Greenland is the world’s largest island.\(^1\) It covers an area of approximately 2.2 million square kilometres and has over 44,000 kilometres of coastline. Despite its huge size, only 14 wells have been drilled offshore Greenland in the last 40 years. This article explores the evolution of oil and gas exploration in Greenland and considers why, despite Greenland’s considerable potential hydrocarbon resources and supportive political environment, Greenland continues to struggle to sustain a thriving oil and gas industry.

Greenland’s estimated oil and gas potential

In 2008 the US Geological Survey conducted the Circum-Arctic Resource Appraisal focusing on all areas north of the Arctic Circle.\(^2\) Based on the estimates from this appraisal, the three major basins around Greenland are believed to hold up to 52 billion boe of potential oil and gas resources.\(^3\)

<table>
<thead>
<tr>
<th>Basin</th>
<th>Oil (MMBO)</th>
<th>Total Gas (BCF)</th>
<th>NGL (MMBNGL)</th>
<th>BOE (MMBOE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Greenland - Rift Basins</td>
<td>8,902</td>
<td>86,180</td>
<td>8,121</td>
<td>31,387</td>
</tr>
<tr>
<td>West Greenland - East Canada</td>
<td>7,274</td>
<td>51,818</td>
<td>1,153</td>
<td>17,063</td>
</tr>
<tr>
<td>North Greenland - Sheared Margin</td>
<td>1,350</td>
<td>10,207</td>
<td>274</td>
<td>3,324</td>
</tr>
<tr>
<td>TOTAL</td>
<td>17,526</td>
<td>148,205</td>
<td>9,548</td>
<td>51,774</td>
</tr>
</tbody>
</table>

undiscovered oil reserves and 30% of the world’s undiscovered natural gas reserves.\(^4\)  

History of oil and gas in Greenland

Interest in oil and gas exploration in Greenland has historically been very limited. One of the earliest ventures in Greenland was the formation of the KANUMAS (Kalaallit Nunaat Marine Seismic) Project in 1989. This project involved the granting of a prospecting licence by the Government of Denmark to a consortium of companies to investigate the potential for oil and gas in the area off the coast of Northwest and Northeast Greenland. The consortium comprised ExxonMobil, Statoil, BP, Japan National Oil Company, Texaco, Shell and Nunaoil. Between 1990 and 1996 the KANUMAS Project collected over 7,000km\(^2\) of seismic data, covering the extreme northern areas offshore eastern and western Greenland.

Another key step in the development of Greenland’s oil and gas industry occurred in 1992 when the Geological Survey of Denmark and Greenland registered oil seeps on Disco Island. In following years numerous seeps were recorded over a wide area. These promising signs prompted a number of seismic companies to acquire speculative data offshore Greenland.

Oil and gas licensing in Greenland started in earnest in the early 2000s, with licensing rounds in 2002, 2004, 2006, 2010 and 2012-13. In addition, Greenland offered a separate open door procedure in the Jameson Land and South West Greenland areas in 2002 and 2008, respectively. These were areas with comparatively more limited data coverage where the open door procedure allowed companies to apply for acreage on an ongoing basis, with applications considered, and areas awarded on a first come, first served basis.

Currently, 23 offshore licences for oil and gas exploration and exploitation have been awarded by the Government...
The only company who has undertaken serious drilling activity in Greenland is Cairn Energy. To date, Cairn has drilled eight wells offshore Greenland. In 2010 Cairn drilled three wells, one of which, the Alpha-1S1 well drilled in the Sigguk Block in Baffin Bay, had hydrocarbon shows. On 21 September 2010 Cairn Energy announced that “Oil has also been observed intermittently over a 400m section…” and “…confirms the presence of two oil types which have different origins and levels of maturity”.

Following this early promise, Cairn drilled a further five wells in Greenlandic waters in 2011. However, despite spending around US$1.2 billion on its well programme in Greenland, Cairn’s efforts have resulted in no commercial discoveries. In its pre-close announcement on 21 January 2014, Cairn clearly indicated a de-prioritising of its operations in Greenland in favour of its African activities.

Current oil and gas strategy in Greenland

Greenland has historically been – and still is – a territory of the Kingdom of Denmark. During the 20th and 21st centuries however, Greenland has become increasingly independent with additional autonomy to oversee certain policy areas. The latest major development was the passing of the Act of Greenland Self-Government (Act no. 473) by the Danish Parliament on 12 June 2009 (the “Act”).

The Act allows the Government of Greenland to assume certain legislative, executive and judicial powers from the Danish authorities provided that those responsibilities are financed by the Government from the date of assumption. As part of this power transfer, the Government has assumed authority in respect of mineral resource activities.

One of the most recent manifestations of the Government of Greenland’s authority over mineral resources has been the publishing of Greenland’s Oil and Mineral Strategy 2014-2018 (the “2014-2018 Strategy”). The 2014-2018 Strategy replaced the earlier mineral and hydrocarbon strategies that expired at the end of 2013. The stated goal of the 2014-2018 Strategy is to ‘promote prosperity and welfare by creating new income and employment opportunities in the area of mineral resources activities’. In respect of oil and gas, the 2014-2018 Strategy attempts to maintain the current levels of exploration activity over the next five years and extend those activities into different regions of Greenland in the hope that they result in a commercially viable oil discovery. The 2014-2018 Strategy offers a number of recommendations as to how oil and gas exploration can be encouraged, including by offering new licensing rounds, further development of the legal licensing framework, such as, the addition of a three-year exploration licence with no long-term commitments (see below) and by streamlining administrative business processes for the handling of licences.

Other key elements of the 2014-2018 Strategy include:

- ensuring exploration and related production activities generate jobs for the local population;
- establishing GeoSurvey Greenland in order to improve Greenland’s geotechnical knowledge and encourage greater interest in the Greenlandic subsoil from international investors;
- an increasing focus on mitigating the environmental impact of oil and gas exploration and production in Greenland, with the introduction of new strategic environmental impact assessments and the expansion of
Greenland’s oil spill response capabilities; and

- revisions to the oil and gas taxation model to ensure increased income for the Government of Greenland without prejudicing the competitiveness of the existing fiscal regime.

**Current licensing: open door and licensing rounds**

The 2014-2018 Strategy sets out an aggressive objective for licensing in Greenland over the next four years, significantly accelerating the frequency of licensing rounds from the biennial basis that has prevailed since 2002.

Over the next four years, the Government of Greenland intends to focus its licensing activities in the following five areas:

1. The Government of Greenland is pursuing a combined approach of formal licensing rounds in the Disco and Nuussuaq, Baffin Bay and Davis Strait as well as offering two areas (South West Greenland and Jameson Land) on an open door basis.

2. In previous years, the licences that were awarded, particularly in the Disco West and Baffin Bay licensing rounds, covered large areas of around 10,000km² or more. Moving forward, the Government of Greenland’s intention is to reduce the size of the block areas to around 1,000 - 4,000km².

**Developing fiscal / legal terms in Greenland**

The licensing process in Greenland follows a transparent process. Model licences, qualification procedures and requirements, model form joint operating agreements (together with a model form co-operation agreement) and model
form guarantees, are issued publically by the Ministry of Industry and Mineral Resources on the Government website at the beginning of each licensing round or the start of the relevant open door process.\textsuperscript{11}

The standard licence provides for:

- a 10-year term (in exceptional cases, 16 years) divided into three sub-periods;
- a ‘drill-or-drop’ decision to be taken prior to the end of each sub-period where the licence holder must either commit to carry out the work programme for the next sub-period or relinquish the licence;
- relinquishment of a minimum of 30% of the original area at the end of each sub-period; and
- upon a commercial discovery, an extension of the licence for up to 30 years in respect of the discovery area.

Following the introduction of the 2014-2018 Strategy, there have been some notable modifications to the licensing terms for acreage in Greenland; these are discussed below. The licence changes have been driven by a number of factors: the desire to attract greater investment, a changing fiscal approach, developments in Greenland’s hydrocarbons knowledge and a greater awareness of the contribution and impact of oil and gas exploration and production in the wider socio-economic sphere in Greenland. The changes represent a maturation of a Greenland’s approach to the oil and gas industry.

### Special Licensing Terms

In the onshore areas of Jameson Land and Disco and Nuussuag, the Government of Greenland is offering a special licensing regime for exploration and exploitation licences in an effort to attract greater investment. A licence application will be assessed, and the licence will be granted, on the basis of a shortened work program which covers a three-year period only. There is no division of the licence into three sub-periods, as there is under the standard licence. If the licence holder believes the area is of interest at the end of the licence, it will then be entitled to apply for an extension to the licence for a further three years by submitting a new work program. The suitability of the licence holder to carry out these further work commitments will then be re-evaluated upon receipt of an application for an extension.

This staggered process of short, three-year licences, with no long-term commitment, offers a more flexible licensing regime in areas where there has historically been little or no exploration. The applicant is evaluated by reference to the current work program rather than a ten-year work program, thereby allowing the Government of Greenland to award licences to smaller companies who may not have the technical or financial capacity to undertake deepwater drilling activities but are skilled in earlier non-intrusive stages of exploration activities. The commercial drivers of oil and gas exploration mean that such companies would naturally introduce a new partner to participate in later stage exploration once the prospectivity of a particular area had been demonstrated. These special licensing terms therefore create a much wider pool of potential licence applicants but also enable the Government to continue to assess the suitability of applicants to perform more complex and risky work commitments before agreeing to extend the licence.

### Government Take

The 2014-2018 Strategy also recommends the introduction of a number of fiscal changes to the licence terms for oil and gas. The fiscal model that has been proposed in the new licences published by the Government of Greenland is as follows:

- corporate and withholding tax, at the applicable rates in force from time to time in Greenland;
- a sales royalty (based on turnover) of 2.5% (the “Sales Royalty”);
- a surplus royalty of 7.5%, 10% and 12.5% when the accumulated income exceeds 35%, 45% and 55%, respectively (the “Surplus Royalty”); and
- participation by the state oil company (Nunaoil) of 6.25%, carried through exploration.

Most notably, the 2014-2018 Strategy introduces the Sales Royalty but balances this additional royalty mechanism with a decrease in the state participation via Nunaoil (from a participating interest of 12.5% to 6.25%). The introduction of the Sales Royalty was driven by the Government of Greenland’s concern that while the existing Surplus Royalty offers a fair allocation of the additional upside realised from a field, it unnecessarily exposed the Government to the risks of production delays and cost overruns. By introducing a turnover royalty, the Government has secured a minimum level of revenue from production from the very outset of production activities.

These changes do not represent a radical departure in the fiscal structure of government take, rather a refinement of existing policy. The 2014-2018 Strategy makes it clear that the Government of Greenland considers that the existing government take percentage (around 52%) to be fair and competitive when compared to other jurisdictions and there is no intention to increase that share. The fiscal changes in these latest licences instead demonstrate a developing appreciation by the Government of the realities of oil and gas exploration and production, particularly given the geographical remoteness and environmental challenges of Arctic exploration.
Socio-economic Impact

The new licence terms also include a greater focus on the social impact of exploration and production activities. There are now new requirements for a development plan to be accompanied by a social impact assessment as well as more onerous obligations for licence holders to ensure that their plans for oil and gas exploration and production are socially sustainable.

In line with developments in a number of other emerging hydrocarbon provinces, the latest licence terms in Greenland include significantly enhanced local content requirements. In addition to the cooperation and training commitments included in earlier licences, the new model licence provisions reflect the aspirations outlined in the 2014-2018 Strategy. Licence holders will be required to enter into an impact and benefit agreement (“IBA”). The IBA sets out the targets to be reached in terms of the involvement of Greenland businesses and labour in oil and gas exploration and production as well as the training requirements and level of local community engagement that must be observed. The Government of Greenland views the IBA as an important tool in ensuring that oil and gas activities in Greenland contribute to social development.

Future for Greenland

The latest modifications to the model licence represent a maturing of the Government of Greenland’s approach to oil and gas exploration and production. The fact that the changes introduced by the 2014-2018 Strategy are relatively cautious, refining rather than overhauling the licensing strategy for the country, is perhaps also a sign of the awareness of the Government of the challenges that Greenland faces in developing a thriving oil and gas industry.

The challenges that face oil and gas exploration and production in Greenland are huge. Greenland is in one of the most remote regions on earth. The climatic conditions are extreme, with temperatures below -50°C, near total darkness in winter and drilling windows often no longer than 100 days in a year. There is also very little existing infrastructure to support the needs of the industry, adding significant costs to project budgets. In addition, there are political sensitivities about drilling in an environmentally sensitive area, such as Greenland. Indeed, in September 2012 the late CEO of Total, Christophe de Margerie, stated that “Oil on Greenland would be a disaster... A leak would do too much damage to the image of the company”.

In addition to the intrinsic challenges to oil and gas exploration and production in Greenland, there are extrinsic factors which, in the short term at least, will inhibit the growth of the oil and gas industry in the country. One of the key challenges to all Arctic oil is the competition it faces from other sources. In recent years, the market has been flooded with US oil and gas as a result of the US shale revolution. This has already triggered the indefinite postponement of one Arctic project, Russia’s Shotochka gas field in the Barents Sea, and has been the stated reason for Exxon’s non-participation in the 2013 licensing round in northeast Greenland. Similarly, Cairn’s recent successes in Senegal, closer to more accessible and liquid markets, may result in a further deprioritising of its ambitions in Greenland.

The declining prices of oil and gas also act as a deterrent to exploration and production in Greenland. The remote nature, lack of infrastructure and difficult operating conditions mean that exploration and development of oil and gas fields in Greenland results in long project development times. They also mean that extensive investment is required. In order to justify this level of investment, companies need sustained high oil or gas prices together with multibillion barrel discoveries in order to make such developments economically viable.

Despite the myriad challenges that face oil and gas exploration and production in Greenland, there is some reason for cautious optimism. The recent changes to the licensing regime announced by the Government of Greenland show a reasoned and practical regulatory approach which aims to incentivise IOCs to continue to explore both onshore and offshore Greenland. Furthermore, the huge resource potential of Greenland will continue to provide a long-term draw for IOCs. There should be no expectation that oil and gas exploration and production will take off any time soon in Greenland; oil and gas production is, at best, 15-20 years away. Although the timing is uncertain, it seems inevitable that as technologies improve, environmental concerns abate and market demand increases, Greenland will become a significant hydrocarbons province of the future.

1. Although Australia is more than three times the size of Greenland (and surrounded by water), it is common to describe Australia as a continent rather than an island.


12. http://www.ft.com/cms/s/0/350be724-070a-11e2-92ef-00144feabdc0.html#axzz3JLyGsi5z


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