

## *The Quest for Resources – the Case of Greenland<sup>1</sup>*

**Bent Ole Gram Mortensen, University of Southern Denmark**

### **Resources and their Political Significance**

The importance of resources for any country does not require much introduction. History is filled with exhaustively described examples of where the need for access to various kinds of resources – drinking water, agricultural land, various minerals – has been geopolitically important and has even led to war. War strategies themselves can be affected by the need for access to resources. Germany's and Japan's needs for oil and World War II are prime examples.

Energy and minerals are among the classic resources that are highly important, and securing access to these resources is a strong motivation. The concentration of many raw materials deposits in certain regions constitutes a geopolitical risk, and the development of mines in new regions helps diversity and the security of supply. In Greenland, cryolite is an example. Cryolite is important in the production of aluminium and was particularly significant during World War II for the manufacture of aircraft.<sup>2</sup> Following its occupation by Germany, Denmark was prevented from supplying

---

<sup>1</sup> Editor's Note: The footnotes in this article and in the others in this issue of the Journal of Military and Strategic Studies have been left in the European format in which they were received, except that they have been placed at the bottom of the page to ease readability. We apologize for any confusion this may cause our North American readers.

<sup>2</sup> Rosing, 2012, pp. 14-15; Boel and Thuesen, 2010, p. 16; Berry, 2012, p. 224.

Greenland with certain necessities of life which then, as now, it had to import. During World War II exports of cryolite to North America are believed to have contributed to the defence agreement between Greenland and the USA.<sup>3</sup> During this period Greenland was supplied from the USA, which was paid in cryolite. The importance of Greenland's cryolite meant that both the United Kingdom and Canada were prepared, if necessary, to occupy parts of Greenland and the USA was also interested in acquiring Greenland. By means of the defence agreement with the USA, the Danish representatives in Greenland and the Greenlandic politicians managed not only to secure the necessary supplies, but also to avoid the occupation of Greenland.<sup>4</sup>

Today, Greenland is not at risk of military occupation, and interest in Greenland is not so pressing. Nevertheless, its natural resources can be important for its economy. Jobs and government revenues are often associated with the existence of resources. In the case of Greenland, the possibility of exploiting mineral resources is a major factor in the political desire for greater economic independence from the Danish Realm, as expressed by the great majority of the political establishment in Greenland. It is this political significance of mineral resources and their legal implications that are the subject of this article.

### **Greenland – Short Facts**

Located north-east of Canada, Greenland is part of the Arctic region. Greenland covers an area of 2,175,600 km<sup>2</sup>. About 80 percent of this area is covered by the inland ice-sheet (1,833,900 km<sup>2</sup>). With a population of less than 57,000 Greenland has a very low population density.

The economy of Greenland is similarly limited. The GNP was about 12.3 billion Danish Kroner in 2010. In the same year there was a deficit in the balance of trade of 2.4 billion Danish Kroner, nearly 20 percent of GNP. In recent years exports have stagnated while imports have increased rapidly. This fact has made Greenland dependent on foreign remittances. The Danish State's block grant was 3.495 million Danish Kroner in

---

<sup>3</sup> Denmark-United States: Agreement Relating to the Defense of Greenland. Signed at Washington, 9 April 1941. Printed in the American Journal of International Law 1941, pp. 129-134, and available at [www.jstor.org/stable/2213493](http://www.jstor.org/stable/2213493)

<sup>4</sup> Heinrich, 2012, pp. 52 ff. and regarding Canada, Berry, 2012, pp. 226 ff.

2010 and in the same year the partnership and fisheries agreement with the EU brought in 210 million Danish Kroner.<sup>5</sup>

The climate in Greenland can be categorised as arctic, but there are wide differences between north and south, among other things because of a distance of over 2,600 km. There can be wide local variations even over short distances. The land is influenced by both inland ice and sea ice.

Air and sea transport are the most important forms of transport. Towns and settlements are not linked together by a road network. In large parts of Greenland shipping is affected by the sea ice which can cut off access to harbours. In general the climate is a challenge for many kinds of economic development, including mining and the extraction of oil and gas. However, generally the southwest of Greenland is open to shipping throughout the year. Transport costs are generally high.<sup>6</sup>

Over 80 percent of Greenland's population live in towns. Urbanisation increased rapidly in the inter-war years, when fisheries replaced seal hunting as the main activity. The more industrialised nature of fishing promoted urbanisation.<sup>7</sup>

### *The Commercial Structure*

There is a large public sector in Greenland, even compared with the Nordic countries. The public sector amounts to about three-quarters of Greenland's BNP.<sup>8</sup> Key undertakings in the transport, communications and trading sectors are owned by the Greenland Self-Government.

Commerce is strongly characterised by fisheries, which account for more than 90 percent of exports, a figure that has not changed significantly over the last 20 years. This sector has been stagnating, though varying from year to year, and a system of quotas limits the scope for expanding the sector.<sup>9</sup> Tourism has stimulated some

---

<sup>5</sup> Christensen and Jensen, 2012.

<sup>6</sup> On Greenland's climate, see *Steenfos & Taagholt*, 2012, 241 ff.

<sup>7</sup> Heinrich, 2012, p. 26.

<sup>8</sup> Andersen, 2012, p. 103.

<sup>9</sup> Christensen and Jensen, 2012; Andersen, 2012, pp. 102-103.

development in recent years, and there has been some activity in the area of minerals, an area that has historically been of interest for Greenland. However, both sectors face challenges from Greenland's geography, climate and infrastructure. Other commercial activities can be considered ancillary.

Locally the building and construction sector is important, with the public sector being the major developer. This sector is to some extent subject to seasonal working. It is expected that there will be considerable infrastructure investment in the coming years. In its report in January 2011, the Greenland Transport Commission estimated that there was an overall requirement for capital investment in new or improved airports and extended harbour facilities of at least 2 to 3 billion Danish Kroner.<sup>10</sup>

The labour force includes 26,791 permanent residents, aged 18-64 (monthly average 2011),<sup>11</sup> a substantial part of which is made up of Danes who are temporarily or permanently resident in Greenland. In recent years there has been net immigration of Danish workers to Greenland. From a global perspective, the levels of wages and prices are high and are linked to the levels in Denmark, with which Greenland shares a currency. The unemployment rate is high, as the average is 9.4 percent.

The dominance of fishing is clearly a challenge to Greenland society, and the country has a natural desire to establish a more diversified commercial sector which can lead to a more robust economy. As the former President of the Parliament of Greenland Jonathan Motzfeldt has said: 'Greenland's economy is simply very vulnerable, because it depends to such an extent on the ocean's fragile renewable resources.'<sup>12</sup> Hitherto it has been difficult to develop other export-oriented commercial sectors. The barriers to this are the high transport costs in Greenland, the geographically spread population, the educational level<sup>13</sup> and the generally high costs compared to costs in Denmark.

### *The Demographic Development*

---

<sup>10</sup> Transportkommissionen, 2011. 2 billion Danish Kroner are equal to 364159 USD as pr. January 11 2014.

<sup>11</sup> Greenland Statistics, 2013: p. 7.

<sup>12</sup> Motzfeldt, 2008: p. 30.

<sup>13</sup> 70 percent of the population aged 15-64 have only ground school education.

Over the next 20 years it is expected that the size of the Greenlandic population will remain more or less stable. The average age is expected to rise from 34 to 37 years. This is still lower than the population of Denmark, for example. The number of old people (65 and over) is expected to double, but more than half the population will still be economically active.<sup>14</sup> Based on data from the United States' Census Bureau (U.S. Department of Commerce),<sup>15</sup> there will be a rapid increase in the number of people over 65. In 2013 this group will be 4,672 persons out of a population of 57,714 (8.1 percent). In 2025 it is forecast that the corresponding figures will be 7,569 out of 57,174 (13.2 percent), and in 2050 the figures will be 9,046 out of 49,356 (18.3 percent).<sup>16</sup>

Accepting that such extrapolations are based on a number of assumptions, the demographic development in the near future seems not to be threatened. However, if the number of persons over 65 continues to grow, then in the longer term the social services system in Greenland will come under much greater pressure, and there is thus a major strategic interest in increasing the number of workplaces in Greenland.

### *The Constitutional Status*

Greenland is a former Danish colony which is now part of the Danish Realm, together with Denmark and the Faeroe Islands. One can consider the Realm as three autonomously legal societies with one common constitution.<sup>17</sup> Greenland obtained a measure of home rule in 1979<sup>18</sup> and since 21 June 2009 it has had a more extensive degree of self-government in relation to the Danish Realm. Under the Act on Greenland Self-Government,<sup>19</sup> Greenland has a classic separation of powers, with courts which have judicial powers, a parliament (Inatsisartut) with legislative powers, and a government (Naalakkersuisut) with executive powers.

---

<sup>14</sup> See Statistics Greenland - [www.stat.gl/](http://www.stat.gl/)

<sup>15</sup> See International Data Base at [www.census.gov/population/international/data/idb/informationGateway.php](http://www.census.gov/population/international/data/idb/informationGateway.php). The relevant data was accessed on 2 January 2013.

<sup>16</sup> Note that this data assumes there will be a marked fall in the population towards 2050. Other sources expect the same though the figures vary.

<sup>17</sup> Zahle, 2006, p. 121; Alfredsson, 1982.

<sup>18</sup> Home rule was introduced by Act No 577 of 29 November 1978 - The Greenland Home Rule Act.

<sup>19</sup> Act No 473 of 12 June 2009 on Greenland Self-Government.

A number of policy areas have now been transferred to the Government of Greenland. The Act on Greenland Self-Government determines which matters fall within the jurisdiction of the Government of Greenland and which fall within the jurisdiction of the Danish Realm (effectively Denmark). The Act also lays down which matters can and shall be taken over by the Greenlandic authorities.

The mineral resources sector is one of the policy areas that could be taken over by the Greenlandic authorities.<sup>20</sup> The mineral resources sector was taken over by the Greenlandic authorities from 1 January 2010.<sup>21</sup> The mineral resources sector thus now falls under the exclusive competence of the Government of Greenland, and the public revenues derived from mineral resources (i.e. taxes and licence fees) are payable to the Government of Greenland. However, part of the public revenues from the mining industry is indirectly payable to Denmark. If the revenue accruing to Greenland from mineral resource activities in Greenland exceeds a given amount, the Danish Government's subsidy to Greenland will be reduced and there will be negotiations on the distribution of revenue from mineral resource activities.<sup>22</sup>

Finally, under Section 21 of the Act on Greenland Self-Government, Greenland can claim full independence, i.e. full national sovereignty. However, such independence requires the agreement of the Danish Parliament. While there is broad agreement between Greenland's politicians on a desire for greater political and economic independence it is less certain that Greenland wishes to withdraw entirely from the Danish Realm. The decision on this lies primarily with the Greenlandic people, which is in accordance with the International Labour Organisation (ILO) Convention No 169 concerning Indigenous and Tribal Peoples in Independent Countries.

### **Greenland's Mineral Resources**

Greenland is believed to be one of the countries that is richest in untapped mineral deposits. The existence of minerals is not necessarily to be considered a resource. Mineral deposits first become resources when it is technically and economically viable to exploit them.

---

<sup>20</sup> See List II, No 26, of the Schedule to the Act on Greenland Self-Government.

<sup>21</sup> There is a list of the areas taken over at: [www.stm.dk/\\_p\\_8181.html#selvstyreloven](http://www.stm.dk/_p_8181.html#selvstyreloven).

<sup>22</sup> See Sections 8 and 10 of the Act on Greenland Self-Government.

The exploitation of mineral resources in Greenland is not new. Terrestrial copper mining took place from 1852.<sup>23</sup> Cryolite was mined from 1857.<sup>24</sup> Later in the twentieth century came lead, zinc and silver mines.<sup>25</sup> Mining for coal commenced in 1906, but local collecting started before that.<sup>26</sup> A small gold mine is currently being operated in south Greenland, but in the spring of 2013 the company went bankrupt and the future of the mine is uncertain.

There has previously been exploration for oil and natural gas offshore from Greenland. This began in the 1970s, but was relatively soon stopped (1978). Exploration was taken up again in the 1990s with seismic exploration, and licences have been issued in the 2000s.<sup>27</sup> As of 1 January 2014 there were 22 current (exclusive) exploration and exploitation licences and 17 (non-exclusive) prospecting licences covering an area of more than 200,000 km<sup>2</sup>. There were bidding rounds for licences in 2002, 2004, 2006, 2010 and 2012/2013. A number of exploration wells were sunk in 2011, and these found signs of both oil and natural gas. However, these findings have not resulted in specific plans for extraction.<sup>28</sup> Seismic research was undertaken in several locations in 2012.<sup>29</sup>

The economic potential of oil and other mineral extraction has major political implications for Greenlandic society. It can help provide the necessary basis for Greenland's further independence (both economic and political) from the Danish Realm. Revenues especially from oil but also partly from other mineral extraction can help make unnecessary the support that Greenland currently gets from the Danish Realm. Moreover it is expected that the mining industry in particular will create a number of work places which could help ensure general welfare in Greenland.<sup>30</sup> These

---

<sup>23</sup> The Innatsiaq copper mine was in operation from 1852 to 1856 and again from 1907 to 1914.

<sup>24</sup> The Ivittuut cryolite mine was in operation from 1857 to 1987.

<sup>25</sup> Mestersvig mine was in operation from 1953 to 1959 and the Black Angel mine from 1973 to 1990.

Source: [www.govmin.gl](http://www.govmin.gl).

<sup>26</sup> On historical mining activities in Greenland, see Steenfos & Taagholt, 2012, 71 ff.

<sup>27</sup> Roggenkamp, et al., 2007, p. 447.

<sup>28</sup> Bureau of Minerals and Petroleum, 2012: p. 18.

<sup>29</sup> Gram Mortensen, 2013, p. 338 f.

<sup>30</sup> Both hard mining and drilling for oil and gas face particular challenges when they take place in the Arctic region, where the natural environment is so vulnerable. These special conditions are only referred to in passing in this chapter. On environmental conditions in Greenland in connection with mining activities, see e.g. Basse 2012 and Gram Mortensen 2012, 673-688.

intentions for the mining industry are set out clearly in the travaux préparatoires to the Act on Greenland Self-Government:

The development of the mineral resource area in Greenland constitutes a potentially significant element in the future industrial development in Greenland and in the creation of revenue capable of replacing in whole or in part the Danish Government's subsidy, thus helping to make Greenland more economically self-sustaining.<sup>31</sup>

In general it is not certain than hydrocarbons will ever be exploited and production lies many years ahead. Hard mining may become a reality within a few years.

### *Mining Regulation*

Mining regulation was introduced in Greenland by a Royal Decree of 27 April 1935, according to which the principles of the Danish Subsoil Act were applied to Greenland. Greenland has had its own mining regulations since the mid-1960s. At that time the administration of Greenland's subsoil was still the responsibility of the Danish Realm, and the legislation was therefore adopted by the Danish Parliament.<sup>32</sup> The idea of having separate regulations for Greenland was to make the exploitation of mineral resources in Greenland more attractive. Mining in Denmark does not include metallic minerals, and the conditions are very different, which was the major reason for a separate regulation for Greenland.<sup>33</sup>

The mining regulations were revised in the late 1970s<sup>34</sup> following the introduction of Greenland's home rule.<sup>35</sup> In these regulations the basic rights of the resident population of Greenland to the natural resources of Greenland were acknowledged and a mutual veto right between the Greenland Home Rule Government

---

<sup>31</sup> The Travaux Préparatoires to the Act on Greenland Self-Government, section 5.3.3 of the general notes.

<sup>32</sup> Act No 166 of 12 May 1965 on Mineral Resources in Greenland.

<sup>33</sup> Mining in Denmark does not include metallic minerals, and the conditions are very different.

<sup>34</sup> Act No 585 of 29 November 1978 on Mineral Resources in Greenland.

<sup>35</sup> Act No 577 of 29 November 1978 – The Greenland Home Rule Act. In this, the basic rights to the natural resources of Greenland for the resident population of Greenland were acknowledged and at mutual veto right between the Greenland Home Rule and the Danish Government was established.



and the Danish Government was established. A new Mineral Resources Act was adopted in 1988,<sup>36</sup> and in 1991 yet another Mineral Resources Act was adopted,<sup>37</sup> introducing amended licensing terms particularly for the exploitation of hard minerals, in order to be able to offer more competitive terms than other countries. There was a further amendment in 1996 for the same purpose.<sup>38</sup> In 1998 responsibility for the administration of mineral extraction was transferred to Greenland, and the appointment of the head of the Bureau of Minerals and Petroleum<sup>39</sup> became a matter for the Greenlandic political system.

This Act was replaced by the present legislation – the Greenland Parliament Act No 7 of 7 December 2009 on mineral resources and mineral resource activities (the Mineral Resources Act) which took effect on 1 January 2010. The new legislation was a natural consequence of the new Greenlandic Self-Government taking over responsibility for minerals. Under the present Mineral Resources Act, mining in Greenland is based on a concession system (licences) granted by the State.<sup>40</sup> In Greenland all land is Crown land. Landowners' rights are therefore not an issue, although other rights over land may have been established.<sup>41</sup>

### *Hydrocarbons*

There is currently no extraction of oil or natural gas in Greenland. However, in recent years there has been a growing interest in exploration for hydrocarbons (oil and natural gas) in the waters around Greenland.<sup>42</sup> The suspended exploration activities of

---

<sup>36</sup> Act No 844 of 21 December 1988.

<sup>37</sup> Act No 335 of 6 June 1991.

<sup>38</sup> Act No 303 of 24 April 1996. See also Consolidated Act No 368 of 18 June 1998.

<sup>39</sup> The Bureau of Minerals and Petroleum (BMP) has recently become the Mineral Licence and Safety Authority (MLSA). The website [bmp.gl](http://bmp.gl) will be replaced by the website [govmin.gl](http://govmin.gl)

<sup>40</sup> See Bureau of Minerals and Petroleum (BMP) at [www.govmin.gl/about-bmp/legal-foundation](http://www.govmin.gl/about-bmp/legal-foundation). There is a more detailed description of the licensing regime in Gram Mortensen 2012.

<sup>41</sup> For a more general introduction to regulation in Greenland on hard minerals, see Pedersen, 2012 and for oil and gas, Gram Mortensen, 2012.

<sup>42</sup> In Greenland there is offshore exploration for hydrocarbons. There is no current expectation of finding hydrocarbons on land, and there is no current exploration for hydrocarbons on land.

the 1970s were taken up again in the 1990s with seismic exploration, and licences were granted in the course of the 2000s.<sup>43</sup>

Several test bores were drilled in 2010 and 2011. So far the exploration has not produced significant results; however there are great expectations. It is assumed that there are significant undiscovered oil and natural gas deposits offshore from both northeast and northwest Greenland. According to the United States Geological Survey (USGS), it is estimated that between northwest Greenland and northeast Canada there are 7.3 billion barrels of oil, and 52 billion cubic feet of gas.<sup>44</sup> The USGS estimates that offshore from northeast Greenland there is oil and gas equivalent to 31.4 million barrels of oil (MMBOE).<sup>45</sup> In comparison, Denmark's estimated oil reserves are 128 million m<sup>2</sup><sup>46</sup> equal to 805 million barrals and the global consumption in 2011 was 87.4 million barrels per day.<sup>47</sup> There are thus substantial expected deposits of considerable value at current prices. But they are not deposits that can be expected to radically alter the market situation.<sup>48</sup> However, these estimates have not yet been confirmed by test bores and they are therefore very uncertain.

In the longer term, commercial exploitation of these resources will have a major economic and commercial impact on Greenland. It is presumably from oil that the biggest contribution to Greenland's economy can be expected in the form of royalties and taxes. However, there are no current plans to establish refinery capacity in Greenland and not much prospect of there being a large number of permanent jobs in Greenland as a consequence of oil extraction. Any finds cannot be expected to have any great significance for Greenland's security of supply, and any exploitation of hydrocarbons presumably lies 10 to 20 years in the future.

The North American production of shale oil and gas has greatly increased the world supply of oil and natural gas, and it is difficult to predict what effect this will

---

<sup>43</sup> Five test bores were drilled off West Greenland in 1976-77 and a single test bore in 2000. Roggenkamp et al. 2007, p. 447.

<sup>44</sup> USGS, 2008.

<sup>45</sup> USGS, 2007.

<sup>46</sup> Energistyrelsen, 2012: p. 43.

<sup>47</sup> International Energy Agency, 2012, p. 81.

<sup>48</sup> One barrel is equal to 42 gallons (US) or 158,98 litres (0,15896 m<sup>2</sup>).

have on the willingness of oil companies to explore the Arctic region. In Russia, plans to expand a gas field in the Barents Sea have been shelved because of falling gas prices.

*'Hard' Minerals*

Greenland currently has only very limited mining operations. The overall turnover is probably only about 500 million Danish Kroner. However, in recent years there has been significant exploration activity and a considerable number of licences have been issued for both exploration and prospecting.<sup>49</sup> For several years there have been high expectations for minerals, but these expectations have not yet been fulfilled. Nevertheless a number of projects are quite advanced; see the following table:

**Status of the most advanced exploration and exploitation projects<sup>50</sup>**

Locality (and minerals)	Licensee	Expected construction and production phases	Workforce in the construction	Workforce in the operationa
----------------------------	----------	--	-------------------------------------	-----------------------------------

<sup>49</sup> A list of the licences granted can be found at the homepage of the Mineral Licence and Safety Authority (MLSA) at [www.govmin.gl/minerals/current-licences](http://www.govmin.gl/minerals/current-licences).

<sup>50</sup> Source: Råstofdirektoratet 2012, 27.

			phase	1 phase
Citronen Fjord, North Greenland (Lead and zinc)	Ironbark Zinc Ltd.	<ul style="list-style-type: none"> <li>• Expected profitability study 2012</li> <li>• Possible construction phase 2013-2016</li> <li>• Possible production from 2016</li> </ul>	Not given	200-300
Isukasia (Isua) (Iron)	London Mining Greenland A/S.	<ul style="list-style-type: none"> <li>• Expected profitability study</li> <li>• Exploitation licence granted in 2013</li> <li>• Possible production 2015</li> </ul>	2100 (peak)	700
Killavaat Alannuat (Kringlerne), South Greenland (Eudialyte and rare earth metals)	Rimbal Pty Ltd.  (Tanbreez Mining Greenland A/S)	<ul style="list-style-type: none"> <li>• Expected profitability study</li> <li>• Application for exploitation 2012</li> <li>• Possible production from 2014</li> </ul>	100	60-80
Fiskenæsset (Rubies and sapphires)	True North Gems	<ul style="list-style-type: none"> <li>• Expected application for exploitation 2012</li> <li>• Possible production from 2014</li> </ul>	50	80
Maarmorilik (Lead and zinc)	Black Angel Mining A/S	<ul style="list-style-type: none"> <li>• Exploitation licence granted</li> <li>• Expected production from 2014</li> </ul>	-	100

Nalunaq (Gold)	Angel Mining (Gold) A/S	<ul style="list-style-type: none"> <li>• Exploitation licence granted</li> <li>• Production started January 2010</li> </ul>	-	60-80
Skærgården, East Greenland (Gold and platinum group elements)	Platina Resources Ltd.	<ul style="list-style-type: none"> <li>• Pre-profitability study 2012</li> <li>• Possible production from 2015</li> </ul>	Not given	300-500
Sarfartoq, Kangerlussuaq (Rare earths)	Hudson Resources Inc.	<ul style="list-style-type: none"> <li>• Construction phase – not determined</li> <li>• Possible production from 2015</li> </ul>	200-300	300-500
Kuannersuit (Kvanefjeldet) Narsaq (Rare earth metals, uranium and zinc)	Greenland Minerals and Energy (Trading) A/S	<ul style="list-style-type: none"> <li>• Expected application – 2012</li> <li>• Possible construction phase from 2013</li> <li>• Possible production from 2015</li> </ul>	2000	700
Malmbjerg	Malmbjerg Molybdenum A/S	<ul style="list-style-type: none"> <li>• Pending</li> </ul>	600	500

Most of Greenland's mineral deposits are in inaccessible areas. Potential mining projects in Greenland thus depend on the establishment of infrastructure for energy supply, roads, harbours and so on. Because of the need for such major start-up investments, small-scale production will often not be economically sustainable. Greenland is thus forced to rely on large-scale projects, even if, given the size of its work-force, it could be argued that it would be better to start with small-scale projects.

Large-scale mining operations may take more than 10 years to explore and develop, and some major projects may take up to 20 years.<sup>51</sup> However, far from all mining projects take as long. Despite the need to establish harbour facilities, to construct over 100 km of roads and to build a manufacturing facility at the mine, the planned iron mine west of Nuuk could start operations already in early 2016.<sup>52</sup> The extraction of oil will presumably take longer to come on-stream. For the time being Greenland seem to be concentrating more on hard minerals than on oil.

The following concentrates on rare earths and uranium.

### *Rare Earths*

The term 'rare earth elements' (REEs) refers to a group of elements that have more recently been found to be of strategic importance. These elements consist of scandium, yttrium and the lanthanides (15 different elements). The term 'rare' does not refer to the infrequency of their occurrence but to the fact that these elements are found in very low concentrations in different kinds of ores.

These elements are involved in the production of, for example, electronic goods, catalysers, magnets and supplementary materials, and they are therefore important for various kinds of high technology products such as wind turbines, low energy batteries, pumps and weapons. The good magnetic properties of these elements make it possible to reduce the weight of many products, and their characteristics are thus in demand in low energy products etc. These minerals are much in demand, are considered to be very important to the global supply chain,<sup>53</sup> and could form the basis for commercial mining operations.

In Greenland, it is expected that REEs will be found both at Kvanefjeld (Narsaq) and Kringlerne (Qaqortoq) in the Ilímaussaqq complex. However, it is expected that alternatives to REEs will be developed over time so that if Greenland wants to develop

---

<sup>51</sup> Tiess, 2011, p. 10.

<sup>52</sup> Information given by London Mining – Greenland, Communications Director Kaj Kleist to the Politiken newspaper; see internet article of 12 June 2012; see <http://politiken.dk/udland/ECE1653114/kina-vil-tjene-milliarder-paa-raastoffer-i-groenlands-undergrund/>.

<sup>53</sup> Humphries, 2010.

the extraction of REEs, it should not wait too long. In a few years, the world market price for REEs, and thus the value of Greenland's reserves, could fall drastically and the interest of potential investors could be diminished.

REEs in particular have prompted the question of whether China has a special interest in Greenland. China currently controls about 97 percent of the production of REEs. China's control of the market is not due to the lack of these elements elsewhere in the world, but to China's investment over the last couple of decades in recovering these resources. It has been estimated that China has about 36 percent of known reserves.<sup>54</sup> There is a global interest in China's dominance of the extraction of REEs not continuing too long, both because such a monopolistic position can give China a competitive industrial advantage, and because such a monopoly can be exploited politically. According to Japan, control over this resource has already been used in connection with disputes in the East China Sea.<sup>55</sup> Hitherto, China has used export restrictions in the form of quotas. These have now been referred to the WTO.<sup>56</sup>

China's current monopoly position can help increase interest in extracting REEs in Greenland, and thus attract investors. However, China's monopoly position is about to come to an end. In the coming years China's share of the world market is expected to fall as other countries increase their production. High concentrations of rare earth elements are found in countries other than China. For instance niobium is found in Brazil and rhodium is found in South Africa.<sup>57</sup> By 2017, China's share of the world market is expected to be down to about 45 percent. Among others, Australia, the USA and Greenland are seen as future major producers. By 2017, Greenland is expected to be able to produce 15 percent of the world market for REEs.<sup>58</sup> Whether this will in fact be the case for Greenland is not yet certain.

In the Danish media China's interest in Greenland and the Arctic was drawn attention to in connection with the visit of China's President Hu Jintao to Denmark in

---

<sup>54</sup> TMR, 2012.

<sup>55</sup> gb times, 2010.

<sup>56</sup> See the WTO at [www.wto.org/english/tratop\\_e/dispu\\_e/cases\\_e/ds431\\_e.htm](http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds431_e.htm).

<sup>57</sup> Tiess, 2011, p. 27.

<sup>58</sup> Thagesen and Ørbech, 2012.

the summer of 2012.<sup>59</sup> It is not known how strong this interest is. Any Chinese interest in Greenland must be seen as part of a general interest in the Arctic. China is not only interested in REEs, but in mineral resources in general, as well as in the possibility for shipping freight through the Arctic, which can be highly relevant to China's exports.<sup>60</sup> Japan and South Korea have also shown interest in the Arctic issues for various reasons.<sup>61</sup> Greenland's interest in China is clear; mining operations require risk capital with a long-term investment, and China may be a potential investor.

### *Uranium*

Since the end of the 1980s and until recently, exploration for and exploitation of radioactive elements has been prohibited in Greenland. This has not always been the case. In the post-war years Denmark was interested in promoting the use of nuclear energy. This included access to uranium within the territories of the Realm. From 1955 and for a few years following there was exploration for uranium in Greenland. Three nuclear reactors were operated in the period 1957-2000. During this time, the last of the three, a 10 MW unit was closed down. In 1958 the Risø nuclear research centre opened in Denmark. In 1980, 4,200 tons of material from Kvanefjeld was brought to Risø to be tested for the extraction of uranium.

Denmark's interest in nuclear power as a source of energy came to an end with Parliament's decision, B 103, of 29 March 1985 that the public provision of energy should be planned on the basis that nuclear power should not be used. There were already a number of legislative acts in place on the use of nuclear power in Denmark; these still apply. As a matter of interest, the only nuclear power plant (a non-test reactor) in the Danish Realm was situated in Greenland at the US research station Camp Century about 200 km east of the Thule base. The small PM-2A power plant generated a modest 1.5 MW and was only in use from October 1960 to July 1963.<sup>62</sup>

---

<sup>59</sup> In Chen, 2012, it was pointed out that it was the first visit to Denmark by a Chinese head of state since the two countries established ties 62 years ago.

<sup>60</sup> China's interest in ship navigation via the Arctic is also discussed in Wright, 2011.

<sup>61</sup> Jakobsen and Syong-Hong, 2013.

<sup>62</sup> Steenfos and Taagholt, 2012, p. 378



From this perspective, the prohibition of exploration for and exploitation of uranium deposits is a logical extension of the Danish policy. However, the policy must also be seen as a special Greenlandic policy. Because of the US military base at Thule, Greenland has lived close to nuclear weapons. In 1968 a US bomber carrying atomic weapons crashed near the base.

At the same time, Greenland has had some bad experiences with environmental damage from other mining operations. Mining waste has caused problems, including polluting marine flora and fauna. The bio-accumulation of lead in marine biota, in particular in intertidal species (mussels and seaweed) has been a problem. The waste rock deposited in the intertidal zone at the Ivittuut cryolite mine, polluting the fjord with lead and zinc, is an example of this. The waste rock contains sulphides which are oxidised and then washed into the fjord. Among other things, this pollution led to restrictions being imposed on which parts of locally captured animals were considered suitable for human consumption.









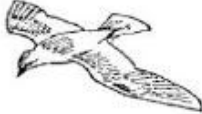







In 1993, a public folder<sup>63</sup> was distributed in the Uummannaq district describing which animals and which parts of the animals were contaminated and which were not.<sup>64</sup>

---

<sup>63</sup> Grønlands Miljøundersøgelser, 1993.

<sup>64</sup> The upper part describes the uncontaminated parts of different species and the lower part contaminated species and parts.

**Suut mingutsinneqarsimappat suullu mingutsinneqarsimanngillat?**

<b>Mingutsinneqarsimanngitsut</b>			
Puisi: orsua, neqaa, tingua, tartua	Uugaq: nerpia	Qeeraq: nerpia	
			
Qaleralik: nerpia	Kanajoq: nerpia	Saarullik: nerpia	
			
Kinguppak: nerpia	Miteq: neqaa, tingua, tartua	Naajarnaq: neqaa tingua, tartua	Serfaq: neqaa tingua, tartua
			
<b>Mingutsinneqarsimasut</b>			
Ammassak	Kanajoq: tingua	Uiloq	
			
Kinguppak: niaqua qaleraalu	Qeeraq: tingua	Qeqquaq	
			

In mining uranium the problem is not as much the radioactivity but the fact that uranium is a toxic metal. Especially dust inhaled into the lungs can pose a more serious hazard.

There is thus little doubt that the prohibition of the exploration and exploitation of uranium in Greenland has been strongly politically motivated. While the prohibition was not laid down in law, it was the consistent practice, as expressed in the Mineral Licence and Safety Authority's (MLSA) standard terms for prospecting, which stated: 'The license covers prospecting for all mineral resources except hydrocarbons and radioactive elements, unless otherwise indicated in the license.' Mining for other minerals in deposits containing radioactive elements was also prohibited.

This prohibited the exploitation of the many known and expected deposits of uranium in Greenland.<sup>65</sup> This covered both extraction where uranium was the principal product and extraction where uranium was a by-product, or even a waste product. Extracting uranium as the main product could be possible at Illorsuit, Gauss Halvø, Kap Simpson, Werner Bjerger and Kvanefjeldet. The deposits of REEs and zinc at Kvanefjeld, the niobium-tantalum deposit at the Motzfeldt Sø (South Greenland) and the carbonatite deposit (niobium) at Sarfartoq (West Greenland) cannot be exploited for due to the ban on the exploitation of radioactive minerals.<sup>66</sup>

Greenland thus had to choose between the exploitation of some promising deposits and the maintenance of its established prohibition. A debate started in Greenland in 2008 on the social and environmental aspects of uranium exploitation. However, since 2010 in connection with exploration licences it has been possible to seek approval to undertake environmental, safety and health studies in connection with uranium deposits. Licences for exploration but not for extraction have been issued to Greenland Minerals and Energy (Kvanefjeld) and to other companies.

Following the change of government in Greenland in the spring of 2013 there had been indications that the prohibition of the extraction of uranium would be repealed. If Greenland allows the exploitation of deposits which contain uranium, it

---

<sup>65</sup> On the uranium potential, see Bureau of Minerals and Petroleum 2007.

<sup>66</sup> See the Mineral Licence and Safety Authority (MLSA) at [www.govmin.gl/minerals/geology-of-greenland/exploration-projects](http://www.govmin.gl/minerals/geology-of-greenland/exploration-projects).

must be made clear whether it will permit the extraction of uranium as a by-product. If this is permitted, the mineral deposits in question will be more attractive for mining companies. Technological developments have now made it possible to recover uranium from ore with very low concentrations of uranium. If uranium may not be treated as a by-product, it will have to be treated as a waste product, with due regard for all the environmental and health risks. The working environment could be exposed to radon, dust etc., and radium constitutes a risk of water pollution.

To the extent that Greenland becomes an exporter of uranium, it will have to comply with the special rules of the International Atomic Energy Agency (IAEA). While mining operations are not in themselves covered by these rules, they will apply at the moment it is enriched or used for fuel. Greenland is not covered by the agreement between the EU and the IAEA, but Denmark has concluded a separate IAEA safeguards agreement for Greenland. No additional protocol has been made regarding uranium mines, and Greenland will have to enter into a bilateral agreement backed by IAEA safeguards to avoid the use of the uranium for weapons purposes.<sup>67</sup>

The idea of Greenland as a possible exporter of uranium has led to discussions between the Greenlandic and the Danish governments whether Greenland has the jurisdiction to act autonomously regarding uranium. The two parties disagree and no agreement has yet been made.

### *Hydro Power*

The use of water as a source of energy in Greenland has been considered since at least 1921. However, it was not until 1993 that the first hydro power plant began operating (the Buksefjord power plant near Nuuk, 45 MW). Subsequently hydro power plants have been established for supplying Qaqortoq and Narsaq (7.2 MW), Tasiilaq (1.2 MW), Sisimiut (15 MW) and a hydro power plant for Illulissat is expected to be opened in 2013 (22.5 MW).<sup>68</sup> What is common to these power plants is that they provide electricity to towns and that water power replaces imported sources of energy (fuel oil) which currently provides more than 90 percent of Greenland's energy requirements.

---

<sup>67</sup> See in general Vestergaard and Bourgouin, 2012.

<sup>68</sup> Steenfos and Taagholt, 2012, p. 380 ff.

Water power is generally regarded as a cheap form of energy, and investments in the existing hydro power installations are based on economic considerations. However, the capital costs for hydro power are high while the marginal production costs are low. For reasons of security of supply, Greenland already has a political interest in promoting the use of domestic sources of energy. However, hydro power plants can also be installed to supply specific industries which have high energy demands. Access to cheap energy can be decisive for the profitability of industries with high energy consumption such as mining, and aluminium and iron smelting.

In the 1960s plans were drawn up for a hydro energy plant in connection with the proposed uranium mine in Narsaq.<sup>69</sup> There are currently negotiations about the possibility of establishing an aluminium smelter at Maniitsoq (the Alcoa project). This possibility is regarded as being so interesting that the Government of Greenland has already earmarked potential hydro power for the project. In 2006, the Alcoa aluminium company contacted the Government of Greenland expressing the wish to explore the opportunities for aluminium production in Greenland. In 2012 the project was transferred from Greenland Development to the Ministry for Industry and Labour.

As a condition for granting a licence to extract minerals the Government of Greenland may require the establishment of a power station, for example a hydroelectricity plant, to supply the extraction operations. The Government can set a fee for payment of an energy licence based on area, production, profit, volume or use. Further, the licence may be made conditional on other holders of rights being able to link up to the power plant, and that on termination of the operations the power plant shall be transferred to the Government of Greenland. This is generally known as the right of reversion and it is known, among others, from the Norwegian regulation of hydro-electricity, where it was introduced in 1909. The basic principle of such an arrangement is that, after the expiry of the licence period, private licensees hand back ownership to the State without payment.<sup>70</sup> As such, the development of hydro power in

---

<sup>69</sup> Steenfos and Taagholt, 2012, p. 380.

<sup>70</sup> In Case E-2/06 on 26 June 2007, the EFTA Court ruled that it was discriminatory that the reversionary right only applied to privately owned power plants and not to publicly owned power plants, and in future it could not be expected that licences would be granted to private undertakings, whereas minority private ownership would presumably be allowed.

connection with the operation of mines can in time be an extra economic benefit for Greenland. The Alcoa project includes the construction of probably two hydroelectric plants with a joint capacity of more than 650 MW and an annual generating capacity of over 5.5 billion kWh.

The establishment of a power plant will be part of the usual framework negotiations between the Government and an investor. Thus, it is quite possible that the Government will undertake to invest in a hydroelectricity generating plant. But that will be risky, since the production capacity may not be used after closure of the mine or plant. Mining projects may also end up with more conventional power supply. In one of the mining projects which is closest to being implemented – the iron ore mine at Nuuk – it appears that the possibility of using hydropower is no longer realistic. The mining company in question (London Mining) wants to use fossil fuel instead, which will presumably mean that the mine can be established sooner and the investment costs will be lower. Accordingly, the use of hydropower is not referred to in the licence agreement.<sup>71</sup>

### **Labour**

Mining is a primary sector activity which makes minerals available for production.<sup>72</sup> The mining process has different stages, for instance: preliminary assessment, prospection, exploration, development,<sup>73</sup> production/exploitation, closure/decommissioning and post closure.<sup>74</sup> Large numbers of workers are particularly needed during the development of a mine. This can easily require a couple of thousand employees for a couple of years. It will be difficult for a country with a workforce such as Greenland's to supply these.

The development of the minerals sector will therefore require the importation of workers to Greenland. On the one hand there are not enough local people with the

---

<sup>71</sup> The Government of Greenland: Exclusive Licence No 2013/31, For Exploitation of Certain Mineral Resources in Areas at Isukasia in West Greenland, October 2013.

<sup>72</sup> Tiess, 2011, p. 8.

<sup>73</sup> The establishment of a mine generally costs between USD 200 million and 2,000 million. See for instance Gocht 1983, for an earlier illustration of expenditures on different sequences for a copper mining project. (Reprinted in Tiess, 2011, p. 11.)

<sup>74</sup> Gram Mortensen, 2012.

special skills required, and on the other hand the need for short term employment in the construction phase can be so great that it would be unrealistic to expect to find the number of workers needed from among the existing workforce. If merely one of the large mining projects is realised at the same time as the Alcoa project or another mining project, several thousand people will need to be employed during the construction phase. Depending on the type of mine, the need for workers can vary widely between the construction phase and the operational phase. In the mining operations planned in Isukasia (iron) and Kuannersuit (REEs – among others), it is expected that there will be a need for up to a couple of thousand in the construction phase, which is three times the number of workers required in the operational phase. See the table in section 3.2.

Greenland has an obvious interest in having as many as possible of its own workers employed, and in training up its workforce so as to be able to take on better-paid jobs. Greenland has set a target of having more than 50 percent of all workers in the minerals sector being local workers.<sup>75</sup> Extracting minerals using local workers requires the Greenlandic workforce to have both the right qualifications and the necessary mobility.<sup>76</sup> Also the need for qualifications, such as English language skills, may be a barrier.<sup>77</sup> The more long-term jobs during the operational phase are presumably more interesting for the Greenland economy than short-term employment in the establishment phase.

Moreover, if Greenland manages to increase its income by exploiting its mineral resources, this may lead to a decline in other productive sectors.<sup>78</sup> General salary levels will be pushed up, making non-mineral sectors less competitive, and there is a risk that smaller towns and villages will lose certain kinds of qualified workers.

---

<sup>75</sup> Naalakkersuisut, 2012: p. 22.

<sup>76</sup> Andersen, 2012, p. 108 f.

<sup>77</sup> Dollerup-Scheibel, 2013.

<sup>78</sup> Paldam, 2013; Ploeg, 2011; Holmgren and Ronnle, 2012.

*The use of local workers as a licence condition*

According to Section 18 of the Greenland Mineral Resources Act, the grant of a licence to explore and/or exploit minerals can be made conditional on the use of Greenlandic workers or undertakings and on the social sustainability of the activity. The provision is based on the mineral sector's strategy of contributing to the development of Greenlandic society, as stated in the 2011 Report of the Greenland Self-Government Bureau of Minerals and Petroleum to Inatsisartut on mineral resource activities in Greenland which stated:

The development of the mineral resource industry must take place so as to create as much benefit as possible for Greenland's society. Society must obtain the highest possible competitive share of profits from extraction, and local insight into and knowledge about activities must be safeguarded, among other things to ensure that local manpower and local companies are being used as much as possible.<sup>79</sup>

In the standard terms for minerals exploration/exploitation, section 13, it is stated, that the licensee shall 'use his reasonable endeavours to employ manpower from Greenland or Denmark when employees are hired', but 'to the extent necessary for the activities the licensee may employ staff from other countries, if manpower with similar qualifications does not exist or is not available in Greenland or Denmark.'<sup>80</sup> This will apply to many mining activities. Further, the licensee shall 'use his reasonable endeavours to assign contracts, sub-contracts, purchases of supplies and services to Greenland enterprises', but 'the licensee may assign such contracts, purchases of supplies and services to other enterprises provided Greenland enterprises are not technically or commercially competitive.' Greenland enterprises are defined as 'enterprises which are domiciled in Greenland and which by virtue of the commercial activities they perform have a true connection to the Greenland community'.

According to Section 76 of the Greenland Mineral Resources Act, if an activity covered by the Act is considered capable of having a significant impact on society, a licence can only be granted if a Social Impact Assessment is made. There are guidelines

---

<sup>79</sup> Naalakkersuisut, 2011: p. 8.

<sup>80</sup> Available at

[http://www.govmin.gl/images/stories/faelles/App\\_standard\\_pros\\_eng\\_25\\_jun\\_2013\\_web.pdf](http://www.govmin.gl/images/stories/faelles/App_standard_pros_eng_25_jun_2013_web.pdf)



on this covering the mineral resources sector. These list the aims that lie behind the guidelines, which include:

- Recruiting Greenlandic labour;
- Engaging Greenlandic enterprises;
- Focusing on knowledge transfer (e.g. education programmes) to ensure long term capacity building of local competences in the mining and mining support industries.

The licensing process concludes by entering into an Impact Benefit Agreement (IBA) between the Government of Greenland, the local municipality and the licensee. This includes laying down a Benefit and Impact Plan, a Monitoring Plan and an Evaluation Plan. For example, an IBA was entered into in the summer of 2010 in connection with a drilling programme for four test bores for oil which it was assessed, on the basis of a Social Impact Assessment, could have a significant social impact. The IBA contained conditions such as:

- Involving Greenlandic undertakings, including as direct subcontractors, as well as holding subcontracting seminars for potential new suppliers;
- Employing Greenlandic workers through Arctic Base Supply and Cairn; and
- Training, including providing English language courses and training pilots.

#### *The Act on Large-scale Projects*

There is a special problem associated with the payment of imported workers. There is a generally high salary level in Greenland, and mining companies can therefore save considerable amounts of money by importing labourers at much lower wages. This has been directly put forward as a demand in connection with investors' negotiations with the Government of Greenland.

In December 2012, the Greenlandic Parliament adopted an Act on large-scale projects.<sup>81</sup> Under this Act, certain large-scale construction projects in the mining and hydro power sectors, or industries with especially high energy demands, are exempt from the existing rules requiring the parties in the labour market to enter into collective employment agreements. Instead, the activities of such projects can be covered by collective agreements on wages and salaries and terms of employment entered into with foreign trade union organisations. In the commentary on the Bill it was stated that the purpose of the Act is to make it possible to carry out large-scale projects in Greenland. The Act also seeks to make it possible to carry out large-scale projects without this raising the general level of wages and costs to the detriment of commerce and the economy of Greenland. In other words, the intention is that mining companies and investors should not be put off choosing Greenland because of its high level of wages and salaries.

The Greenlandic legislator has been influenced by a similar special arrangement in Denmark – the Danish International Register of Shipping,<sup>82</sup> which is heavily referred to in the travaux préparatoires on the Act. According to the Danish arrangement, employers of foreign crew members on ships registered in the Danish International Register of Shipping are not bound by collective agreements on wages and salaries and terms of employment entered into between Danish shipping companies and Danish trade union organisations. Instead, collective agreements relating to a crew member's home country are used. The purpose of the Register is to counteract the flagging out of Danish ships to other countries with cheaper labour.

The Act on large-scale projects lays down a minimum wage of 80.41 Danish Kroner,<sup>83</sup> corresponding to the minimum wage rate under collective agreements.<sup>84</sup> However, in calculating the basic wage employers can include the value of board and lodging, the costs of clothing, free travel, insurance etc. The use of the arrangement is conditional on Greenland not having sufficient labour and expertise to carry out a task.

---

<sup>81</sup> Law No 25 of 18 December 2012 on large-scale projects (bygge- og anlægsarbejder ved storskalaprojekter).

<sup>82</sup> Law No 273 of 11 April 1997 on the Danish International Register of Shipping.

<sup>83</sup> Equal to USD 14.64 as per January 12, 2014.

<sup>84</sup> The agreement between Grønlands Arbejdsgiverforening (the Greenlandic Employers' Association) and Sulinermik Inuutissarsiuteqartut Kattuffiat (the Greenland Workers Union).

Foreign workers employed pursuant to the Act on large-scale projects may not take on other work than that covered by the construction agreement entered into under the rules on large-scale projects. There is little doubt that, in its licensing negotiations with investors for large-scale projects, the Government of Greenland has been pressed by investors in these projects to secure lower wage costs especially in the construction phase.

### *Immigration Law*

The use of foreign workers requires such workers to be given residence permits. Jurisdiction over immigration has not been transferred to the Government of Greenland and remains a matter for the Danish Realm. However, immigration is one of the policy areas could be taken over by the Government of Greenland.<sup>85</sup>

Hitherto, the conditions for obtaining a residence permit for Greenland have been laid down in the Danish Immigration Act<sup>86</sup> which entered into force in Greenland by Decree No 150 of 23 February 2001 on the application of the Immigration Act in Greenland. Today, Section 9(2)(3) of the Act allows a residence permit to be granted with a view to employment in Greenland if there are significant employment or commercial considerations favouring the acceptance of an application, for example if there is a lack of persons in Greenland who are able to carry out the kind of work in question. However, the Danish Ministry of Justice has decided that it is not possible, under this provision, to grant residence permits to foreigners to carry out work in the construction phase of a large-scale project on wages and salaries and terms of employment that are based on collective agreements in the worker's home country. The reason for this is that it would depart from the established practice that foreigners must be employed in accordance with the usual domestic wages and salaries and terms of employment. As a consequence, the implementation of the Act on large-scale projects depends on the Danish Parliament amending the Danish Immigration Act.

---

<sup>85</sup> See List II, No 6, of the Schedule to the Act on Greenland Self-Government; see Section 2 of the Act.

<sup>86</sup> Most recently in Law No 984 of 2 October 2012.

If large-scale projects are realised in Greenland, it must be expected that foreign workers in their thousands will become temporarily resident in Greenland. Greenland will be obliged to treat these persons in accordance with its international obligations. Section 10(6) of the Act on large-scale projects explicitly provides that the wages and salaries and terms of employment of foreign workers who are employed to carry out large-scale projects that are covered by the Act on large-scale projects may not be in breach of the applicable rules of the law of Greenland or of Greenland's international obligations. Among other things, these obligations can include family law issues. The residence of so many foreign workers in Greenland will undoubtedly lead to marriages being contracted and children being born together with members of the local population. This means that circumstances will arise where it will be necessary to decide on questions of family cohabitation and social welfare rights.

### **Concluding Comments**

As a country with a small population and an imbalanced commercial structure, Greenland faces challenges. The political desire for greater independence puts additional focus on the economy. Greenland must find new sources of income. Greenland's strength is that the country is not heavily indebted, but over the coming years unless something is done its expenditures will increase more than its income. Greenland's distance from the major markets presumably excludes more traditional industries. Mineral exploitation including oil and gas would appear to be Greenland's only real possibility of making itself independent of its financial support from Denmark. However, due to the expected growth in welfare costs, the mining industry in itself may not be enough.

It is likely that Greenland's role in the Danish Realm will depend on whether it is able to manage its future economy and thus whether the extraction of minerals can become a stable source of income. Whether this will be the case depends on external factors such as demand and commodity prices, as well as on internal factors in Greenland. The latter include the licensing conditions for mineral extraction, including taxation and the extraction of uranium. There is not broad political agreement in Greenland on these points. The change of government in Greenland in the spring of

2013 has given rise to some concern, reinforced by the fact the issue of royalties was one of the main points at issue in the election campaign, and during the campaign the new government argued that changes to the existing framework conditions were needed. Royalty is now a demand. The lack of political agreement on this is not favourable for Greenland's mineral extraction industry. A stable political background is needed in order to attract investors for long-term large-scale mining projects. Greenland has to compete for investments against many other countries. Several observers now suggest that any Greenlandic mineral rush must lie as much as 20 years in the future. If London Mining is successful in financing the Isua Iron Mine Project these expectations will fail.

Further, Greenlandic measures in the minerals sector have been criticised from many angles, among other things in relation to environmental risks and the conditions for imported workers. These are serious objections. However, there remains the question of how otherwise Greenland is to tackle the challenges it faces. Today, exploiting hydro power and mineral resources seem to be the most practical strategic choices.

While this chapter has been written, the Danish Government has been considering how it should react to the Greenlandic Act on large-scale projects and on the lift of the ban on uranium mining. Much depends on the Danish reaction. There is little doubt that the majority in the Danish Parliament would prefer not to intervene in internal Greenlandic matters, but nor are they enthusiastic about departing from the general principles of the labour market. If Denmark decides not to amend the rules for foreign workers, there will be a risk that the Government of Greenland will take over responsibility for immigration to Greenland. This is also something which most member of the Danish Parliament would not be enthusiastic about. At the same time there is a debate about whether Greenland can repeal the uranium prohibition unilaterally. Does it contain issues of defence and security policy, aspects of uranium will belong under the control of the Realm.

It is remarkable how little political debate there has been in Denmark about Greenland, leading up to the introduction of self-government and of the consequences of transferring responsibility for mineral resources to the Greenland Self-Government. If and when mineral extraction activities give Greenland a sustainable economy, the

question will arise as to whether Greenland will wholly withdraw from the Danish Realm. If this were to be the case, the presence of mineral deposits will not only have been the cause of a national strengthening of the economy, but of a wholly new situation in the Arctic region. Who holds power in Greenland will suddenly become interesting for the other Arctic coastal states and other interested parties. For better or worse, a country with so few inhabitants and in such a position could easily be considered a power vacuum. Greenland will certainly change. Status quo is not an option.

**Bibliography**

- Alfredsson, Gudmundur. 1982. Greenland and the Law of Political Decolonization. *German Yearbook of International Law* 25.
- Andersen Torben M. 2012. Grønlands økonomi. In *Grønlands fascinationskraft*. By Marita Akhøj Nielsen. Det Kongelige Danske Videnskabernes Selskab.
- Basse, Ellen Margrethe. 2012. Lovgivning om råstof- og olieudvindinger, miljø, jagt og fiskeri i Grønland. *Tidsskrift for Miljø*.
- Berry, Dawn Alexandra. 2012. Cryolite, the Canadian aluminium industry and the American occupation of Greenland during the Second World War. In *The Polar Journal* 2:2, pp. 219-235.
- Boel, Jens and Søren T. Thuesen. 2010. Greenland and the World: The Impact of World War II on Danish-Greenlandic Relations in Ilisimatusarfik. In *Cultural and Social Research in Greenland*. Atuagkat.
- Bureau of Minerals and Petroleum (BMP). 2012. Report to Inatsisartut on mineral resource activities in Greenland.
- Bureau of Minerals and Petroleum (BMP). 2007. Efterforskning og udnyttelse af uran.
- Bureau of Minerals and Petroleum (BMP). Standard terms for prospecting. Available at [www.bmp.gl/about-bmp/legal-foundation](http://www.bmp.gl/about-bmp/legal-foundation).
- Chen, Gang. 2012. China's emerging Arctic strategy. In *The Polar Journal* 2:2, pp. 358-371.
- Christensen, Anders Møller and Carina Moselund Jensen. 2012. Aktuelle tendenser i den grønlandske Økonomi. Den Danske Nationalbank. Kvartalsoversigt 1st quarter 2012 part 1.
- Clark, Elmer F. 1965. Camp Century. Evolution of concept and history of design, construction and performance. U.S. Army Material Command, Cold Regions Research & Engineering Laboratory, Hanover, New Hampshire. Available at <http://www.dtic.mil/dtic/tr/fulltext/u2/477706.pdf>

- Degeorges, Damien. 2012. *The Role of Greenland in the Arctic*. Institut de Recherche Stratégique de l'Ecole Militaire (IRSEM). April.
- Dollerup-Scheibel, Mads. 2013. English skills could oil the wheels of Greenland commerce. *Greenland Oil & Minerals* 6.
- Energistyrelsen. 2012.
- gb times. 2010. *Sjældne jordarter er i vælten igen*. 29 October.  
<http://dk.gbtimes.com/nyheder/sjaeldne-jordarter-i-vaelten-igen>
- Gocht, W. 1983. *Wirtschaftsgeologie und Rohstoffpolitik: Untersuchung, Erschließung, Bewertung, Verteilung und Nutzung mineralischer Rohstoffe* [Economic geology and raw materials policy: investigation, exploitation, evaluation]. 2<sup>nd</sup> ed. Springer.
- Gram Mortensen, Bent Ole 2012. Mining and pollution. In *The Yearbook of Polar Law* 4. Edited by Waliul Hasanat. Leiden: Martinus Nijhoff Publishers.
- Gram Mortensen, Bent Ole 2013. Greenland. In *Upstream Law and Regulation: A Global Handbook*. Edited by Eduardo Pereira and Kim Talus. London: Globe Business Publishing.
- Greenland Statistics. 2013. Greenland in figures – 2013. Available at <http://www.stat.gl/publ/da/GF/2013/pdf/Greenland%20in%20Figures%202013.pdf> f. (accessed on May, 2013).
- Grønlands Miljøundersøgelser, 1993. Miljøundersøgelser ved Maarmorilik 1991 og 1992.
- Heinrich, Jens 2012. *Eske Brun og det moderne Grønlands tilblivelse*. Naalakkersuisut.
- Holmgren, Michael and Erik Ronnle. 2012. Hydrocarbons in Greenland – Prospects for the Greenlandic Economy. Master Thesis Technology Management: 236/2012. Lund University School of Economics and Management, Sweden.
- Humphries, Marc. 2010. Rare Earth Elements: The Global Supply Chain. Congressional Research Service. September.
- Jakobsen, Linda and Syong-Hong Lee. 2013. The North East Asian States. Interests in the Arctic and Possible Cooperation with the Kingdom of Denmark. Report



- prepared for the Ministry of Foreign Affairs of Denmark, Stockholm International Peace Research Institute (SIPRI). April.
- Motzfeldt, Jonathan. 2008. Selvstyre i Grønland. Debat i Det grønlandske Selskab om selvstyre i Grønland. *Tidsskriftet Grønland* 1: 26-32.
- Naalakkersuisut. 2012. Vores fremtid – dit og mit ansvar – på vej mod 2025.
- Naalakkersuisut. 2011. Report to Inatsisartut on mineral resource activities in Greenland. February. Available at [http://www.bmp.gl/images/stories/about\\_bmp/publications/Report\\_to\\_inatsisartut\\_on\\_mineral\\_reousrce\\_activities\\_in\\_2011.pdf](http://www.bmp.gl/images/stories/about_bmp/publications/Report_to_inatsisartut_on_mineral_reousrce_activities_in_2011.pdf)
- Nuttall, Mark. 2013. Zero-tolerance, uranium and Greenland's mining future. In *The Polar Journal*, 3:2, pp. 368-383.
- Paldam, Martin. 2013. Dutch Disease and Rent Seeking: The Greenland Model. *European Journal of Political Economy* 13(3): 591-614.
- Pedersen, Per Vestergaard. 2012. *Greenland*. In *Minerals and Mining: A Pracical Global Guide*, pp. 107-129. London: Global Business Publishing Ltd.
- Ploeg, Frederick van der. 2011. Natural Resources: Curse or Blessing?. *Journal of Economic Literature* 49(2): 366-420.
- Roggenkamp, Martha M., Cathrine Redgwell, Iñigo del Guayo and Anita Rønne. 2007. *Energy Law in Europe*. 2nd ed. Oxford University Press.
- Rosing, Minik. 2012. Grønland – en verden af mineraler. In *Grønlands fascinationskraft*. By Marita Akhøj Nielsen. Det Kongelige Danske Videnskabernes Selskab.
- Råstofdirektoratet. 2012. Redegørelse til Inatsisartut vedrørende råstofaktivitetet i Grønland. June.
- Steenfos, Hans P. and Jørgen Taagholt. 2012. *Grønlands teknologihistorie*. Gyldendal.
- Thagesen, Peter and Ingeborg Ørbech. 2012. Kina mister monopol på sjældne jordarter. *Indsiget*. Dansk Industri. February. Available at <http://publikationer.di.dk/di/78/2>

Tiess, Günter. 2011. *General and International Mineral Policy*. Vienna: Springer-Verlag.

Technology Metals Research (TMR). 2012. *Big News From China On The Future Of The Heavy Rare Earths Industry*. 31 March. Available at <http://www.techmetalsresearch.com/2012/03/big-news-from-china-on-the-future-of-the-heavy-rare-earths-industry/>

Transportkommissionen. 2012. *Betækning*, January. Available at [www.transportkommissionen.gl](http://www.transportkommissionen.gl).

United States Geological Survey (USGS). 2007. Assessment of Undiscovered Oil and Gas Resources of the East Greenland Rift Basins Province. Available at [http://pubs.usgs.gov/fs/2007/3077/pdf/FS07-3077\\_508.pdf](http://pubs.usgs.gov/fs/2007/3077/pdf/FS07-3077_508.pdf)

United States Geological Survey (USGS). 2008. Assessment of Undiscovered Oil and Gas Resources of the West Greenland–East Canada Province. Available at [http://pubs.usgs.gov/fs/2008/3014/pdf/FS08-3014\\_508.pdf](http://pubs.usgs.gov/fs/2008/3014/pdf/FS08-3014_508.pdf)

Vestergaard, Cindy and France Bourgouin. 2012. Should Greenland Mine its Uranium?. *DIIS Policy Brief*. April.

Wright, David Curtis. 2011. *The Dragon Eyes the Top of the World*. Arctic Policy Debate and Discussion in China. USA: Naval War College, China Maritime Studies Institute.

Zahle, Henrik, ed. 2006. *Grundloven – Danmarks Riges Grundlov med kommentarer*. Jurist- og Økonomiforbundets Forlag.

### **Homepages and databases**

Government of Greenland: Mineral Licence and Safety Authority (MLSA) – [www.govmin.gl](http://www.govmin.gl).

Statistics Greenland - [www.stat.gl/](http://www.stat.gl/)

U.S. Department of Commerce, United States Census Bureau: International Data Base - [www.census.gov/population/international/data/idb/informationGateway.php](http://www.census.gov/population/international/data/idb/informationGateway.php)

Legislation etc.

*International*

ILO Convention No 169 concerning Indigenous and Tribal Peoples in Independent Countries. Adoption: Geneva, 76th ILC session (27 June 1989). Entry into force: 5 September 1991.

Denmark-United States: Agreement Relating to the Defense of Greenland. Signed at Washington, 9 April 1941. Printed in the American Journal of International Law 1941, pp. 129-134, and available at [www.jstor.org/stable/2213493](http://www.jstor.org/stable/2213493).

*Danish/Greenlandish*

Act No 27 of 19 February 1932 on exploration and exploitation of Mineral Resources in subsoil of the Kingdom of Denmark.

Royal Decree of 27 April 1935, according to which the principles of the Danish Subsoil Act applied to Greenland.

Act No 166 of 12 May 1965 on Mineral Resources in Greenland.

Act No 577 of 29 November 1978 - The Greenland Home Rule Act.

Act No 585 of 29 November 1978 on Mineral Resources in Greenland.

Act No 844 of 21 December 1988 regarding amendment of Act on Mineral Resources in Greenland.

Act No 335 of 6 June 1991 on Mineral Resources in Greenland.

Act No 303 of 24 April 1996. See also Consolidated Act No 368 of 18 June 1998.

Law No 273 of 11 April 1997 on the Danish International Register of Shipping.

Decree No 150 of 23 February 2001 on the application of the Immigration Act in Greenland.

Act No 473 of 12 June 2009 on Greenland Self-Government.

- The explanatory notes to the Act on Greenland Self-Government.

Greenland Mineral Resources Act nr. 7 of 7 December 2009 – (Inatsisartutlov om mineralske råstoffer og aktiviteter af betydning herfor).

Law No 984 of 2 October 2012 - the Danish Immigration Act.