocarbons in Greenland. The licence is known as Atammik. See figure 1.

Subsequently, in 2004, a licensing round was carried out for areas offshore west Greenland. This round covered four licence areas, each of which contains at least two to three large structures with hydrocarbon potential.

The 2004 licensing round resulted in a new licence for exploration and exploitation of hydrocarbons in Greenland for the Canadian oil company EnCana Corporation and NUNAOIL A/S, known as Lady Franklin. The area involved covers 2,897 km^2 in an offshore area approximately 250 km west of Nuuk, west Greenland.

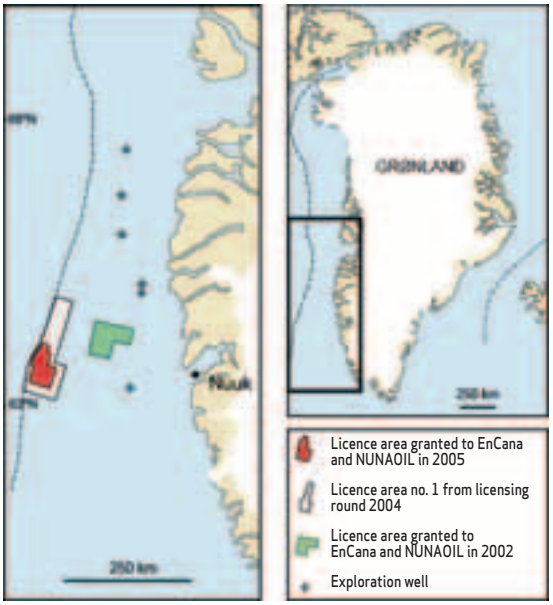


Figure 1.
Licensing round areas in 2002 and 2004.

In 2007, EnCana Corporation successfully farmed out a share of their Atammik and Lady Franklin exploration and exploitation licences offshore west Greenland to Capricorn Atammik Limited and Capricorn Lady Franklin Limited, both of which are subsidiaries of Cairn Energy PLC.

3.1.2 The Disko West Licensing Round

The first phase of the Disko West Licensing Round 2006 for the area between 67°N and 71°N offshore Disko-Nuussuaq in west Greenland in 2007 led to the signing of four hydrocarbon exploration and exploitation licences, which were granted to the oil companies ExxonMobil, Chevron, Husky Energy, DONG Energy and NUNAOIL A/S.

The second phase of the Disko West Licensing Round was formally opened on 1 August 2007.

On the opening day of the second phase of the licensing round, the Bureau of Minerals and Petroleum received an application from Capricorn/Cairn Energy PLC for the granting of an exploration and exploitation licence for Blocks 1 and 3. See figure 2.

In September 2007, the Bureau of Minerals and Petroleum received an application from the Swedish oil company PA Resources, which resulted in the granting of an exploration and exploitation licence for Block 8.

The Disko West licensing round was therefore a great success. A total of seven licence blocks have now been issued, covering a total area of approximately 82,000 km^2, corresponding more or less to an area twice the size of Denmark.

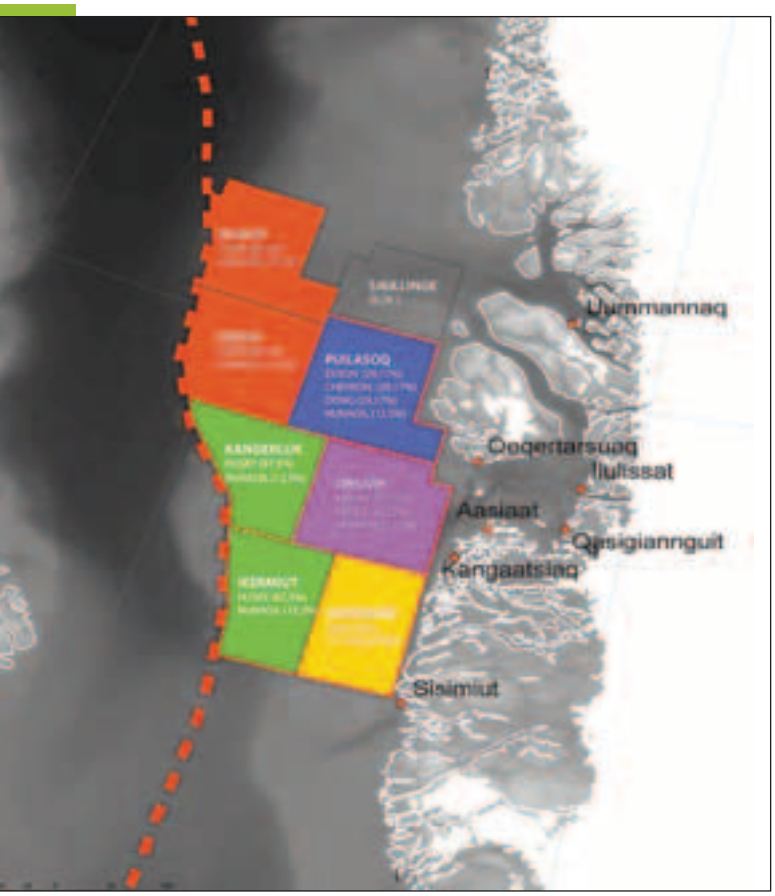


Figure 2.
Blocks in the Disko-Nuussuaq region:

- ExxonMobil (US), Chevron (US), DONG Energy (Denmark) and NUNAOIL A/S (Greenland);
- Husky (Canada), ExxonMobil (US) and NUNAOIL A/S (Greenland);
- Capricorn/Cairn Energy PLC (UK) and NUNAOIL A/S (Greenland);
- Husky (Canada) and NUNAOIL A/S (Greenland);
- PA Resources (Sweden) and NUNAOIL A/S (Greenland).

The licences issued cover an exploration period of 10 years, which for all licences is divided into three sub periods. Before the end of sub period 1, the licence holders must either accept their obligations for sub period 2 or relinquish their licence. The obligations for sub period 2 will typically comprise drilling one well and collecting further data. Similarly, before the end of sub period 2, the licence holders must accept their obligations for sub period 3 or relinquish their licence.

During the summer of 2008, a very comprehensive exploration programme for the Disko West area was carried out, including the collection of approximately 20,000 km of 2D seismic data and substantial quantities of airborne gravimetric and magnetic data, as well as other geophysical data. Sub period 1 will conclude after three to four years. Before then, the oil companies must decide whether they want to continue into the next sub period, which will typically require them to drill an exploration well.

The Disko West Licensing Round has been deemed extremely successful. Not only has it led to many new exploration obligations, it has also led to increased international attention to the hydrocarbon potential of Greenland's subsurface.

3.1.3 Licences for Open-Door areas

Up until 2008, the Open-Door areas covered the area offshore south-west Greenland between 60°N and 63°N as well as Jameson Land in east Greenland (see figure 3). The Open-Door areas are characterised by thin data coverage and are therefore associated with high exploration risks. Furthermore, the area offshore south-west Greenland is characterised by difficult operating conditions due to relatively great sea depths and pack ice.

A special procedure applies to these areas by which companies can apply for hydrocarbon exploration licences year round and applications are processed in the order in which they are received. All licences are divided into three sub periods with individual work programmes. Holders of an Open-Door licence are obligated to carry out activities in accordance with the work programme, if they choose to continue their exploration into the subsequent sub period. If they choose not to continue their exploration, the licence holders must give up their licences.

The Bureau of Minerals and Petroleum has experienced increasing interest in all of the offshore area south of 63°N. In December 2007, it therefore recommended to the Joint Committee on Mineral Resources in Greenland that the current Open-Door area be expanded to include the offshore area south of 60°N (see figure 3). The Joint Committee, followed by the Danish and Greenland governments, endorsed this recommendation. In 2008, two applications for licence blocks south of 60°N were received from Capricorn/Cairn Energy PLC, who were granted two licences in November 2008 with NUNAOIL A/S as a carried partner in the exploration phase.

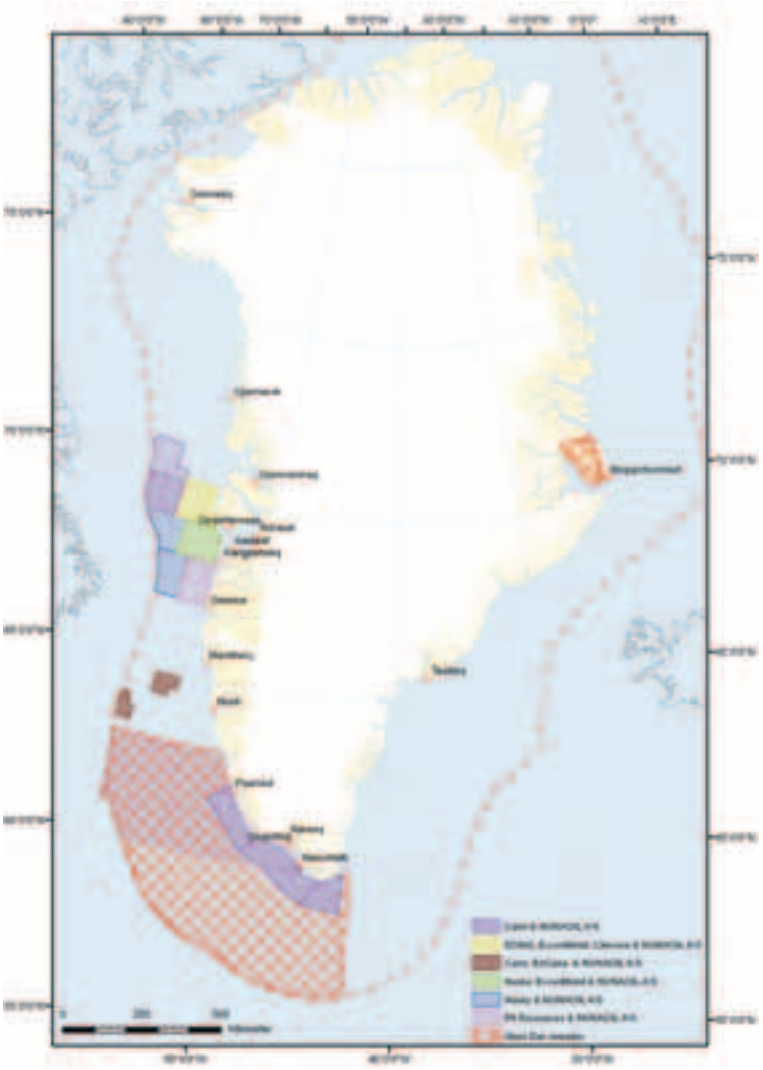


Figure 3.
Open-Door area offshore south Greenland. The chequered offshore area constitutes the whole of the current Open-Door area in south Greenland after expansion. The light area of the chequered area marks the expansion.

3.2
Overall status of licences granted in Greenland

During 2007 and 2008, the number of exploration and exploitation licences increased from 2 to 13, which means the number has increased more than five-fold. The total area of oil licences has increased from 6,882 km^2 to approximately 130,000 km^2 during the same period, which means the total area is now more than 18 times greater.

4. Strategy for licence policy in the years to come

In 2006, the authorities commenced planning the oil licence policy for the areas offshore north-east and north-west Greenland. International focus on these KANUMAS areas has been great, amongst other things due to estimates by the USGS, the US Geological Survey, that these regions hold very significant oil and gas potentials.

The interest in north-east and north-west Greenland has led to the collection of large volumes of commercial seismic, as well as aero-gravimetric and aero-magnetic data in 2007 and 2008. Similarly, the oil industry has collected seabed samples offshore north-east and north-west Greenland.

The following sections describe the oil and gas potential in the KANUMAS areas; industry interests; ice, environmental and nature conditions; choice of licence areas; technological opportunities in the KANUMAS areas; and proposed economic conditions for oil activities in the areas.

Figure 4.
The KANUMAS areas.

4.1 The KANUMAS project

The KANUMAS project commenced in late 1989 as a long-term investment to promote oil activities in the areas.

The KANUMAS project was a regional seismic survey project of offshore areas in north-west and north-east Greenland, carried out by a group of companies including Exxon, Statoil, BP, Japan National Oil Corporation (JOGMEC), Texaco, Shell and NUNAOIL.

The KANUMAS licence was a prospecting licence and therefore entailed no exclusive rights for the licence holders. The licence nevertheless entailed substantial exploration obligations, which is reflected in the special preferential position the companies have to the areas by virtue of their licence. This preferential position applies in relation to later licensing rounds for north-east and north-west Greenland. The special conditions applying to the KANUMAS areas include:

- a procedure for obtaining statements and opinions from the KANUMAS companies prior to and in connection with planning of licensing rounds for the areas offshore north-west and north-east Greenland, respectively, areas from where the KANUMAS project has gathered seismic data;

- rights (preferential position) for the individual KANUMAS company to participate in a special, specified pre-licensing round before the first licensing round for north-west and north-east Greenland;

- the fact that NUNAOIL A/S, on behalf of the group, is obligated to store, maintain and market the group's seismic data, which will be confidential until one year following the conclusion of the first ordinary licensing round.

The KANUMAS group's prospecting licence has lapsed, but the rights and obligations of the group still apply, including their preferential position to the areas from where the project has collected seismic data.

The Self-Government has entered into an agreement with the KANUMAS companies concerning how this preferential position is to be realised. The main elements of this new agreement are that, following a comprehensive strategic environmental impact assessment covering the areas offshore north-east and north-west Greenland, a licensing round will be carried out for Baffin Bay in 2010 and a licensing round will be carried out in two phases for offshore north-east Greenland in 2012 and 2013.

4.2 The oil and gas potential in the KANUMAS areas

4.2.1 New estimates of oil and gas deposits offshore north-east Greenland

In 2007, the USGS completed a new estimate of average undiscovered hydrocarbon resources in the sea offshore north-east Greenland.

The estimated average (mean) for oil and gas in the region from 70°N to 82°N was estimated at 9 billion barrels of oil, 86 trillion cubic feet of natural gas and 8 billion barrels of liquid natural gas, corresponding to a total of 31.4 billion barrels of oil equivalents. This estimate is based on existing seismic and other geophysical data collected off the coast of east Greenland. However, due to the very limited density of the data and the still limited knowledge, the estimate is associated with some uncertainty.

Furthermore, the estimate is based on hydrocarbons which are deemed possible to extract using existing technologies. It appears from these calculations that approximately 85% of the hydrocarbon resources are in the Danmarkshavn Basin.

Figure 5.
The area covered by the most recent USGS assessment for east Greenland. Source: USGS, the US Geological Survey

Figure 6.
The area covered by the most recent USGS assessment for west Greenland.
Source: USGS, the US Geological Survey

The most recent assessment by the USGS falls into five units: North Danmarkshavn Salt Basin AU, South Danmarkshavn Basin AU, Northeast Greenland Volcanic Province AU, Thetis Basin AU, Liverpool Land Basin AU (figure 5).

4.2.2 New estimates of oil and gas deposits offshore north-west Greenland

In May 2008, the USGS completed a new estimate of undiscovered oil and gas resources in the subsoil offshore between west Greenland and east Canada. This assessment exclusively covers the offshore areas north of the Arctic Circle (see figure 6).

The most recent assessment by the USGS falls into five units:
AU-1 Eurekan structures AU,
AU-2 Northwest Greenland Rifted Margin AU,
AU-3 Northeast Canada Rifted Margin AU,
AU-4 Baffin Bay AU,
AU-5 Greater Ungava Fault Zone AU.

This estimate is based on existing geophysical data (including seismic data) and results from a small number of drillings offshore west Greenland and Canada. However, due to the limited data density, the estimate is associated with some uncertainty. The estimated average (mean) for oil and gas in the region is estimated at 7.3 billion barrels of oil, 51.8 trillion cubic feet of natural gas and 1.2 billion barrels of liquid natural gas, corresponding to almost 18 billion barrels of oil equivalents.

No statistical assessment has been made of the areas south of the Arctic Circle. To Greenland, exploration activities in progress in the six current licence areas seem to prove that the oil companies believe in the existence of oil and gas deposits in this south-western area.

4.3 Industry interests

The positive result of the oil licensing round for offshore Disko-Nuussuaq reveals a long-term interest from oil companies and the seismic industry. Comprehensive data collection has thus taken place in recent years, not only in the Disko-Nuussuaq region but also in the KANUMAS areas.

The interest in north-east and north-west Greenland led to the collection of large volumes of commercial seismic, as well as aero-gravimetric and aero-magnetic data in 2007 and 2008. In 2008, seismic surveys were conducted and seabed samples taken over a period from July to November in Baffin Bay offshore north-west Greenland. In north-east Greenland, in July, shallow stratigraphic core drillings were carried out. The cores from nine bore holes were taken at a water depth of approximately 200m and all had a core length of less than 100m. The core samples are important in order to interpret and understand the seismic profiles from the area.

The ongoing activities in the areas show that surveys may be performed in five to eight months annually without any major difficulties due to ice and weather conditions. Climate change is expected to affect, presumably in a positive way, future mineral resources exploration, cf. the section below on ice conditions.

Effects of climate change apply to all parts of the Arctic, which is experiencing an upward surge in oil and gas activities. This applies to the areas north of Russia, Alaska, northern Norway (the Barents Sea) and more. Most recently, Iceland announced a tendering of oil licences in the area south of Jan Mayen. Around 100 licences will be tendered in January 2009 for an offshore area covering 40,000 km^2 north-east of Iceland and south of the Norwegian islands of Jan Mayen.

All of the countries in the Arctic Ocean are therefore positioning themselves in order to attract investment from oil companies in new discoveries of oil reserves. This blossoming interest is based, amongst other things, on the substantial ice melt taking place in this area.

The considerable sale of commercial seismic data and other geophysical data by the seismic industry etc. to the oil industry is a specific indication of the increasing industry interest in offshore north-east and north-west Greenland. It therefore seems that oil companies are maintaining both a short-term and a long-term interest in the KANUMAS areas; an interest which is not based on short-term oil price fluctuations.

4.4 Ice conditions and other physical conditions

Climate change, as we are witnessing today in the form of warming and melting of the sea ice around Greenland and in the Arctic Ocean, melting of Greenland's ice cap and thawing of the permafrost, is expected to influence the mineral resources area.

Climate change will probably have a positive effect on the future of mineral resources exploration, both on land and offshore. Higher temperatures and thus longer field seasons, shorter winters and longer periods with open waters, less ice coverage and fewer icebergs will very much increase the opportunities for companies to investigate possible mineral resources deposits in Greenland.

In collaboration with DTU Space Center, National Space Institute and the Danish Meteorological Institute, the Bureau of Minerals and Petroleum has carried out new comprehensive surveys of the ice conditions in the KANUMAS areas. Furthermore, ice condition changes in the Arctic Ocean and their significance for the KANUMAS areas were assessed. This aspect of the assessment is based to a great extent on ongoing surveys by a number of international research institutions, including the National Snow and Ice Center in Boulder, Colorado.

4.4.1 Ice conditions in KANUMAS West

There are two aspects of interest to the oil industry with regard to ice conditions in the sea offshore northwest Greenland. These are icebergs and sea ice.

Icebergs

Icebergs originate from glaciers in the Disko Bay and from more northern glaciers. Already prior to the Disko West Licensing Round, comprehensive surveys had been performed of the population density and drift patterns of icebergs etc. in the Disko-Nuussuaq region as well as further north in the KANUMAS West area. These surveys were updated with new field studies in 2008, carried out by the Danish Meteorological Institute and DTU.

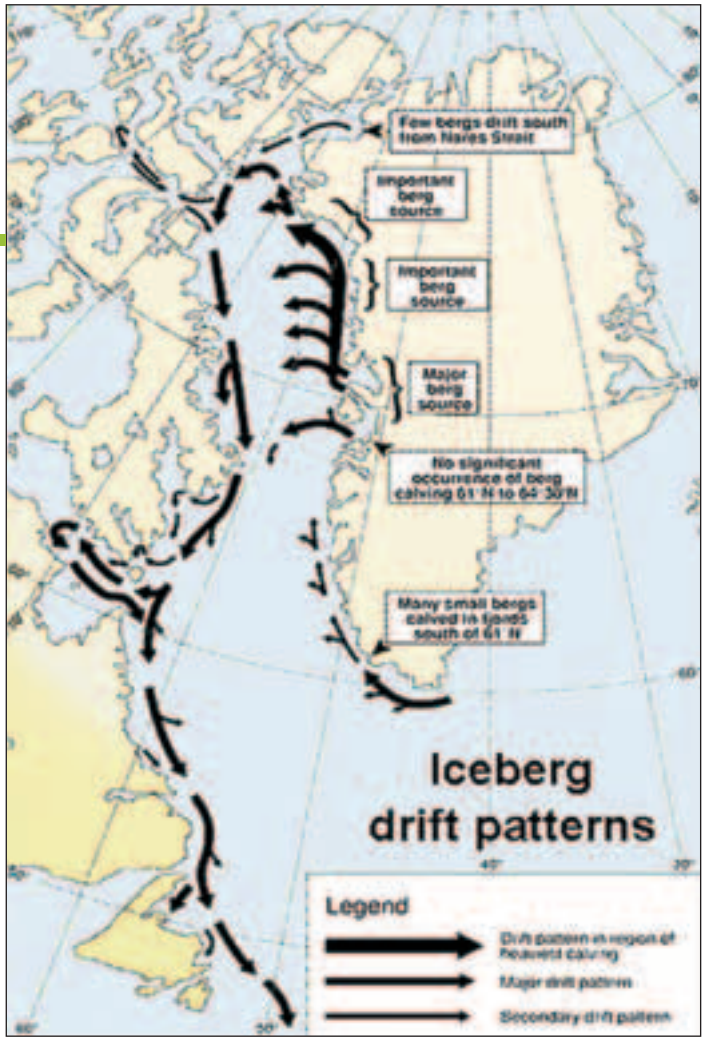
As can be seen from the figure, icebergs drift northward and north-westward and then down along the Canadian east coast. Oil fields offshore Newfoundland are currently being operated in a sea environment with iceberg conditions which to a great extent resemble those present in the Disko West and KANUMAS West areas. Even though icebergs constitute a substantial challenge to operating in the area, a number of companies are very experienced from similar areas in managing this challenge.

Sea ice

Observations show that KANUMAS West contains almost exclusively first-year sea ice, and that the thickness of this sea ice averages 80-100cm. The sea ice conditions in KANUMAS West are therefore fairly comparable to the conditions in the Disko West area, which have also been examined by the Danish Meteorological Institute and DTU.

A comparison of the average number of ice-free days in the period 1978-2008, with data from the period 2000-2008 (figure 8) reveals that the number of ice-free days in the sea offshore northwest Greenland has increased. The increase in the number of ice-free days is greatest in the Disko West area, where the number of days has increased by one to two months in the different sub sectors (and in some sectors by even more). Further north, the ice-free period has so far been prolonged by one to three weeks.

It may be concluded that ice conditions in KANUMAS West to a great extent resemble the conditions in the northern part of the Disko West area. The number of ice-free days in Block 1 in the area covered by the Disko West Licensing Round is therefore at the same level as in the northern KANUMAS West area. Assessed on the basis of the sale and purchase of seismic data etc., there is a fairly comparable industry interest in the two areas.



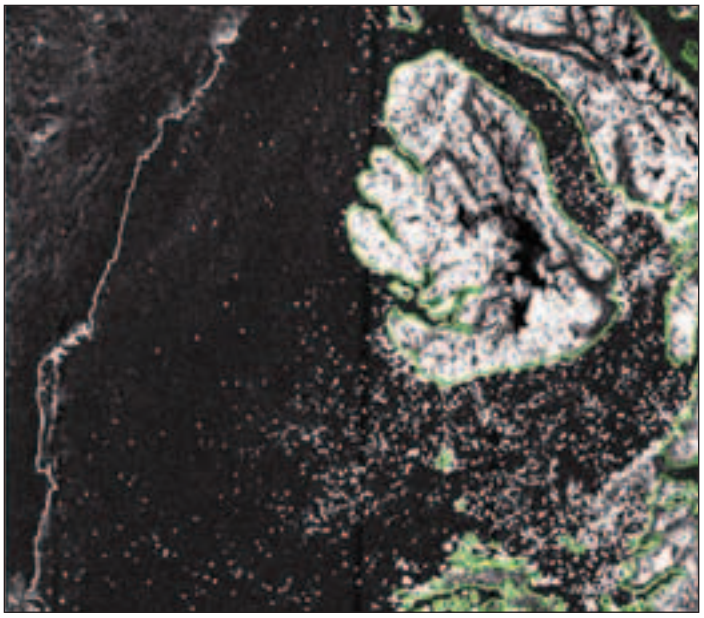
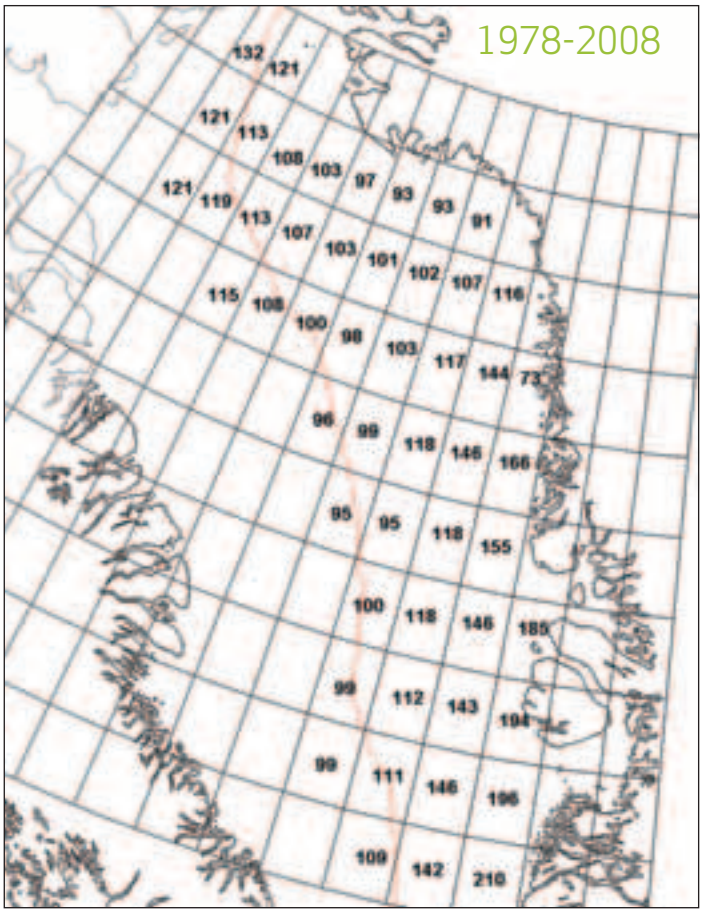
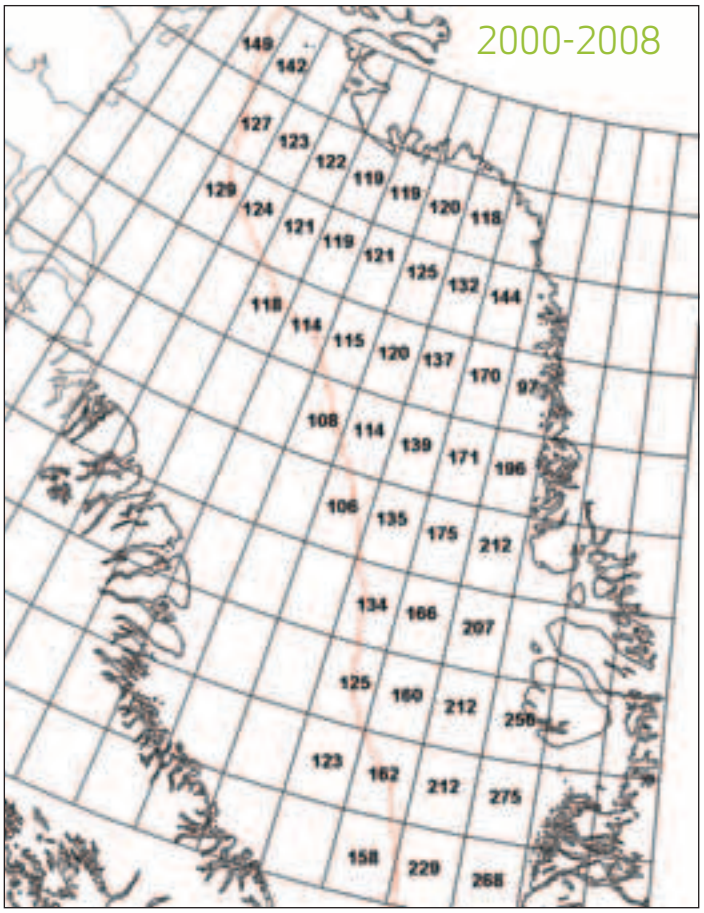


Figure 7 shows iceberg drift trajectories north and north-west. The image to the right shows the Ice Fjord at Illulissat in the Disko Bay. As can be seen, a large majority of icebergs melt in the water before reaching open sea. This means the iceberg population density is far greater in the inner fjord than on the open sea.

Figure 8.
The figure below shows the average number of ice-free days in 1978-2008 and 2000-2008, respectively.



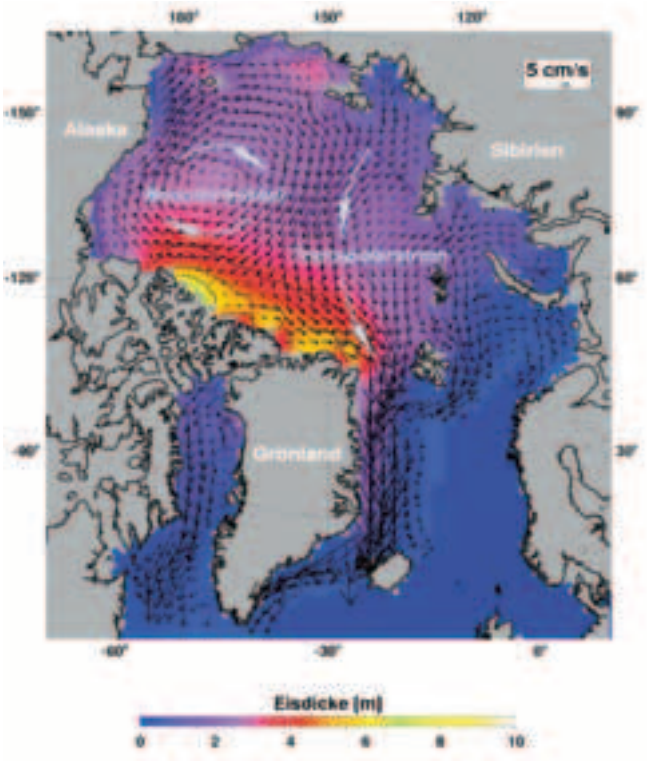


4.4.2 Ice conditions in KANUMAS East

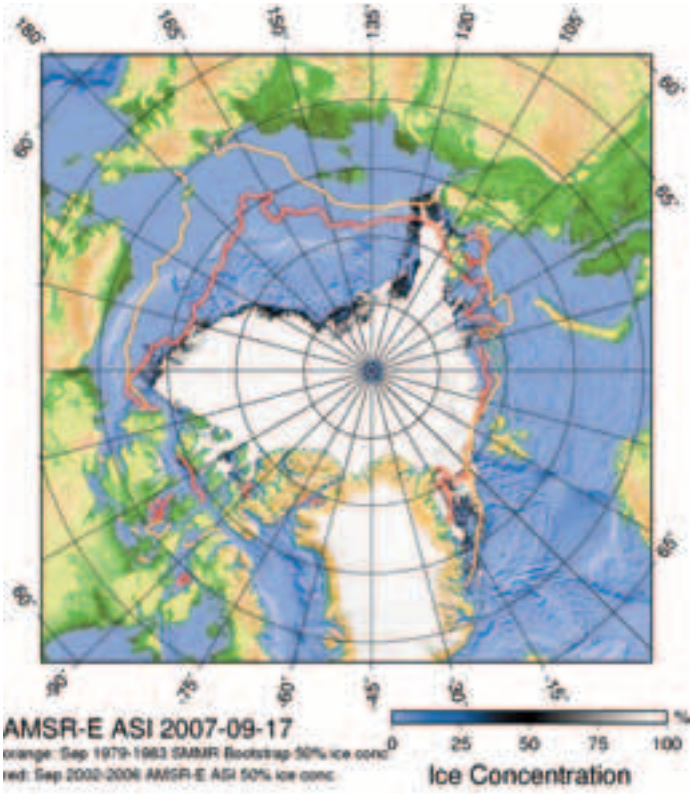
Changes in ice conditions in the Arctic Ocean are an important parameter for changes in ice conditions in north-east Greenland. The bulk of multi-year ice which can be observed in the sea offshore north-east Greenland comes from the Arctic Ocean. The melting of ice in the Arctic Ocean is critical for the ice situation in the sea offshore north-east Greenland, since the Transpolar Drift Stream leads most of the ice from the Arctic Ocean down through Fram Strait and along the east coast of Greenland.

As can be seen from figure 10 below, in September 2007 Arctic sea ice extent was at the lowest level observed in the 34 years of satellite observations of sea ice in this region. The red line shows average ice extent in the month of September in the years 2002-2006. The orange line shows average ice extent in the month of September in the years 1979-1983.

According to the National Snow and Ice Center (US), Arctic sea ice extent has declined by 50% since the 1950s, if observations made by ships and airplanes are included in the comparison. The decline for September ice extent constitutes approximately 10% per decade or 28,000 km^2 per year.

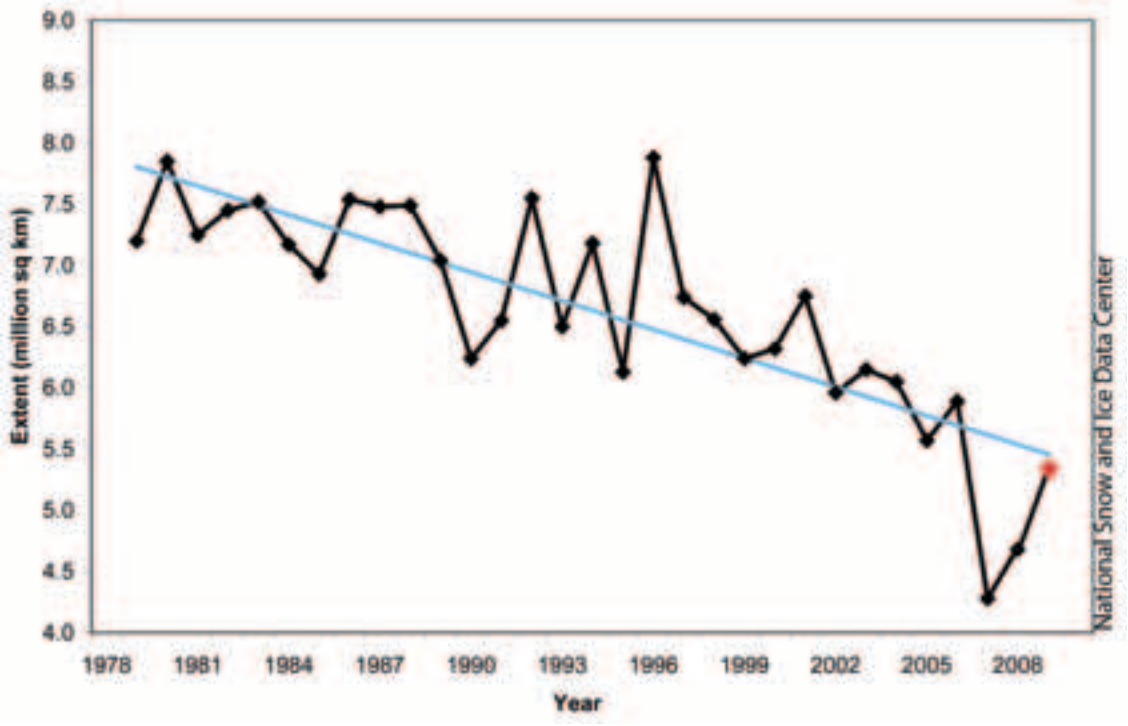


Figur 9.
The significance of Arctic Sea currents for sea ice in north-east Greenland.



Figur 10.
Ice extent in the Arctic Ocean.

Figure 11.
Average Arctic Ocean ice extent.



Average ice extent 1979 to 2008: 7.04 million km^2

5.57 million km^2 in September 2005

September 2008 ice extent was 4.5 million km^2

The sea ice off the coast of north-east Greenland has started to decline in extent as well as in thickness. The effect of the very substantial melting taking place in the Arctic Ocean further north will become even more evident in this area in a few years' time, if the eastern edge of the Arctic sea ice continues its present south-westward movement. If so, the sea ice will move outside the reach of the Transpolar Drift Stream. Today, the Transpolar Drift Stream leads the sea ice from the Arctic Ocean down through Fram Strait to the sea off the coast of north-east Greenland.

Furthermore, observations from field studies by DTU Space Center, Denmark, in the sea offshore north-east Greenland during the summer of 2008 show that the ice thickness is now a mere 180 cm. Conclusions from the studies by DTU and the National Snow and Ice Data Center can be summarised as follows:

- Arctic Ocean sea ice is declining rapidly, both with regard to concentration and thickness.
- The proportion of multi-year ice is falling, which means the remaining sea ice is made up of a greater proportion of thinner first-year ice.
- The KANUMAS area offshore north-east Greenland is affected and will be affected further by developments in the Arctic Ocean, as the decline of Arctic sea ice will imply a direct decline of the sea ice in the KANUMAS areas offshore north-east Greenland.

4.5 Environment and nature conditions

4.5.1 General conditions

Concurrent with geological and economic assessments, the Bureau of Minerals and Petroleum has initiated a strategic environmental impact assessment (SEIA) for the region in order to ensure that possible hydrocarbon activities can be carried out on an environmentally sustainable basis. The SEIA has been performed by the National Environmental Research Institute (NERI) and the Greenland Institute of Natural Resources (GN). The SEIA is divided into two sub reports dealing with geographically separate areas, namely KANUMAS West and KANUMAS East.

4.5.2 Environmental description of KANUMAS West and KANUMAS East

Both KANUMAS areas are situated in the Arctic zone and have the biological traits characteristic of this zone: Relatively low biodiversity, short food chains and areas with very high concentrations of biological organisms.

KANUMAS West

KANUMAS West is deemed to be important biologically and ecologically. Primary production in spring is high in certain places, the seabed harbours animal communities, just as there are large occurrences of both birds and marine mammals. Species of bird include thick-billed guillemot, common eider, kittiwake and puffin. Marine mammals include polar bear, walrus, narwhal, beluga and Greenland right whale.

The large polynia known as North Water located between the Qaanaaq area and Ellesmere Island is an important biological area. In winter, this area is an ice-free area in the midst of an otherwise ice-covered sea. Primary production starts much earlier here than in the surrounding areas covered by ice. This leads to concentrations of marine mammal and bird populations, and this has made it possible for humans to settle permanently in the area.

Greenland halibut and shrimp are commercially exploited in the southern part of the assessment area, and hunting and fishing for local consumption are important activities along the settled coasts.

KANUMAS East

KANUMAS East is also assessed to have local areas of biological/ecological importance. Primary production in spring is high in certain places, the seabed harbours rich animal communities, and there are occurrences of both birds and marine mammals. Species of bird include thick-billed guillemot and ivory gull. Marine mammals include polar bear, walrus, narwhal and Greenland right whale.

Also in this area, the polynias are important biological areas in the marine environment. The three large ones are the Northeast Water off the Nordostrundingen, the waters off Wollaston Forland and the entrance to Scoresby Sound. There are also several smaller polynias distributed along the coast. All of the assessment area's large colonies of breeding marine birds are situated at the polynias and this is where many inland aquatic birds gather before the ice disappears from lakes and marshes. Walrus in the area overwinter in the polynias, and here the Northeast Water is important.

Greenland halibut and shrimp are commercially exploited in the southern part of the KANUMAS East area, and hunting and fishing for local consumption are important activities for inhabitants in Ittoqqortoormiut and for hunters from Tasiilaq who go hunting to the north.

4.5.3 Assessment of environmental impact from possible activities

The strategic environmental impact assessment (SEIA) addresses possible impacts on the environment due to the various hydrocarbon activities which it is anticipated will take place during an entire life cycle, from exploration, development and production to close down of activities and the monitoring phase.

Activities in the exploration phase

Exploration activities are temporary. Typically they run for a couple of years and are usually distributed across the different licence areas granted. Furthermore, they are only carried out during the ice-free period, that is in summertime and in autumn, most likely within the period from July to October. If no oil is found which can be exploited, activities cease altogether. If oil is found, development and exploitation of the oil field will commence (see below).

The most significant impacts from exploitation are noise disturbances (e.g. from seismic surveys, drilling in the seabed and from helicopters). Impacts are expected to be relatively mild, temporary and local, as more severe impacts can be avoided through preventive measures such as avoiding activities in particularly sensitive areas or periods.

For KANUMAS West, the occurrence of e.g. beluga, narwhal, Greenland right whale, walrus and bearded seal means that animals in the winter period are sensitive to noisy activities, however exploration activities are not expected to take place in the periods when most of these species are present. Narwhals, however, have an important summer area in Melville Bay. Moreover, important migration routes for both narwhal and belugas go through Melville Bay and along the coast of Qaasuitsup Kommunea, which are also used earlier in the year, before oil activities are closed down for the winter.

Intensive seismic surveys may presumably scare Greenland halibut away from the areas (KANUMAS West and KANUMAS East) for a short period, and if this happens in important fishing areas, the surveys may also have a negative effect on fisheries. However, studies show that this effect is only temporary. Spawning areas are generally considered especially sensitive to seismic surveys, but Greenland halibut do not spawn in the assessment area and this is therefore not a problem.

Seismic surveys are not expected to affect the populations of shrimp or their distribution in the area.

There is a risk that marine mammals will stay away from important foraging areas and migration routes due to disturbances from seismic surveys. However, it is anticipated that this effect will only be temporary (a period of weeks or months), because the activity will cease.

It has been demonstrated that the blast wave from the air guns used in seismic surveys can only destroy fish eggs and larvae within a radius of no more than five meters. It is therefore concluded that seismic surveys do not pose any significant risk for the populations of fish.

Drilling an exploration well also involves noisy activities. The drilling itself produces noise, as do machinery, propellers etc. holding the floating platform in place (in most areas the sea is too deep for the use of drilling units that stand on the seafloor). This may scare off marine mammals, and whales are especially sensitive to noise. There is therefore a risk that narwhals, belugas, Greenland right whales and walrus in particular may be scared away from important habitats.

In KANUMAS West the risk is small however with regard to beluga, Greenland right whale and walrus, as their presence in the area will only overlap with a possible exploratory drilling for a short period in late autumn.

For both areas there is risk that fin whale, minke whale and humpback whale will be scared off temporarily in the summer months. This could have a negative effect on hunting activities during the period of exploration.

Drilling of one well typically produces approximately 450m^3 of drill cuttings and requires about 2,000m^3 of drilling mud. As a rule, drill cuttings and drilling mud are discharged to the seabed after the cuttings have been cleaned. This will have an impact on the local bottom fauna. This impact was especially significant when oil-based drilling mud was used, however today more environmentally friendly water-based types are used.

It is difficult to assess the impact of the discharge of drilling mud and drill cuttings in the KANUMAS West area, because available knowledge about benthic communities is very limited. However, it is expected that discharges from drilling a single exploration well will only have a minimal impact, providing the most environmentally friendly types of drilling mud are used. Impacts can be avoided by omitting to discharge drilling mud and drill cuttings and bringing these ashore instead or pumping it back into the borehole after drilling.

Development and production

In contrast to the exploration phase, activities during development of an oil field and the production of oil or gas are long-term (spanning decades), and several of the activities can cause potential, serious environmental impacts. These impacts can be prevented to a great extent by meticulous planning and use of recognised HSE procedures (Health, Safety and Environment), BATs (Best Available Technologies), and BEP (Best Environmental Practice).

Potential environmental problems associated with production water may be avoided by pumping the water back into the oil well, such as the Norwegian "zero discharge" policy prescribes for the Barents Sea.

Energy consumption from development and production is enormous, and establishing a large oil field in Greenland may, if not regulated, contribute significantly to Greenland's total greenhouse gas emissions. This impact can however be avoided by imposing requirements for injecting CO_2 back into the subsoil.

When locating installations on land, possible impacts on the landscape must be assessed and minimised, as such installations could contribute e.g. to reducing an area's value as a potential tourist attraction.

Fisheries in the areas where development and production activities will take place will be limited in the vicinity of seabed installations (wells and piping) and around platforms. Usually, a safety zone/fenced-off zone will be established at a distance of 500 meters from such installations.

4.5.4 Oil spills

Large oil spills are the most serious environmental impacts that may occur in connection with oil activities. These can occur either from blowouts, where control with the borehole is lost during drilling, or from accidents in connection with storage and transport of oil, for example in connection with shipwrecks.

Large oil spills are very rare today, because equipment and safety measures are continuously being improved. In 2007, AMAP, the Arctic Monitoring and Assessment Programme, assessed the risk of oil spills in the Arctic to be greatest in connection with transport of oil in Arctic waters.

Larger oil spills from drilling and production facilities are extremely rare, due to the technical solutions which have been developed for drilling oil and for securing wells in connection with production of oil. With regard to actual oil blowouts from the subsoil, studies show that it is most likely that high concentrations will only occur in limited areas. The risk of an oil spill from the oil tankers that transport oil to and from Greenland or through Greenland waters is far greater.

A report from the National Research Council (the U.S. National Academy of Sciences) estimates that total spills of petroleum (oil) worldwide from all known sources amount to 1.3 mill. tonnes. According to the report, the main sources are:

- Natural seepage from the subsurface: 46 %
- Discharges during the operation of vessels and from activities onshore: 37 %
- Discharges from vessels caused by accidents/incidents: 12 %
- Oil spills in connection with exploration/exploitation: 3 %
- Other sources: 2 %

Oil spills in coastal waters are generally considered more detrimental than oil spills in the open sea. The reason coastal waters are more vulnerable to oil spills is the fact that here the oil can have an impact on areas with high biodiversity and dense populations of animals such as spawning Atlantic capelin, banks with benthic animals that are an important food source for walrus, and areas with large bird populations.

In the open sea, the effect of thinning and distribution of the oil across the water surface helps reduce the environmental impact of oil spills. An oil spill will rarely affect populations of shrimp and Greenland halibut, which are important species for fisheries in Greenland.

Birds are vulnerable to oil spills on the surface of the sea and the KANUMAS West area has numerous bird populations. Breeding birds include large colonies of thick-billed guillemot, dovekie, common eider, Arctic tern and puffin, and there are important populations of moulting king eider. For KANUMAS East, breeding birds include large colonies of thick-billed guillemot, dovekie, common eider, Arctic tern and ivory gull, and there are moulting common eider and at least one fjord with moulting king eider.

Marine mammals may also be affected by oil spills on the surface of the sea. In KANUMAS West there are populations which are vulnerable because they are already affected by human activity, primarily hunting. This includes beluga, narwhal and walrus, the populations of which are in decline. Furthermore, walrus and bearded seal live off benthic animals and therefore may be exposed to oil through the food chain.

In KANUMAS East, walrus will be exposed, because they are concentrated in a few important foraging areas. New studies also indicate that killer whales (and therefore probably also other whales) are vulnerable to breathing in oil vapours from oil spills.

Polar bears are especially vulnerable, because they lick their pelts to clean off the oil and are therefore poisoned by the oil in the process. Greenland right whales, which occur in the area, belong to a population that has just recently started to show progress after having been almost extinct in the early 20th century.

Simulations of oil spills

The Danish Meteorological Institute has modelled the drift patterns for oil spills in KANUMAS West based on four spill sites. The four sites were selected by GEUS as examples of areas that are likely to be subject to future drilling for oil (based on geological conditions). The oil selected (Statfjord) is an average and representative oil type, which is lighter than sea water and one-third of which will evaporate within 24 hours. In model simulations, where the oil spill was constant, a 10-day period was selected with a daily spill of 3,000 tonnes. This constitutes a large oil spill, which is not very likely to occur. Wind conditions were selected based on three average months with differing wind speeds. A total of 24 seepage simulations of one month duration were performed (from four positions, three periods and two depths). From two of these positions, simulations showed that, in a single period, discharge from the sea surface and seabed reached the coast in significant amounts. From a third position, the simulation showed that discharge from the sea surface and the seabed reached the coast in lesser amounts.

The Danish Meteorological Institute has also modelled the drift patterns for oil spills in KANUMAS East, based on three spill sites (i.e. three positions, three periods and two depths). Here, simulations showed that discharge from one of these positions from the sea surface and seabed, in a single period reached the coast in lesser amounts.

For the remaining 32 of the oil spill scenarios performed in KANUMAS West and KANUMAS East, it is predicted that the oil will **not** reach the coast.

On the basis of the oil spill simulations performed by the Danish Meteorological Institute and mapping of areas with sensitive environments (see the preliminary SEIA), the overview map below shows areas for which special consideration should be given by anyone wishing to participate in the licensing round (figures 12 and 13).

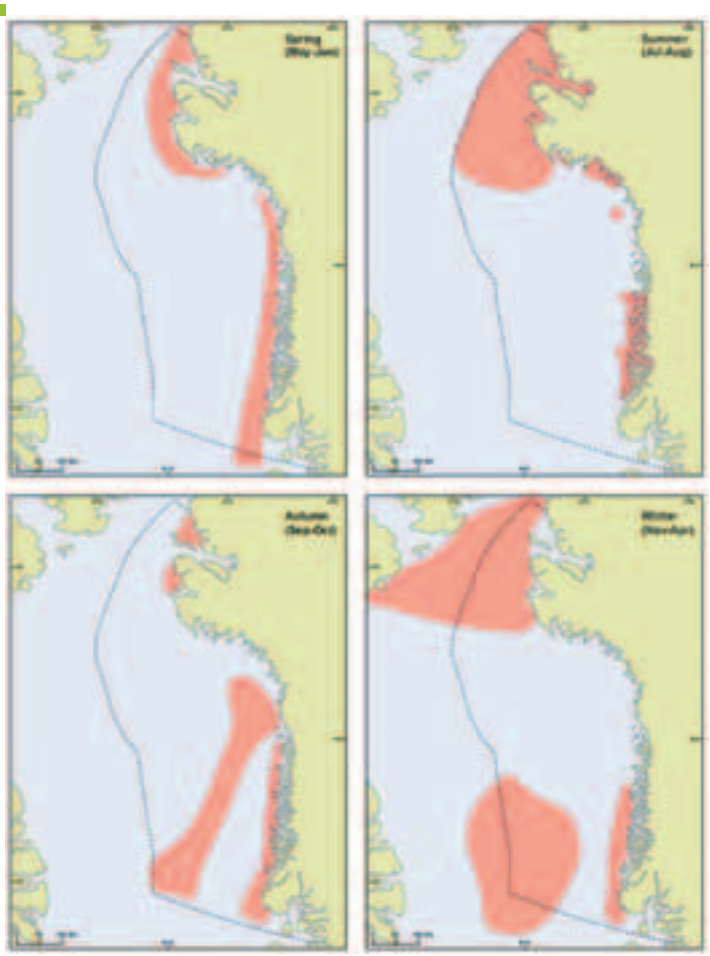


Figure 12.
Sensitive areas in Melville Bay.

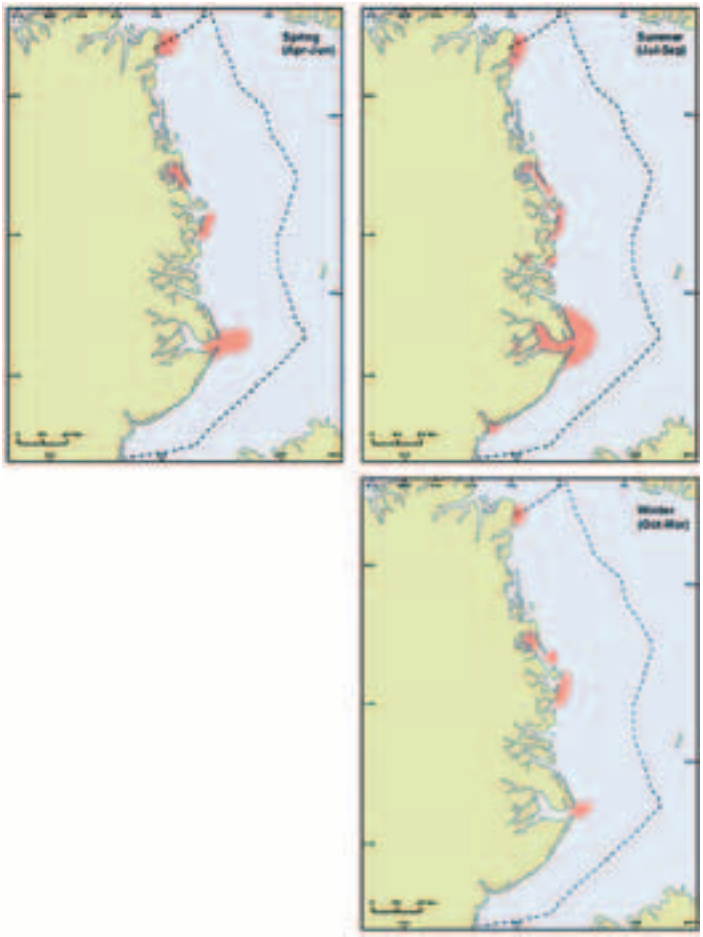


Figure 13.
Sensitive areas in KANUMAS East.

For KANUMAS West, the northern area and the area along the coast contain sites which, throughout the year, will be sensitive to oil exploration and, in a worst-case scenario, oil pollution. Similarly, the Melville Bay is an especially important environmental area for flora and fauna.

In the light of this, the Bureau of Minerals and Petroleum suggests that the northern area (north of 75°30') of the KANUMAS group's current preferential area, the coastal stretch, and Melville Bay are not included in the oil licence area. The licence area is located at distances of 40-70 km from the coast line. In order to take into consideration the areas which have been identified as environmentally sensitive, the distance to the coast is greater than, for example, in the licence blocks in the Open-Door area in south Greenland, and in the blocks situated closest to the coast in the Disko West area. However, the licence area still covers areas which are deemed to be among the most geologically interesting areas on the basis of both newly collected data and assessments by GEUS and USGS.

In addition to the location of the licence area itself, and therefore siting of the potentially disturbing activities, a number of mitigating initiatives can limit the impact on the environmentally sensitive areas. For example, exploration activities performed in the same period as the narwhal's autumn migration across the area must be adapted so that appropriate protection is offered to the narwhals. This could be e.g. in the form of a ban against oil transports in special corridors in relevant periods. The winter habitat of narwhals in the southern part of the area will not have significance for exploration, as no exploration activities will take place here in the winter period.

Also for KANUMAS East, the coastal areas are the areas deemed to be sensitive. Studies show that the area in and around Scoresby Sound is especially sensitive to possible oil activities.

The Bureau of Minerals and Petroleum therefore suggests that the licence area in KANUMAS East is located so that it does not include any coastal stretches. Furthermore, the Bureau of Minerals and Petroleum suggests that the offshore area in and around Scoresby Sound is altogether excluded from the area designated for a licensing round.

Prevention of oil spills

As emphasised above, large oil spills constitute the most severe potential environmental impact from oil activities. Therefore, it is essential to try to prevent oil spills actively.

The best protection against oil spills is to avoid the accidents that cause the spills. Preventive action through training and education of crew members is therefore essential. This includes e.g. meticulous planning, use of the most reliable equipment, and thorough monitoring of safety and material. If accidents do happen, it must be possible to respond immediately. The crew must be able to interpret the pressures measured regularly during drilling, and, on the basis of measurements, regulate the weight of the drilling fluid and operate the safety valves, also known as blowout preventers.

When operating in offshore areas, fast ice or drifting icebergs are likely to present another accident hazard which - in the worst case scenario - may result in oil spills. Very large drifting icebergs may affect the manner of navigating or drilling in the area. Therefore, authorities require that plans be drawn up on how to react to icebergs, and on easy access to equipment to launch such plans.

Oil spill management

The very first response to an oil spill incident is rapid deployment of containment booms to prevent spreading and enable recovery of the oil. Contained oil is pumped into barges, vessels or floating tanks, and transported to onshore receiving facilities, in order to be decomposed. This procedure is used during daylight, in calm and clear weather.

If the area in question is characterised by powerful winds, heavy precipitation and fog or ice, this may reduce the effectiveness of the possible measures that can be taken to abate an oil spill. If weather conditions do not allow the use of containment booms, dispersion may be a suitable response. By dispersion, chemicals spread over the spilled oil promote mixing of oil in the water column, and, thus, remove the oil from the surface of the sea. The dispersion operation can take place from a vessel or an airplane, and the method can therefore be deployed rapidly. The method is most effective on new spills of light oil types. Oil can also be managed by in-situ burning, directly on the surface of the sea. During burning trials, up to 99 per cent of the oil was removed from the surface of the sea.

Coasts which - for reasons of biology or fishing/hunting interests - are particularly sensitive, can be protected by containment booms. Coasts affected by oil spills often have to be cleaned up, using methods adapted to the nature of the coast. By way of example, oil on sandy beaches may be removed by scrapers, and rocky coasts can be washed manually.

Bioremediation are methods that enhance the ability of naturally occurring oil-degrading bacteria to degrade oil in water or on land. These biological methods are particularly efficient for beached oil.

4.5.5 Environmental regulation

Approval

When a company obtains the right to carry out prospecting, and to explore and to exploit mineral resources in a specific area in Greenland, the prospecting licence (including "Standard terms for prospecting licences. Hydrocarbons") or the exploration and exploitation licence (based on the politically agreed model licence) stipulates that the activities of the company must be approved by the authorities before they are initiated.

Licences are awarded on the basis of work programmes for seismic surveys, drilling activities, development, production etc. In addition to a general description of the overall work and the way it will be carried out, the programmes include an environmental assessment of the activities, safety plans, environmental protection plans, emergency response plans and warning plans, for example with measures to be taken in the event of large icebergs approaching the drilling vessel/rig.

Approval of seismic surveys is based on the set of rules in "Seismic Survey Standards for Offshore West Greenland". The EIA and environmental protection plans for seismic surveys must be based on the NERI document, "Preliminary Environmental Impact Assessment of Regional Offshore Seismic Surveys in Greenland", and on the strategic environmental impact assessment (SEIA) prepared by NERI and the Greenland Institute of Natural Resources. For example, it appears that the negative impacts of seismic data collection can be reduced by applying a soft-start to the sound source whenever a new line commences. This will allow marine mammals to notice the sound and move away from it before the noise reaches a harmful level. Furthermore, marine mammal observers can be brought along on ships, so that start of the seismic sources can be delayed if animals are observed in close vicinity of the ship. Furthermore, if an area is particularly vulnerable at a specific time of the year, e.g. when fish are spawning, it will be excluded from seismic surveys during the period in question.

The following briefly describes the main characteristics of environmental impact assessment, environmental protection and emergency response plans.

Environmental impact assessment (EIA) and socio-economic impact assessments (SIA)
Before commencing an activity (e.g. drilling an exploration well), licence holders must prepare a location-specific environmental impact assessment, corresponding to the Danish VVM report (Vurderinger af Virkninger på Miljøet). Such an assessment contains an analysis of the impact of a given activity on its surrounding environment. The assessment includes impacts from the daily operation associated with the activity, as well as impacts on both the biological (fauna and flora) and the physical environment from possible accidents. The assessment must be approved by the authorities.

In addition to the environmental impact assessment, companies must assess the socio-economic impacts. Socio-economic studies may include assessing derived economic and social activities, including the commercial possibilities related to oil activities, such as the use of Greenlandic labour and Greenlandic businesses.

The derived economic and social activities may also include the impact on and the need for infrastructure, the interplay with public authorities, and conditions which otherwise are of significance nationally and for the relevant local communities.

Environmental protection
The Environmental Protection Plan sets out guidelines to be followed by companies in their daily operations, ensuring that the impacts on the environment are reduced and kept within the limits approved by the authorities. The plan specifies which types of xenobiotic substances can be used, and describes the manner in which sewage, waste, chemicals, fuel, drilling mud etc. are to be managed. The plan also presents procedures for cleaning up minor spills of fuel and oil related to operations, for remedying damage to the terrain, and for protecting vulnerable areas and animal life etc.

Furthermore, the plan addresses the use of the most environmentally friendly substances and best available technical solutions, and efforts to reduce activities in biologically sensitive periods and areas.

4.5.6 HSE regulation and prequalification of operators

It is essential that internationally recognised authority requirements are imposed, not least concerning potentially environmentally-harmful discharges. Prior to launching an exploration drilling activity, operators must submit an application to the authorities, asking for a drilling licence. The application must include: specific information on plans for carrying out the project in accordance with good international practice in the sector, including systems for HSE (health, safety and environment), safety and control systems, manpower, working procedures, weather and ice warning systems (with a view to temporarily closing down the project, if needed), and emergency response plans. Moreover, the application must include an environmental impact assessment of the planned activity.

When preparing and implementing a drilling activity, authorities will supervise the activity regularly in order to see that the licence terms are observed, and that the operator's own safety and control systems run satisfactorily.

The Emergency Response Plan addresses procedures for containing and cleaning up possible large oil spills. Minor spills must be managed by the company by means of clean-up equipment placed at a central and appropriate location in relation to the drilling operations. For major spills, efforts by the responsible company are supplemented by international emergency response companies with special skills, and by the authorities in the countries likely to be affected by the incident.

As a minimum, the operator's oil emergency response plans must include a description of the organisation, personnel, alarm and warning procedures, abatement strategies and location of equipment, communication set-up, indication of where possible major oil spills will be contained and cleaned up, procedures for disposal of collected oil, surveillance of the extent of spills, protection and clean-up of coasts. Moreover, cooperating with the authorities, operators must develop long-term monitoring plans aimed at monitoring concentrations of oil and environmental impacts resulting from oil spills.

Abatement of large oil spills is a major task, based on coordinated efforts by several actors: authorities, companies and individuals. Detailed planning is therefore required in order for abatement to be effective. Further to the licence holder's duty of preparedness, the public authorities have established an emergency preparedness facility, which will apply when accidents take place. The emergency preparedness facility consists of the Police; the Greenland Command; the Danish Maritime Authority; the Danish High Commission in Greenland, the general preparedness of the Greenland Government, and the Bureau of Minerals and Petroleum. However, the company has final responsibility for abating and cleaning up after an oil pollution event.

To ensure exploration activities that are environmentally safe, it has been decided that companies wishing to act as operators in the area must go through an approval procedure, which includes the following requirements for satisfactory documentation of:

- the applicant's previous experience in hydrocarbon exploration and exploitation.
- the applicant's previous experience from operations in areas with similar physical conditions.
- the applicant's HSE system. This system must be able to ensure adequate environmentally appropriate oil exploration and exploitation.
  The documentation must also contain a review of the applicant's emergency response plans and the applicant's previous experience in managing environmental emergency situations.

Furthermore, it is a requirement in the model licence that exploration, development, exploitation and decommissioning activities may only be commenced following prior approval by the authorities.

4.6 Choice of licence areas

North-west Greenland, KANUMAS West

The KANUMAS group's preferential position in the KANUMAS West area lapses according to the KANUMAS-2 agreement, which has been negotiated with the KANUMAS group. According to the agreement, an ordinary, open licensing round is to be carried out with equal terms for all oil companies.

As described in the preceding section, the proposed licence area in north-west Greenland has been selected so that account is taken for the environment by keeping an appropriate distance of 40-70 km to the coast in coastal areas.

In the northern part of Melville Bay, special considerations have been taken to areas that are sensitive due to the fauna. The boundary has been drawn at a good distance to the coast (40-70 km) and the northernmost boundary has been drawn along 75°30'N. Towards the south, the boundary has been drawn along 70°15'N and thus includes Block 2 from the Disko West Licensing Round.

Apart from environmental considerations, the licence area has been delineated so as to include as far as possible the areas which, from a geological perspective, are deemed to hold the best oil potential.

The Bureau of Minerals and Petroleum therefore assesses that the boundary of the licensing round area should be placed as far as possible towards the coast so as to contain the most important parts of the subterranean main fault shown in figure 14, since important oil deposits may be located on the western side of the main fault. This is supported by the seabed samples containing oil taken from locations outside the western part of the main fault.

Moreover, it should be mentioned that the boundary shown towards the east mainly follows the old KANUMAS boundary.

The western boundary runs along the border to Canada and the associated two-nautical-mile buffer zone.

The licence area and the division of licence blocks was made on the basis of assessments of the oil potential by USGS and other bodies and on the strategic environmental impact assessment. The block model was also based on proposals from the KANUMAS companies and other oil companies.

The area is divided into 14 blocks varying in size between 8,170 km^2 and 15,220 km^2. The proposed licence area in KANUMAS West covers an area of approximately 151,358 km^2.

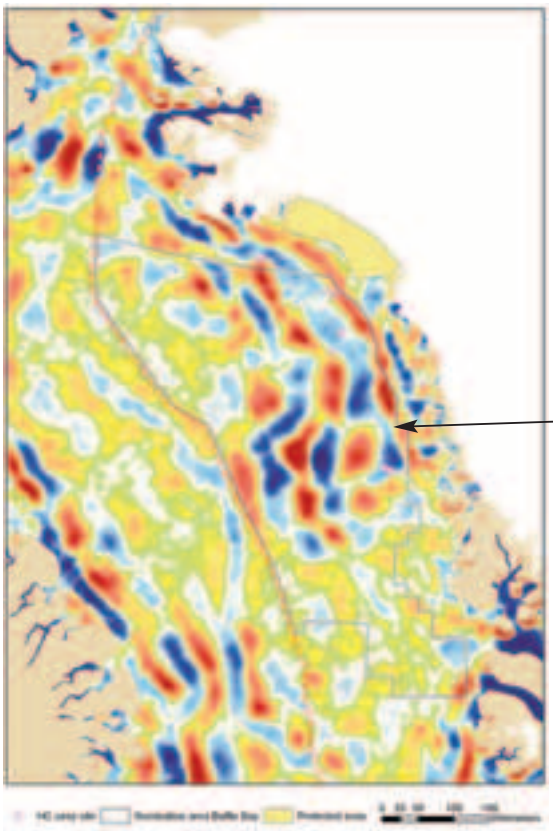


Figure 14.
The delineation of the license area in Baffin Bay superimposed on a gravimetric map. The eastern boundary follows the old KANUMAS boundary to the extent that it includes the main fault (shown in red) in the eastern part of the bay. Melville Bay Wildlife Sanctuary and the natural oil see-pages are also indicated.

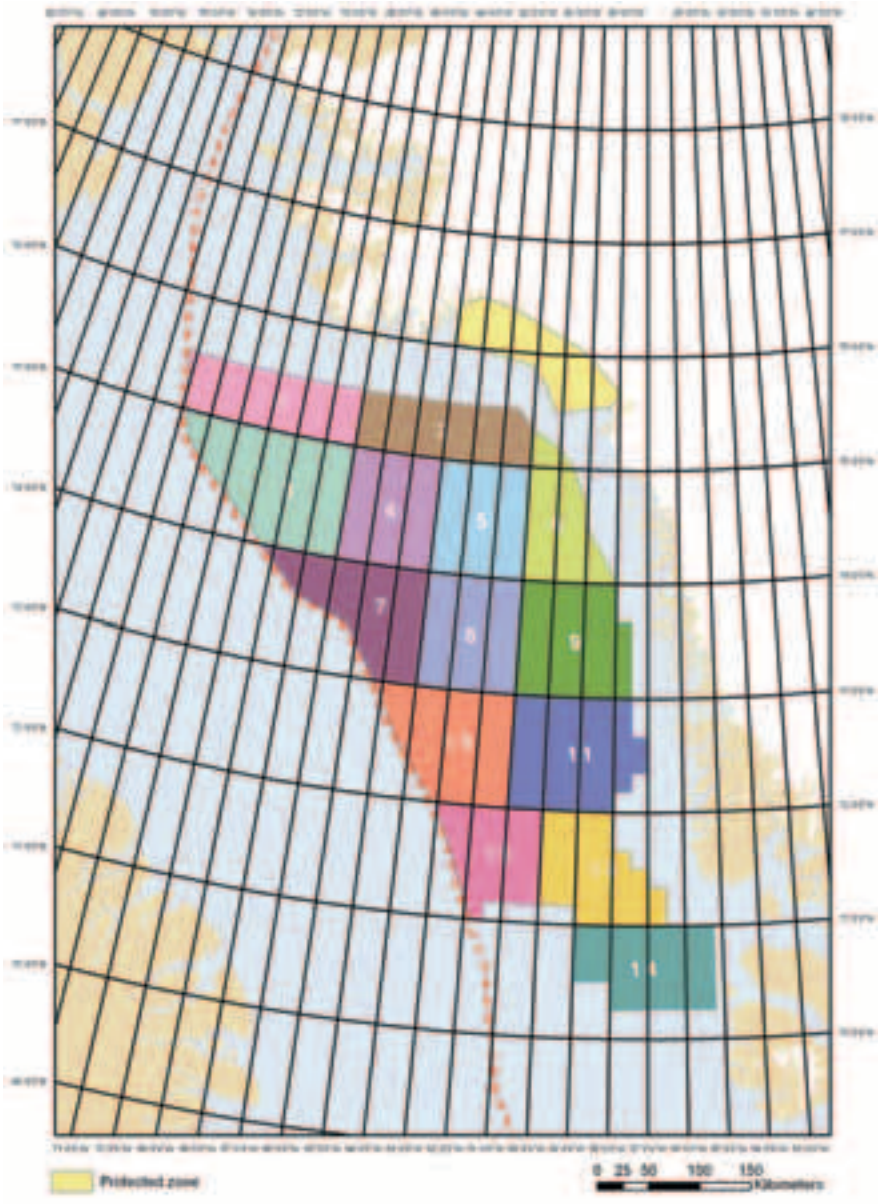


Figure 15.
As far as possible, the delineation of blocks in Baffin Bay follows a block-dimensions definition of one degree latitude (height) by three degrees longitude (width).
The yellow area towards the north indicates a protected area, which is important e.g. for the narwhal.

North-east Greenland, KANUMAS East

The KANUMAS group's preferential position in the KANUMAS East area is stipulated in the KANUMAS 2 agreement which is negotiated with the KANUMAS group, and approved politically. According to the agreement a pre-licensing round reserved for the KANUMAS group has to be carried through, followed by an open licensing round on equal terms for all oil companies. The licensing rounds are described below.

The licensing round area in North-East Greenland has been selected so that the environment is taken into account by keeping an appropriate distance to coastal stretches. Furthermore the offshore area by Ittoqqortoormiit and Scoresby Sund is excluded entirely from the area designated for the licensing round.

The licensing round areas include most of the Danmarkshavn Basin and the Western parts of the Thetis Basin, which contain the most attractive areas with oil potential according to calculations performed by the USGS in August 2007. The USGS mean assessment is that the offshore areas offshore North-East Greenland could contain 31 billion barrels of oil equivalents.

The licensing round area in KANUMAS East is located across three blocks. The Northern block in KANUMAS East has an area of approximately 95,600 km^2, the North-Eastern block in KANUMAS East has an area of approximately 1,900 km^2, and the southern block in KANUMAS East has an area of approximately 21,500 km^2. The total area of licence areas in KANUMAS East is approximately 119,000 km^2.

The delineation of areas was in close dialogue with the KANUMAS companies, and is an integrated part of the KANUMAS 2 agreement. According to this agreement, the KANUMAS group may nominate 30,000 km^2 within the licence area of 119,000 km^2 to be included in the first licensing round (pre-licensing round) reserved for the KANUMAS companies. The companies can also nominate a further 20,000 km^2 to be included in the open phase 2 of the licensing round for offshore North-East Greenland.

The KANUMAS East licensing round area consists of three sub blocks, as illustrated in figure 16 below. No later than 1 January 2011, the KANUMAS group must nominate an area of 50,000 km^2, which is to comprise the licence blocks which the oil companies can bid for in phase 1 and phase 2 of the licensing round. This nomination by members of the KANUMAS group will also cover a proposal for a division of the area into licence blocks.

No later than 1 May 2011, the authorities must make public the area of 50,000 km^2, which is to comprise the licence blocks in phase 1 and phase 2. On 1 September 2011, the KANUMAS group must nominate an area of 30,000 km^2, which is to comprise the licence blocks for which the oil companies can bid in phase 1. The 30,000 km^2 must be located within the area of 50,000 km^2 originally nominated.

No later than 1 January 2012, the authorities must determine and make public the delineation of the 30,000 km^2 area, as well as the final division of the area into the pre-defined licence blocks that the KANUMAS companies can bid for in the pre-licensing round.

Deadline for the oil companies to submit an application for the pre-qualification as operator in the pre-licensing round for the licences is the 1st March 2012.

On the 15th April 2012 the pre-qualification as operators is decided.

Deadline for the oil companies or groups of oil companies (maximum three, of which at least one has to be a KANUMAS company, plus NUNAOIL A/S) to submit applications for exploration and exploitation licences in the pre-licensing round is the 15th December 2012.

Deadline for the oil companies to submit an application for the pre-qualification as operator in the ordinary licensing round for the licences is the 1st July 2013.

On the 15th August 2013 the pre-qualification as operators is decided.

Deadline for the oil companies or groups of oil companies (maximum three, plus NUNAOIL A/S) to submit applications for exploration and exploitation licences in the ordinary licensing round is the 15th October 2013.

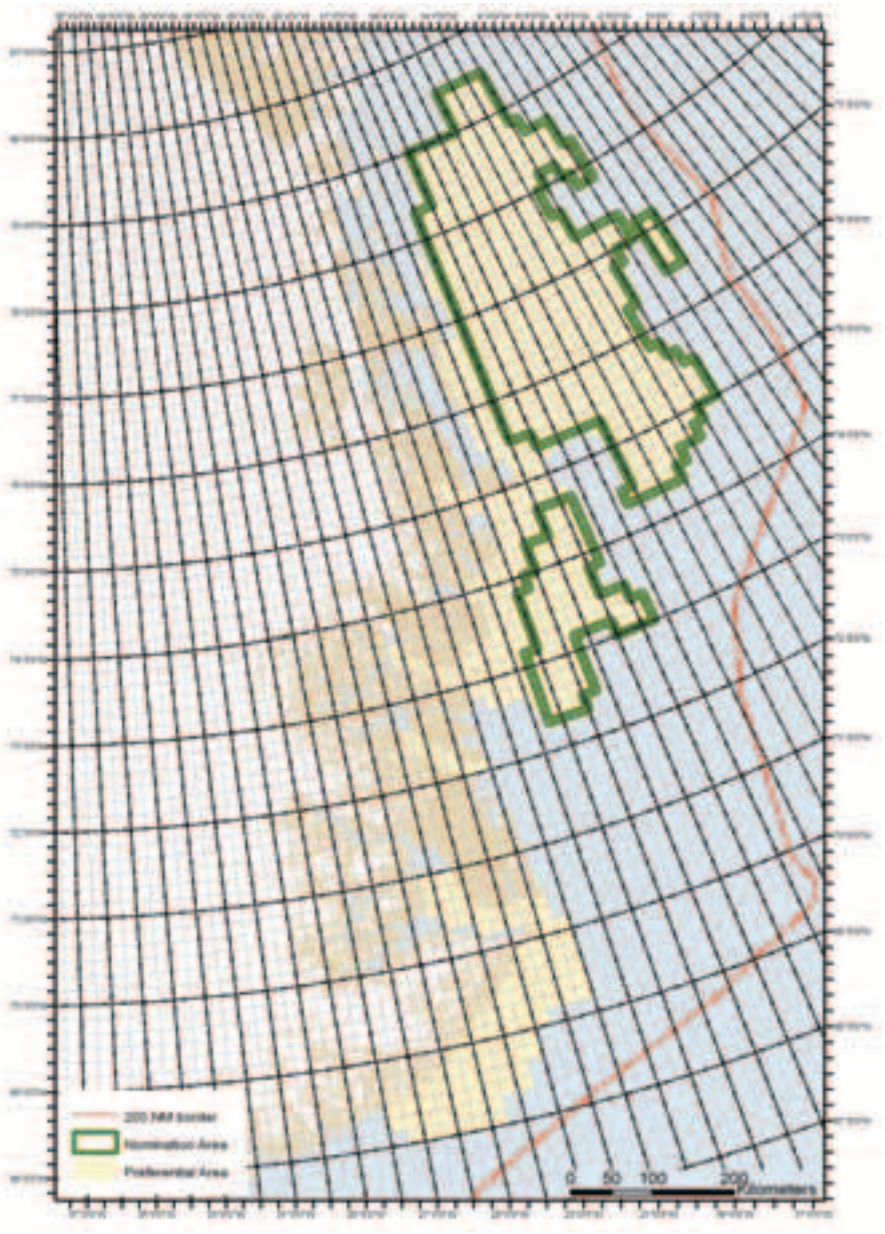


Figure 16.
The delineation of the license area in north-east Greenland. The nomination of areas by the KANUMAS group must follow the fine grid, in which the individual grid cells are 10 minutes (height) by 30 minutes (width).

4.7 Technological possibilities in the licence areas

A large number of Arctic offshore oil projects have been carried out and developed over the past decades. Examples include areas east of Canada (Hibernia, Terra Nova, White Rose), north of Russia (Sakhalin), the Beaufort Sea (Northstar, PanArctic, Drake, Qooguruk) and in the Barents Sea (Shtokman and others). Most recently, Iceland has announced tenders for oil licences in the area south of Jan Mayen.

In 2007 and 2008, seismic surveys were performed and seabed samples taken in Baffin Bay over a period from July to November. In north-east Greenland, in July, shallow stratigraphic core drilling was carried out. The cores from nine bore holes were taken at a water depth of approximately 200m. The ongoing activities in the KANUMAS areas show that surveys can be performed for five to eight months annually without any major difficulties caused by ice and weather conditions. Climate change, as we are witnessing today in the form of warming and melting of the sea ice around Greenland and in the Arctic Ocean, melting of Greenland's ice cap and thawing of the permafrost, is expected to influence and probably have a positive effect on future mineral resources exploration and exploitation.

The most suitable production technologies for Greenland include:

- FPSOs (floating production, storage and offloading vessels). These are e.g. used in the White Rose field in eastern Canada and have demonstrated that they work well in practice.
- Another possibility is sub-sea installations with pipeline connection to installations on land. This technology is used e.g. in the Norwegian Snøhvit and Ormen Lange fields.

The two technologies mentioned above are described in more detail below.

Floating production facilities

The White Rose field 350 km west of Newfoundland's Avalon Peninsula produces oil under conditions that are comparable with Greenlandic conditions (see example in figure 17).

Development of the field commenced in 2002, and the first oil was produced in 2005. The field, which is operated by Husky Energy, is situated at a water depth of 120 m and uses an FPSO facility to extract the oil. The FPSO system consists of subsea protected production installations connected by flexible flowlines to take account of icebergs. Production from the White Rose field is 120,000 to 140,000 barrels per day. The production facilities are designed to withstand a pressure from the possible impact of a 100,000-tonne iceberg.

As a part of overall activities, iceberg warning and management systems have been established, which ensure that icebergs are kept away from the oil-production vessel. This is achieved using ancillary vessels, which can push icebergs off course if they are heading in the direction of the production facility. If necessary, the floating production vessel can be taken down at short notice and moved out of danger from any icebergs which cannot be diverted.

Subsea production facilities

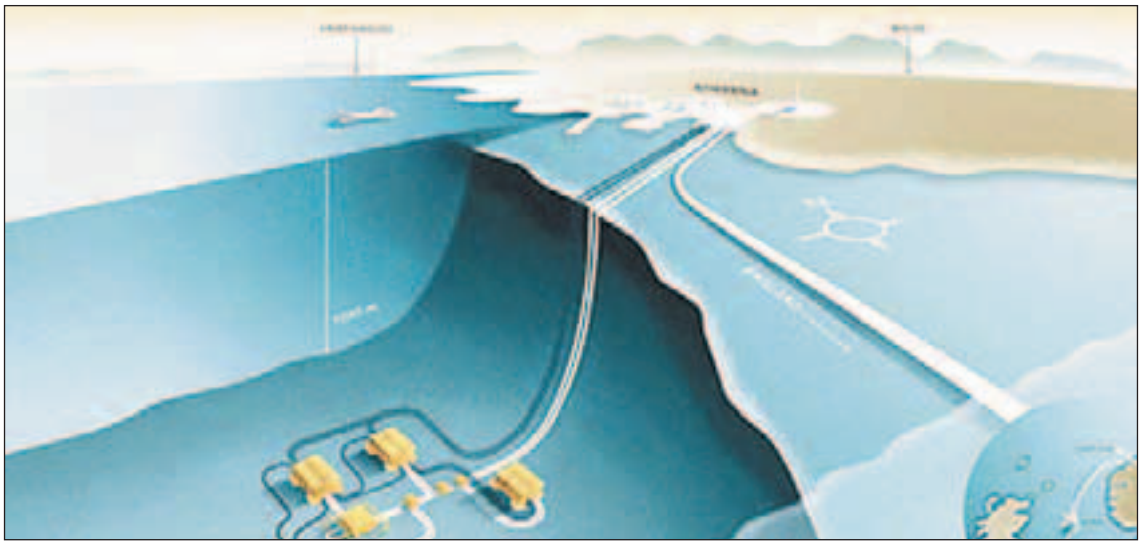
Developments in subsea technologies are going in the direction of faster production and greater distances over which oil and gas are being transported. Technologies are moving from production in deeper waters to production facilities at lesser sea depths, to floating facilities or to production facilities located on land (see example in figure 18).

Examples of subsea facilities include Ormen Lange and Snøhvit. The Ormen Lange field is situated approximately 100 km north-west of Kristiansund, where sea depths vary between 800 and 1,100 meters. The gas is being produced with a subsea installation connected to an onshore treatment plant in Nyhamna, Norway. Here, a plant has been erected which dries the gas.

After treatment, the hydrocarbons are transported to the natural-gas market in Great Britain and continental Europe via the northern part of a 1,200 km-long pipeline.

Figure 17.
Example of a floating production facility.

Figure 18.
Example of a subsea installation connected to an onshore treatment plant.



5. Financial terms and framework

When exploration is in a preliminary phase (as is the case in Greenland) the prospectivity of the area, all else being equal, will be considered extremely uncertain. With this background, it is important that private companies are given an incentive to explore in the new areas and they must be able to see a chance of reasonable financial returns if they discover anything, to compensate for the significant financial risk they are accepting in the exploration. The companies balance the prospects of making a discovery in an area and the financial returns they could reap from such a discovery.

In addition to the geological and costs aspects, as well as tax and royalty conditions, the sales price of the hydrocarbons produced plays a vital role in the assessments. Oil companies have to base their decisions on expectations for changes in energy prices many years into the future, and therefore they do not base their investment calculations regarding activities in Greenland on the current low prices.

Most countries use a combination of several of the following economic instruments: corporation tax and withholding taxes, royalties on production and/or surpluses, government participation/surplus sharing/production sharing, manpower and training obligations.

Based on a situation in which the geological data in Greenland are promising but no commercial discoveries have yet been made, compared with the high costs of exploration, development and operation (linked e.g. to water depth, ice and oceanographic conditions etc.), it is a prerequisite that the financial terms are attractive enough to encourage oil companies to apply for exploration licences in Greenland. It is also important that significant geological breakthroughs are made, which increase the prospectivity of an area considerably, before terms are adjusted/tightened in future licensing rounds.

5.1 Taxation etc. models applied in licensing rounds 2002, 2004, and 2006/2007

Prior to the licensing rounds in 2002 and 2004, and the Disko West Licensing round in 2006 and 2007, benchmark analyses were made of the financial terms for exploration and exploitation of oil and gas. The following countries were included in the study: Argentina, Australia, Brazil, Canada - Newfoundland, Denmark (new system), the Faeroe Islands, Gabon, Greenland, Kazakhstan, Mauritania, New Zealand, Norway, Russia, Tunisia and Great Britain.

The analyses led to the determination of the following competitive model for Government Take[1)] consisting of:

- Corporation tax and withholding tax at a total of 37 %.
- No royalties on turnover.
- A surplus royalty of 7.5 % when the internal rate of return before tax is more than 21.75 % + the discount rate, increasing to 17.5 % and 30 % when the internal rate of return is more than 29.25 % + the discount rate and 36.75 % + the discount rate respectively.
- A 12.5 % interest for NUNAOIL A/S in the exploration phase.
- Various taxes and charges to cover costs of case processing by the authorities.

5.2 Government Take in Greenland compared with other countries

In collaboration with the internationally recognised energy consultancy, IHS Energy, the Bureau of Minerals and Petroleum carried out an assessment of the above model for taxation and fees in the oil sector in Greenland compared with a number of similar countries.

The assessment includes:

- A comparison of the taxes and fees etc. applying to oil activities in Greenland relative to other countries.
- Recommendations for future terms for taxes, fees and public participation in relation to exploration and exploitation of oil and gas in Greenland.

In the study, the potential fiscal instruments for public revenues from oil activities comprise the following categories:

- Corporation tax and withholding tax
- Royalties on gross turnover
- Surplus royalties
- Miscellaneous taxes, including export fees/taxes
- Other indirect taxes (such as stamp duties, value-added tax, transfer taxes, licence charges and fees etc.)
- Direct public participation in licences

Table 1.
In order to derive an appropriate breakdown of the competitive position of comparable countries with regard to taxes and fees, the 17 countries included in the comparison have been broken down into the following categories:

(Greenland is included in each of the groups)

FRONTIER COUNTRIES	NEIGHBOURING COUNTRIES	NON-FRONTIER COUNTRIES
Greenland	Greenland	Greenland
Barbados	Alaska	Alaska
The Falkland Islands	Canada NWF	Argentina
The Faroe Islands	Denmark	Australia
Mauritania	The Faroe Islands	Brazil
Morocco	Norway	Canada NWF
New Zealand	Great Britain	Gabon
Tunisia		Kazakhstan
		Norway
		Russia
		Great Britain

The main prerequisites of the benchmark analysis of the overall Government Take (taxes, fees and public participation) of the individual countries are:

- Exploration costs of USD 300 million (USD 0.30 per barrel oil)
- Investment costs of USD 8,000 million (USD 8.00 per barrel oil)
- Operating costs of USD 23,610 million (USD 23.61 per barrel oil) over the project's life time
- Production of 1 billion barrels oil
- The long-term oil price is set at USD 75 per barrel oil (the present price level is therefore not expected to reflect a long-term level)
- An assumed inflation rate of 3 % per year.

The results of the benchmark analysis of the 17 countries are illustrated in figure 19 below.

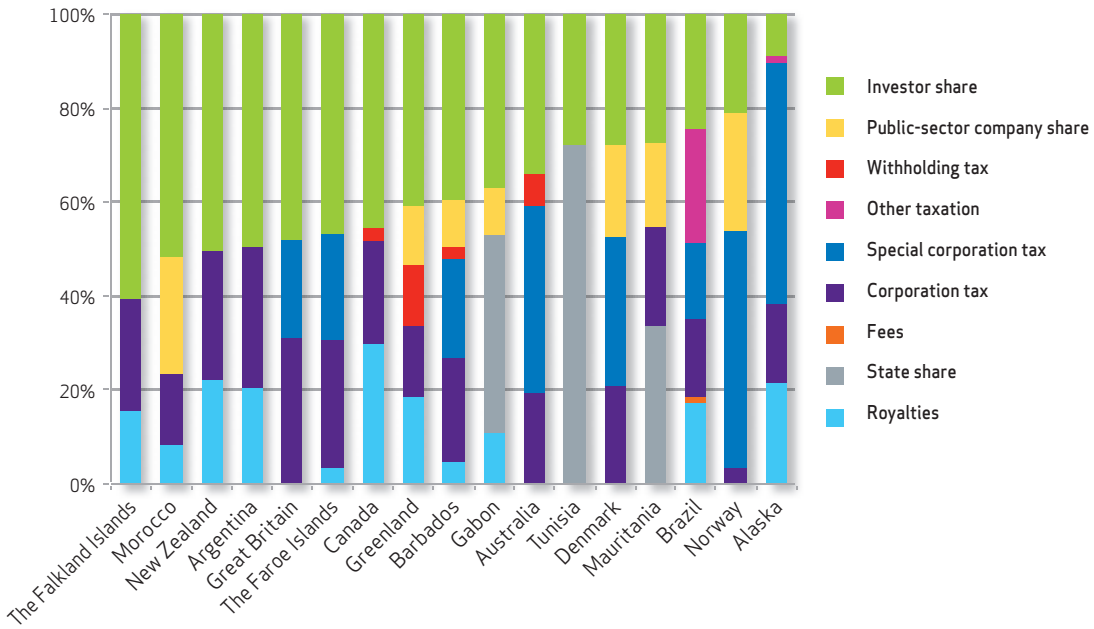
In the calculation example, with the current model for taxes and fees etc., Greenland charges 59 % in taxes, fees and public participation. It appears from the comparison that Greenland places higher than both a number of mature oil countries as well as frontier and neighbouring countries. Greenland's Government Take is therefore higher than that of Canada NWF, the Faroe Islands, Great Britain, Argentina, New Zealand, Morocco and the Falkland Islands.

A comparison with the seven other frontier countries reveals that three countries have a higher Government Take. These are Barbados (60.3 %), Tunisia (72.2 %) and Mauritania (72.8 %).

A comparison with the six other neighbouring countries reveals that three countries have a higher Government Take than Greenland. These are Denmark (72.5 %), Norway (83.3 %) and Alaska (91.2 %). The Government Take of Great Britain (52.1 %), The Faroe Islands (53.3 %) and Newfoundland (54.6 %) is lower than Greenland's.

A majority of mature oil countries, i.e. countries with a well-developed oil sector, charge taxes and fees etc. at a higher level than Greenland (59.2 %). Argentina (50.6%), Great Britain (52.1%) and Canada NWF (54.6 %), however, have a lower Government Take.

Figure 19.
Comparison of countries in the benchmark analysis



5.3 Conclusion on country comparison

With more than 120 countries worldwide competing for investments in exploration and exploitation by oil companies, knowing Greenland's competitive position relative to the other countries is essential. Oil companies can easily aim their exploration budgets at other countries and regions. Greenland therefore has competition from both neighbouring countries as well as other frontier countries and countries with well-developed oil regions.

Among the frontier countries, New Zealand issued the greatest number of oil licences (138) in the period 2002 to 2008. Greenland had a total of 13 oil licences in 2008. All other frontier countries have issued about the same number or more licences. The Faroe Islands and the Falkland Islands have issued 11 and 7, respectively, while Tunesia and Mauritania have issued 60 and 48, respectively.

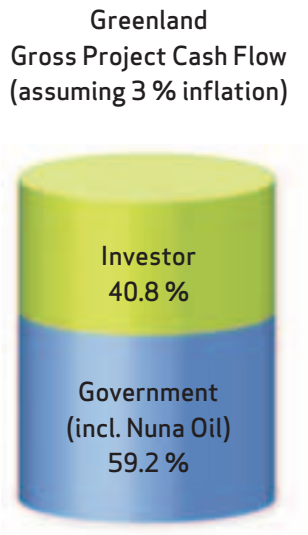


Figure 20.
Total division of net revenues in Greenland.

Among the frontier countries, in the period from 2002 to 2007, the greatest number of drilling activities was carried out in New Zealand (70), Tunisia (45) and Mauritania (23). There were no drilling activities in Greenland and the Falkland Islands.

As mentioned, IHS Energy has calculated Greenland's maximum Government Take to be 59.2%. Figure 20 below shows how net revenues are divided among the investor (the oil company) and public authorities.

When looking at the competitiveness of the countries from the point of view of oil companies, the Government Take of Greenland ranges 5th out of a total of 8 frontier countries, and 4th out of a total of seven neighbouring countries. Compared with the countries that have a well-developed oil region (non-frontier countries), Greenland is the fourth most competitive out of a total of 11 countries.

Despite a relatively high Government Take, the current royalty model has proved its sustainability offshore west Greenland (from the southern point up to 71°N, which is the northern boundary of the area for the Disko West Licensing Round), in that interest in the area has been constant and has even grown after the most recent licensing round.

The question is therefore only whether the current Government Take model is also competitive for the northern KANUMAS areas, which are characterised by a high cost level and difficult operating conditions. The recommendation for the level of taxation, fees and public participation in these areas must be seen in context with an assessment of whether the tax and royalty components used have been combined in the most appropriate manner, or whether other economic models should be considered.

5.4 Possible new models for taxation, fees and public participation

5.4.1 Public participation

In previous licensing rounds, emphasis was on whether NUNAOIL A/S should also be included as a public partner in new licences. NUNAOIL A/S was to participate as a carried partner in the exploration and assessment phase.

The advantage of public participation is that it allows for development of competency within the oil industry and thereby lays the foundations for a future oil industry in Greenland. In addition the public sector is assured a share of the surplus from any oil production, and a publicly owned company could also help increase Greenland's share in the supply of goods and services. One of the disadvantages of demanding a publicly owned company's participation in the exploration phase is that this increases the other oil companies' costs in this phase.

In compliance with previous decisions by the governments of Greenland and Denmark, it is recommended that in future a public company participates as a 12.5% carried partner in the exploration and assessment phase.

5.4.2 Royalties

Generally, surplus royalties are introduced on the grounds that society can thereby achieve a greater share of the profits from oil production. Surplus royalties are calculated on the surplus in relation to the capital invested. The advantage of surplus royalties is that the oil companies only have to pay a royalty once a reasonable internal rate of return on the company's investment has been achieved. In this way oil companies can be sure that they will not have to pay royalties on loss-making production. This makes countries with surplus royalties attractive for companies considering making investments in risky regions such as Greenland.

IHS Energy has calculated Greenland's maximum Government Take to be 59.2 %. Figure 21 below shows the breakdown of net revenues between the different taxation and fee categories, NUNAOIL A/S and the oil companies.

Royalties based on gross turnover are typically paid from the start of production as a fixed percentage of the value of production. Payments are thus independent of the size of the surplus from exploiting a discovery. The advantage of a royalty based on turnover is

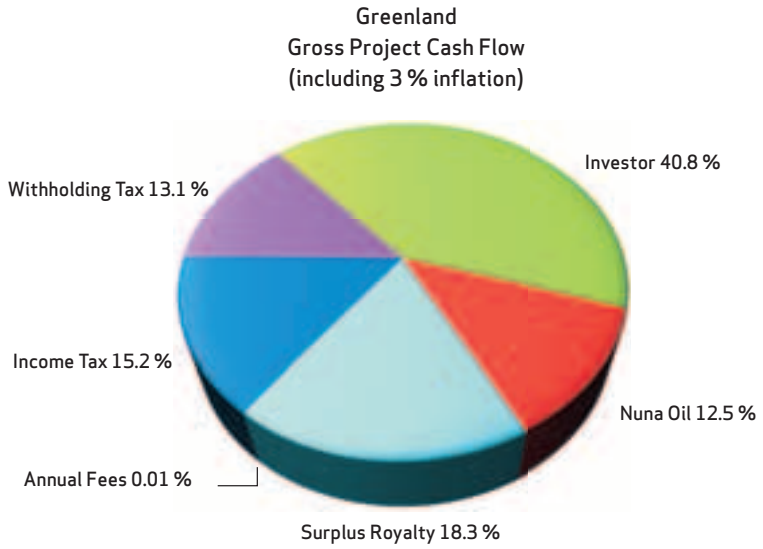


Figure 21.
The breakdown of net revenues between the different taxation and fee categories, NUNAOIL A/S and the oil companies.

that the public sector receives an income from the commencement of production, irrespective of whether the oil company earns a surplus, as the royalties do not depend on the size of the surplus. The disadvantage is that the oil companies risk having to pay royalties in a situation where production has given rise to losses. The oil companies therefore consider this form of royalty as an inappropriate taxation parameter and consequently prefer the other fiscal tools and countries that have no royalty on gross turnover. Introducing a royalty on gross turnover could therefore put a stop to the current investments in oil exploration in Greenland.

In the analysis performed by IHS Energy, three of the nine frontier countries covered by the analysis have royalties on total turnover. These countries include Barbados (3%), the Falkland Islands (9%) and the Faroe Islands (2%). None of these countries have any oil activities of significance today.

Retaining a surplus royalty keeps to the principle that production tax should only be paid if a surplus is earned under a licence.

Naturally, the result of a surplus-dependent system is that the greater the investment in developing a production field, the less the income for the Greenland's Self-Governance from the surplus royalty. The reason for this is that the oil companies do not have to pay the surplus royalty until they have a surplus which covers the investment and operating costs incurred as well as interest on the capital invested.

From the public sector's perspective, the worst possible scenario would be a licence with exceptionally high initial investments over a large number of years before production commences. On the other hand the licence holder would have funds tied up in the investment for many years without earning a return to cover the costs of financing the investment. All else being equal, this would reduce the licence holder's real return from the licence, and therefore it is in the licence holder's interests to start production as quickly as possible.

If this strategy plan, the aim of which is to offer the KANUMAS areas for tender, is implemented, the activities will take place under difficult operational conditions, including not least sea ice and icebergs to greater or lesser extent. This means that initial investments in oil-extraction equipment will probably be much higher than for the offshore areas further south. The high level of investment (with the current surplus royalty system adapted to areas further south) could reduce the percentage share of the public sector in the oil companies' surplus to an inappropriately low level.

A possibility could be to introduce an adapted royalty system which retains the best elements of the current system, but which is also less sensitive to the large initial investment. In this context it is important that the system is not designed so that it inhibits investment by the oil industry.

The primary objective of an adapted system is that it should be less sensitive to large initial investments and adapted to a frontier area, i.e. that it should only add limited supplementary revenue to the corporation tax, if the oil companies only earn modest returns from activities in Greenland. However, the system should also be progressive so that the industry must pay a higher percentage Government Take to the public sector if the surplus from oil activities rises. At the same time the model must be suitably simple and transparent for the oil industry.

To help in this assessment, the Bureau of Minerals and Petroleum, in collaboration with IHS Energy, has analysed the alternative models of royalties and surplus royalties listed below. Models which, using control calculations, have been characterised as being either (a) extremely inhibitive to investment - i.e. even more than some of those shown, (b) unusual examples for some of the models included or (c) very digressive - i.e. with an increasing tax rate for falling surplus and vice-versa, have not been included in the final presentation.

Figure 22 below shows the percentage revenue to the public sector for each of the five models mentioned below. The diagram also includes the results of sensitivity calculations which show the changes in Government Take rates compared with the current Greenland model for taxes and surplus royalties etc., when the sales price and costs of a barrel of oil are increased or reduced by 40 %.

I.e. the following assumptions:

- Sales price per barrel oil: -40 %
- Cost per barrel oil: +40 %
- Long-term sales price per barrel oil: USD 75 (Base Case)
- Cost per barrel oil: -40 %
- Sales price per barrel oil: +40 %

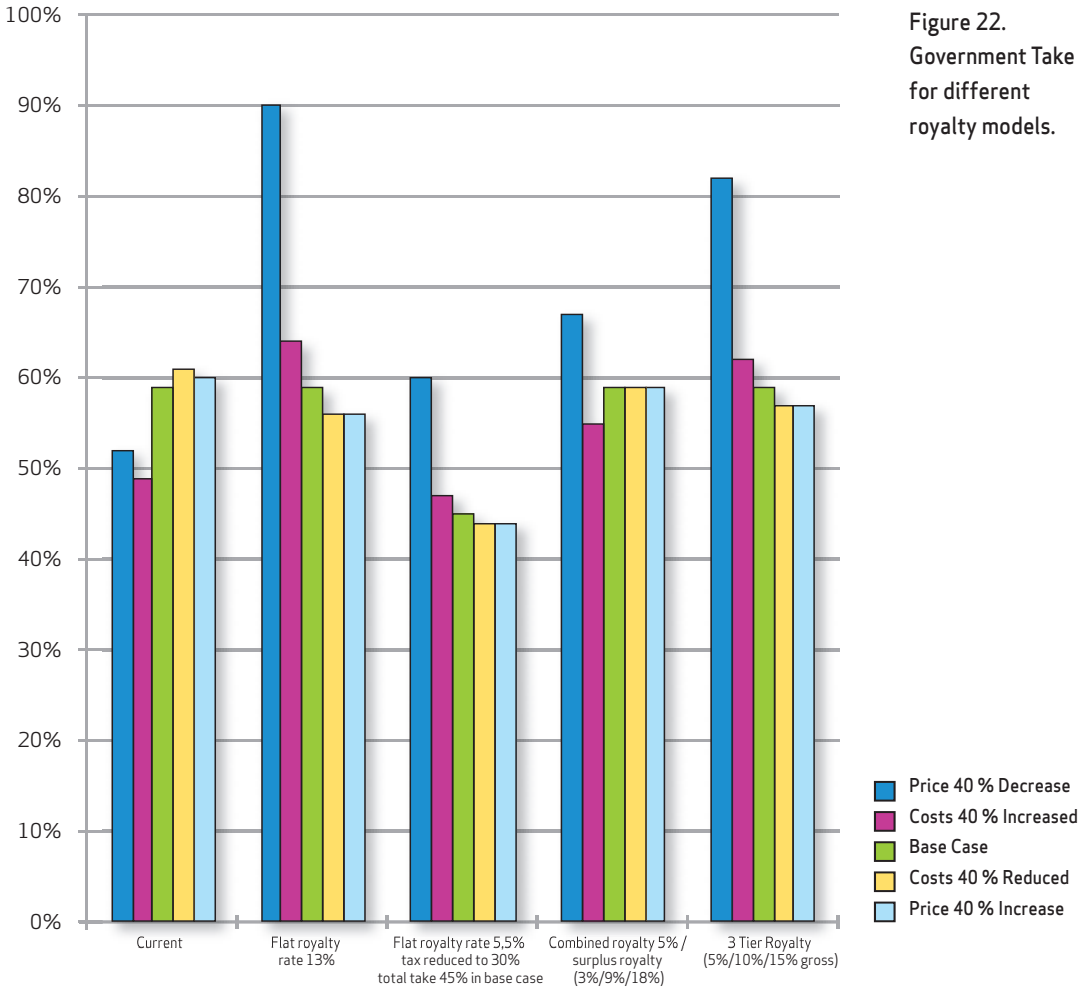


Figure 22. Government Take for different royalty models.

Model no.	Elements in the model	Consequences of the model
1	**The current model in Greenland** • Corporation tax and withholding tax at a total of 37 % • A surplus royalty of 7.5 % when the internal rate of return before tax is more than 21.75 % + the discount rate, increasing to 17.5 % and 30 % when the internal rate of return is more than 29.25 % + the discount rate and 36.75 % + the discount rate respectively • A 12.5 % interest for NUNAOIL A/S in the exploration phase	The current Greenland model includes a progressive Government Take, so that the public share of the surplus increases when the surplus from oil activities increases. However, the model is sensitive to increasing investment costs.
2	**Royalty of 13 %** • Gross royalty of 13 %, which is calculated on turnover(without deduction of transport costs) instead of the current surplus royalty • Corporation tax and withholding tax at a total of 37 % • A 12.5 % interest for NUNAOIL A/S in the exploration phase.	Models 2 and 3 do not demonstrate the desired progressivity, on the contrary they are digressive at low surpluses, i.e. the rate of Government Take increases as surplus falls. Furthermore, the models do not demonstrate the desired progressivity at high surpluses. Model 2, which has an unchanged Government Take of 59 % in the base scenario, increases to 90 % at low surpluses. Model 3, which in accordance with the recommendation of IHS Energy has a Government Take of 45 % in the base calculation, increases to 60 % at low surpluses. Both models are therefore strong impediments to investments.
3	**Flat royalty 5.5 %, reduced corporation tax and withholding tax at a total of 30 %** • Gross royalty of 5.5 %, which is calculated on turnover (without deduction of transport costs) • Abolition of withholding tax of 37 %, so there is only the corporation tax of 30 %. • A 12.5 % interest for NUNAOIL A/S in the exploration phase.	
4	**Combined royalty 5% and surplus royalty 3%/ 9% /18%** • The current surplus royalty with tax rates in the three tiers is reduced to 3 %/9 %/18 %, replacing the current 7.5 %/17.5 %/30 %, but uplift is calculated as under the current rules. • A gross royalty of 5 %, which is calculated on turnover (without deduction of transport costs). • Corporation tax and withholding tax at a total of 37 % • A 12.5 % interest for NUNAOIL A/S in the exploration phase.	This model contains both royalties on turnover and surplus royalties and demonstrates a certain limited progressivity at increasing surplus, however it also contains an increasing Government Take as surplus falls. The model is therefore partly an impediment to investments.
5	**3-tier gross royalty 5 %/10 %/15 %** • Gross royalty in three tiers: 5 %/10 %/15 %. The gross royalty is calculated on turnover (without deduction of transport costs). The three tiers are defined as accumulated gross profit a) between 0-9.99 %, b) 10-19.99 %, and c) more than 20 %. The royalty is calculated so that only the highest, relevant rate is used, i.e. if the accumulated gross profit is more than 20 %, then the total royalty percentage will be 15 %; if the accumulated gross profit is between 10 % and 20 %, then the total royalty percentage will be 10 %; and if the gross profit is less than 10 %, then the total royalty percentage will be 5 %. • Corporation tax and withholding tax at a total of 37 % • A 12.5 % interest for NUNAOIL A/S in the exploration phase.	Model 5 contains increasing royalties on turnover, it is strongly digressive and it will cause the tax and fee percentage to increase as surplus falls. The model is therefore a strong impediment to investments.

5.4.3 Conclusion on model calculations

If it is decided to offer oil licences for tender for the KANUMAS area, which is characterised by difficult operating conditions and high costs, it will be important to avoid implementing a Government-Take model which is an impediment to investments, as this will hinder exploration in the area.

The Greenland Government therefore wants to maintain the current model, because it is progressive and means that the Government Take percentage will increase as surplus goes up. At the same time, royalties will not be charged at low surpluses.

If a breakthrough in oil activities emerges in the long run, in the form of commercial oil and gas discoveries, variants of model 3 or 4 above will be assessed in more detail.

6. Other terms for granting licences

Model licences have been prepared for the Baffin Bay Licensing Round and the licensing rounds in the Greenland Sea, respectively. The general terms of the model licence regulate the licence period, third-party activities in the licence area, technical and environmental aspects, agreements on further training, procedures for approval of activities, royalties and fees for the public sector, supervision, obligations upon termination of the activities, reporting, manpower and supplies, joint cooperation agreement among licence holders, transfer of licence, insurance and guarantees, obligations upon termination of the licence etc.

Licences that are announced in the licensing round in the Baffin Bay area, will be granted for an exploration period of up to ten years. The exploration period will usually be divided into three sub periods. Before the end of a sub period, the licence holder must commit to carrying out the work programme in the subsequent period or give up their licence. Pursuant to the Mineral Resources Act, following an application, the licences may be extended by up to three years at a time.

Licences that are announced in the licensing rounds in the Greenland Sea, will be granted for an exploration period of up to 16 years. The exploration period will usually be divided into three sub periods. Before the end of a sub period, the licence holder must commit to carrying out the work programme in the subsequent period or give up their licence. Pursuant to the Mineral Resources Act, following an application, the licences may be extended by up to three years at a time.

If there are discoveries which the licence holder declares to be commercial and which the licence holder intends to exploit, then the licence holder is entitled to have their licence extended by 30 years for an area around the discovery, providing the other terms of the licence have been met.

Licence holders may apply for pre-defined blocks. If more blocks are applied for, the licence holder must rank these in order of priority. At the end of each sub period, at least 30% of the original area must be "returned". This provision is extremely important, as it means that if a commercial oil or gas discovery is made in the region, the surrounding areas can be offered for tender again and made subject to an enhanced Government Take.

According to the model licence, transport of hydrocarbons by ship requires specific safety requirements for the ships performing such transport,

The licence holder is still obligated to collaborate with NUNAOIL A/S in the development and exploitation period. The objective of involving NUNAOIL A/S as co-operator in the development and exploitation period, is to develop the company's knowhow and expertise.

Furthermore, a requirement for performing socio-economic studies in line with the environmental studies has been added. Socio-economic studies may include assessing derived economic and social activities, including the commercial possibilities related to oil activities, such as the use of Greenlandic labour and Greenlandic businesses.

The derived economic and social activities may also include the impact on and the need for infrastructure, the interplay with public authorities, and conditions which otherwise are of significance nationally and for the relevant local communities.

7. Other areas

7.1 The area between 63°N and 67°N

The area between 63°N and 67°N contains EnCana Corporation's licences Atammik and Lady Franklin. Due to its farm-out process, EnCana Corporation has transferred 40 % of these licences to the Cairn Energy group. EnCana Corporation will continue as operator on both exploration and exploitation licences (see figure 23).

There is good geological basis for making significant oil discoveries in the area between 63°N and 67°N. It is true that the Quelleq-1 exploration well drilled offshore south-west of Nuuk in 2000 was dry, although it revealed large volumes of sandstone with reserve potential (Santonian age), and in the existing models from GEUS there are surveys that indicate possible good, mature source rock types in certain areas of the sedimentary basins.

Furthermore, surveys of the area have also revealed the presence of a thick clay pack which could be a potential seal. GEUS and the industry are still working with geological models, and there are still many possible prospects within the Fylla structure. By and large, the area is ice free year round and, logistically it is a good area in which to operate.

Various international oil companies have expressed interest in new licensing rounds for this region. However, the current policy of the Greenland Government is to await the results of the ongoing exploration activities in the Atammik and Lady Franklin licence areas before new areas are offered for tender in this region. If commercial discoveries are made in the two licence areas, adjacent areas could be offered for tender at higher Government-Take terms, since the exploration risk will then have been reduced considerably.

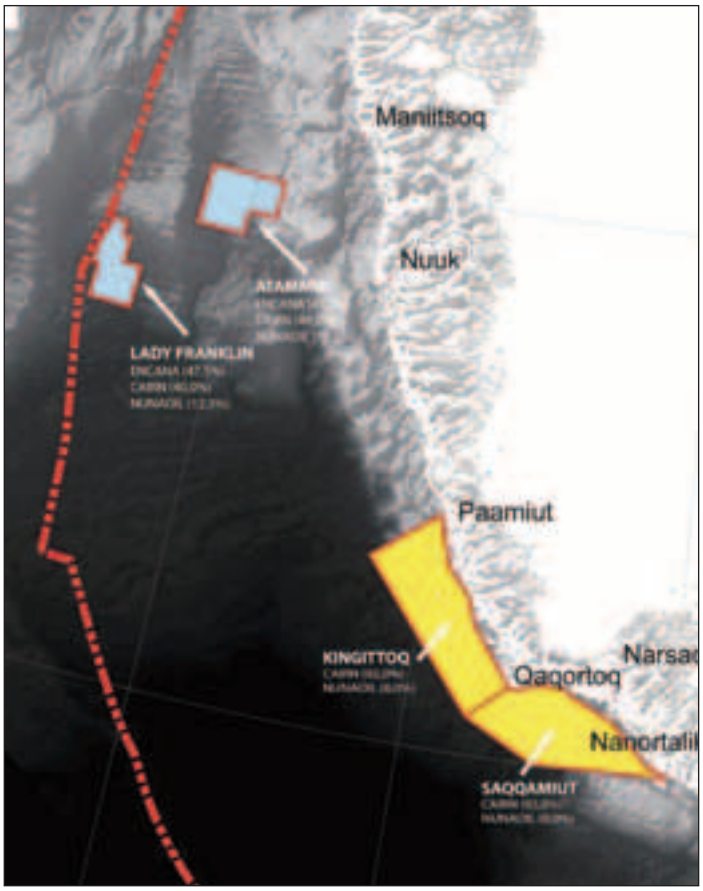


Figure 23.
Licences in the area between 63°N and 67°N.

7.2 The Open-Door areas

The total areas for which licence applications are currently being invited via the Open-Door procedure are shown in figure 24 below.

The offshore area outside south-west Greenland between 60°N and 63°N and Jameson Land have been offered for tender as Open-Door areas since 1999. Since 1 January 2008, the offshore area west of 42°30' W and south of 60°N has been open for applications via the same Open-Door procedure.

The background for this expansion is that in recent years the Bureau of Minerals and Petroleum, in collaboration with the seismic industry, has carried out limited data collection in the area, where preliminary surveys indicate there could be sedimentary basins with structures and depths likely to hold hydrocarbons. This is however associated with some uncertainty due to the limited volume of data.

It is therefore assessed there is a possible hydrocarbon potential in the area, however this is associated with some exploration risk.

The licence conditions for gaining permission to carry out exploration in the area are therefore less strict than in the licensing round areas.

The British oil company Cairn Energy PLC was granted two licences for exploration in the Open-Door area north of 60°N in January 2008. Subsequently, Cairn Energy has obtained approval of two more licence applications in the new Open-Door area, south of 60°N. The company thus has a total of four licences in the Open-Door area (see figure 25).

Increased interest from the industry must mean the Open-Door area has become more attractive to the oil industry.

Figure 24.
Open-Door areas in Greenland.

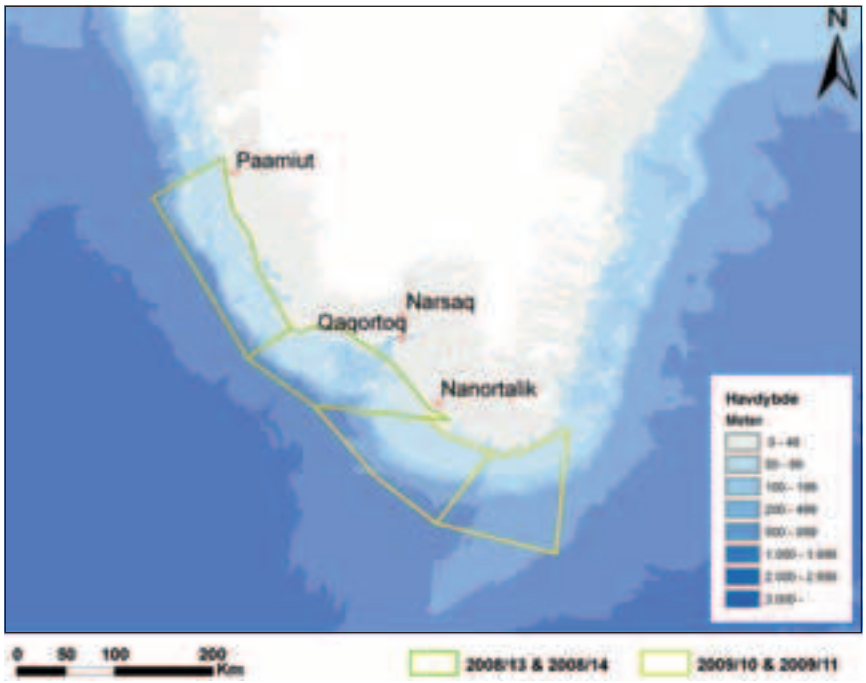


Figure 25.
Licence blocks in the Open-Door area as at 1 January 2009. Bathymetric conditions are also shown.

In connection with the expansion of the area, it was therefore agreed that at first no changes were to be made in the financial licence terms. Rather, changes would be made with affect from 1 January 2010, so that the financial terms will be adjusted to the level applying in the licensing round areas.

This will provide incentive for the oil exploration companies to apply for licences and intensify data collection in order to identify the most promising areas before they are required to return sub areas at the end of individual sub periods in the exploration phase.

7.3 Onshore Disko–Nuussuaq–Svartenhuk

Until 2003, the Disko-Nuussuaq region was an Open-Door area in regard to hydrocarbon exploration and exploitation. When preparations for the Disko West Licensing Round were commenced, both onshore and offshore areas in this region were closed in 2003. When the Disko West Licensing Round was approved, it was decided to open up only the offshore areas west of Disko-Nuussuaq. One of the reasons for this was that the interest of the oil industry was primarily aimed at the offshore areas.

Recently, the onshore area Disko-Nuussuaq-Svartenhuk has been the object of requests regarding the possibilities for applying for licences on the Nuussuaq peninsular in particular. This interest is due to extensive oil seepages and known gas deposits from Nuussuaq. The interest in the area has come mainly from small to medium-sized companies. The Greenland Government's policy is to keep the status of the area unchanged, and that any reopening of the area is pending increased industry interest. The Bureau of Minerals and Petroleum will examine the prospectivity of the area on an ongoing basis with a view to getting involved in the general marketing of the area. If industry interest increases markedly, the status of the area will be reconsidered.

Notes

1) Page 37
In this report the term Government Take is a common denomination for taxes, royalties, charges, fees, carrying of public oil companies in licenses etc.

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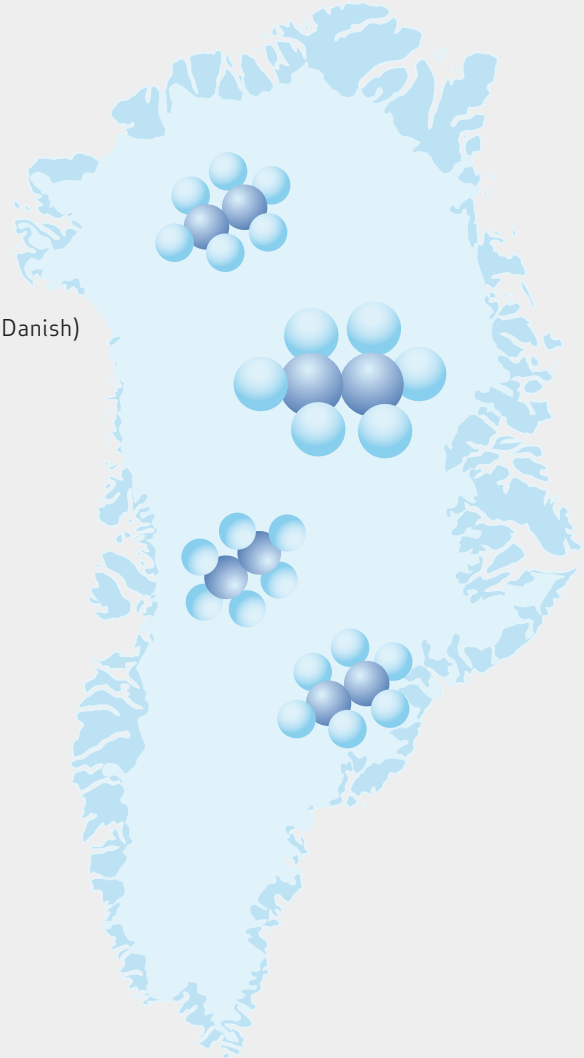

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