Artikel 6

The aluminium smelter project in Greenland – New aspects of an industrialisation process?

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The aluminium smelter project in Greenland – New aspects of an industrialisation process?[27]

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Introduction

Greenland is today in a situation where important decisions have to be made. The demography is changing, the economy is challenged, and the settlement structure is exposed to both internal and external processes of change. Furthermore the option to become less dependent on transfers from Denmark has become an important issue in the political discourse.

The overarching question in this connection is first of all what should be done in order to meet the upcoming challenges over the coming years and as a part of this question it is important to look into what impact may be generated first and foremost in relation to the settlement and housing structure.

Besides showing differences of livelihoods, social orders and social conditions, the major changes throughout the history of Greenland materializes across the different eras of occupational structures and resource exploitation to a large extend through changes in settlements structures and housing conditions.

An overview of the historical background showing the different eras of occupational structures is important to have in order to understand the present and especially the future dilemmas. Regarding the present situation, it goes not the least for the marked changes caused by a shift from dependency on living renewable resources to an expected increased dependency on mineral and energy resources as well as on related large-scale industries.

One of the potential options in this connection has been a proposal for an aluminium smelter project by Alcoa that in turn has raised the question of the expansion of hydropower plants. Furthermore, it has resulted in a discussion on the very special situation when it comes to the two set of environmental legislation and further on to a discussion of the strategic environmental assessment related to the aluminium project. It inevitably leads to a discussion on the planning of housing and infrastructure related to the aluminium smelter project in Maniitsoq, which is a former centre for fisheries. It has now been selected as the future centre for Alcoa's planned aluminium production in Greenland.

An important issue in relation to the on-going processes of change is the question of legitimacy and democratic potentials, where Greenland clearly is a brand new player on the playground of global economy. In the general context, it is clear that in relation to many of the challenges Greenland is facing the fear of not being prepared to bite on spoons with the large international industrial players. That should on the other hand not lead to a political isolation because - as it will be argued - the best possible political perspective for Greenland as a developing as nation is further international involvement and better preparations.

Background

Greenland gained Home Rule in 1979. It was an agreement between Denmark and Greenland to establish a Greenlandic parliament and gradually transfer areas of responsibility to the new Greenlandic administration. Greenland remained an integrated part of the Kingdom of Denmark, which is constituted by the country of Denmark and the self-governing areas of the Faroe Islands and Greenland.

By 2009, a new agreement gave Greenland Self-Government. The 2009 agreement expands significantly the possibilities for Greenland to take over new areas of responsibility but still within the realm of the Kingdom of Denmark. With the 2009 agreement, it is in the

27 A draft version of this article has been reviewed for the Remote Regions Session on 10 February 2012 at the 2012 WRSA meetings 8-11 February 2012 in Koloa, Kauai Hawaii, USA.

hands of Greenland to decide if and when Greenland wishes full independency from Denmark. An important difference between the 1979 and the 2009 agreements is the economy. With the first agreement in 1979, an annual block grant compensated Greenland for areas of responsibility transferred to Greenland, and the sum was negotiated each year. From 2009 the block grant became a fixed amount of money, which is about 3.5 billion DKK (about 620 million USD) annually. The 1979 agreement stated the subsurface as commonly owned amongst Denmark and Greenland. In the 2009 agreement it is recognised as Greenlandic property.

Because of the new conditions, the economic rationality in Greenland has changed significantly. The new structure has animated Greenland to act much more proactively for attract the international mining and oil companies to Greenland. The explicit reason for that is, the Greenlandic strong political desire to expand its Self-Government and eventually gain full independence. At the same time there is a broad understanding among the political parties that the actual political independence from Denmark primarily is a question of financial independence – together with a growing recognition of the importance of independency when it comes to the question of being able to provide the necessary number of people with the educational skills needed in the society.

The Greenlandic economy is today highly dependent on two sources of income. For the first, it is the fishing sector and for the second, it is the annual block transfer from the Danish Government. For decades, Greenland's own economy has been based on exports by the fishing industry. The efficiency and the catches have been expanding almost from every year to the next, but the world market prices have in the same period declined even more. It is specially the case for shrimp fishing where aquaculture production of large warm water shrimp has impacted the price setting of cold water shrimp, and when the export of shrimp is about 90 % of the export from Greenland it has had a significantly negative impact on the Greenland economy (Rasmussen 2007, Garcia et al. 2006).

The development in the fishing industry with the resource exploited to its maximum as well as the bleak prognosis on future revenues from fishing clearly indicates that the fishing industry never will be able to generate enough wealth to give Greenland a financial independency (Rasmussen 2007, Larsen 2010). The mining industry still does not generate much to the Greenland economy. During the last couple of years, the exploratory drilling for oil has yet not shown any oil resources of commercial interest and because of the lack of success in the exploratory offshore drillings in the west of Greenland, there were no new drillings in 2012 and in 2013.

Because of the broad political aspiration for more political independency from Denmark and as economic independency is an essential precondition to political independency the politicians are searching for alternative ways to generate revenues for the country. That must be seen in combination with the necessary response to the prospect of Greenland that is not being able to generate enough wealth from the traditional sources such as fishing let alone tourism and not even from mining and – on the short lane – even oil. Therefore, in order to keep the existing wealth in Greenland and in order to gain economic independence from Denmark, the country is forced to try to find new ways of revenues for the national economy within the next few years.

In this context, a new perspective revealed itself in 2006 in the shape of the international aluminium producing company Alcoa. The politicians took the opportunity and it did not take much time for the politicians to look for inspiration in Greenland's neighbour to the east, Iceland. Iceland has more than forty years of experience with large-scale industrial projects. Forty years of the phase shift between Iceland and Greenland in relation to large-scale industrial projects provides both challenges and advantages for Greenland when looking for inspiration in Iceland.

Eras of occupational structure

In order to fully understand the epochal changes the enquiry by Alcoa in 2006 created, it has been necessary for Greenland to sketch out an overview of the eras of occupational structure in Greenland. For Greenland, the eras of industrialisation can be divided into four eras.

Table 1: *The four eras of occupational structure in Greenland.*

Time period	Era	Primary external contact	Primary resource exploitation
From earliest cultures till second part of the 17th century	Nomadic hunting and fishing	Almost none Peripherally the Norse	Seal, fish
From second part of the 17th century till around 1950	Early industrialisation	Denmark-Norway as colonisers	Seal, whales, fish, prawns plus minerals
From around 1950 till around 1979	National industrialisation	Denmark as developer	Fish, prawns plus minerals
From around 1979 still in force	Global industrialisation	The global market as business partners	Minerals, gas and energy resources plus fish, prawns

The earliest era of occupational structure in Greenland was the Inuit era, covering the period from the first cultures to settle in Greenland for about 4,500 years ago up till the first contact with the European whalers in the second part of the 17th century. This era was characterised by nomadic hunting, fishing and gathering in cultures primarily using wood, skin, stone and bone to provide the artefacts they used.

A short intermezzo happened during the Norse setlements in Greenland from 982 to around year 1500. This era did not leave much effect on the earliest era of occupational structure, as these two cultures only were peripherally in contact with each other during the last century of the Norse settlement era.

It was not until the second part of the 17th century the first Europeans again began to travel on regular basis in the waters surrounding Greenland. During this period the European whalers had sporadic contact with the Inuit. Later, by starting his mission in 'Old Greenland' in 1721, Hans Egede opened for an intensification of the era of early industrialisation in Greenland. Denmark and Norway set up the mission and trade colonies along the south-western part of the coast of Greenland. The Inuit were in closer contact with the Europeans, the missionaries converted them into Christianity and they were engaged in trading with the trading company, den Kongelige Grønlandske Handel (KGH) – the Royal Greenland Trading Company.

During this era, the economy was based on hunting and whaling and later on small-scale fishing. Some small-scale mining took place (i.e. cryolite and coal), and in 1921 the first fish processing plant opened in Sisimiut. During the 1920s, most of the abundant fish resources following the substantial temperature increase in the Greenlandic waters were however captured by foreign boats. It was therefore not until after the Second World War, that Greenland experienced a major new development in the industrialisation process.

Around 1950, several fundamental changes hit Greenland. The era of the national industrialisation had begun. One of the visible factors was the modernisation of the societal infrastructure and the physical living conditions. The economy developed into a service economy, with the Nordic welfare state as its model. To a large extent, the economy was based on transfer of a block grand from Denmark. Slowly the export of fish and shrimp developed and contributed to the national economy.

On the political scene, a movement for more direct involvement in the political decisions affecting Greenland grew from the beginning of the 1960s. It resulted in the introduction of Home Rule by 1st May 1979, which can be seen as the first step into the fourth era, the era of global industrialisation.

In the beginning, the era of global industrialisation in Greenland developed separately from the Home Rule administration, as it primarily developed within the frame of the extraction industry, i.e. mining and exploration for oil and gas, which had its own administration. It will be explained further in a following chapter

As part of the economic crises, Greenland was for the first time in the end of 1980s exposed to the conditions on the global finance market (Westerlund 1988). In august 1988, the Prime Minister of Denmark set up a permanent Advisory Commission on the Greenlandic Economy ("Det rådgivende udvalg vedrørende Grønlands økonomi"). It was active from 1988 to 2009. In 2009, the Danish commission was replaced with the permanent Greenlandic commission "Grønlands Økonomiske Råd", which was set up by the Greenland government (Naalakkersuisut), (Grønlands Økonomiske Råd 2012), but it is still an advisory board based on Danish expertise.

In spite of Greenland experiencing its first contact with the global finance market in 1988, it did not fun-

damentally change the legislative logic in most parts of the Home Rule administration. One of the reasons for that might be the fact that it was Denmark that took the initiative to set up the first commission on the Greenlandic economy and not the Greenland Home Rule. It is thus just another example of the Danish lead development of Greenland which characterised the era of national industrialisation.

Thus, the era of global industrialisation did not evolved dramatically as an integrated part of the Greenlandic political and administrative realm, until 25 years after the introduction of Home Rule. The change is symbolised by the inquiry in the beginning of 2006 by the aluminium company Alcoa.

Settlement structure and housing conditions

Besides showing differences in livelihoods, the division of the history of Greenland materializes into four phase of industrialisation to a large extended through the changes in settlements and housing.

For centuries, the normal dwelling in Greenland was a skin tent during summer and a peat house during winter. The peat houses were in principle "use-and-throwaway houses", as they would normally only be used for one winter due to the nomadic lifestyle of the Inuit.

This pattern changed quite quickly after the first permanent colonial settlement in the 18th century, which identifies the intensification of the era of the era of early industrialisation in Greenland. Drawings from the mid-19th century indicate that the traditional one-winter-only peat houses had been turned into more permanent dwellings, always in close proximity to the colonies of the missionaries and the trading company.

From this housing point of view, it is of interest to see on Illustration 1 from around 1850 that several of the peat houses were constructed with a permanent roof with attic. Besides that almost all the peat houses were equipped with a chimney and – logically – also a stove. These peat houses were therefore permanent dwellings.

Throughout the 19th century and during the first half of the 20th century, the traditional peat houses were gradually transformed into small wooden houses. A standard house for the Inuit family at the beginning of the 20th century was a single-roomed, single-storey house with a layer of wooden boards, which acted as walls and with an inclined roof, which created room for storage. For insulation, these houses had a thick

Illustration 1: *This is a drawing made by the little-known Greenlandic artist Henriette Bolette Jørgensen (1825-1909). The drawing shows the colony of Holsteinsborg (today Sisimiut). The drawing is undated. The three-storey building in the middle of the picture is from 1846. The drawing is probably from around 1850 and definitely earlier than the more well-known drawings by Andreas Kornerup, who travelled in Greenland in 1876-1879. (The drawing belongs to Sisimiut Museum).*

outer wall made in the traditional way with layers of peat and flat stones.

Until the start of the era of national industrialisation which is identified by the intensive modernisation period in the 1950s, the Inuit housing was almost exclusively a 'do-it-yourself' initiative, but this was soon to change dramatically. The age of modernisation emerged after 1950 with the Danish Government's formation of the public authority Grønlands Tekniske Organisation (GTO) – Greenland's Technical Organisation. At that time, Greenland was still almost 100 % administrated from Copenhagen. The GTO was in charge of the orchestration of the transformations of the Greenlandic infrastructure from an archaic, colonial museum into a modern and streamlined society. Very important here was, the decision to create up-to-date housing. This was to be developed in two parts.

For the approximately 75 smaller settlements, the GTO constructed a set of standard houses with proper insulations, wooden floors and windows (Rosendahl 1988). This was a huge step forward. The people, whom these houses were meant for, were however unable to provide any financing on their own. Therefore, loans, which did not need to be repaid for thirty years were introduced. Although the system had seemed to work well for decades, it was ultimately concluded that those who were unable to pay the loan at establishment, were unlikely to be able to pay it thirty years later. Subsequently most of these loans were simply written off.

For most of the 19 towns, the strategy was somewhat different. A town was defined as the major inhabited area in each municipality. All other inhabited places within the municipalities were defined as settlements. The number of municipalities has changed a little over the years. In the towns blocks of flats with running water and modern toilet facilities were built during the 1950s and the 1960s.

Through this, the majority of the inhabitants in the towns became tenants, in the state-owned modern housing developments. Rents were kept artificially low, as a majority of tenants would simply not be able to pay a market based rent.

The introduction of Home Rule in 1979 did not immediately change the housing market. The responsibility for the housing was transferred to the Greenlandic Home Rule administration in January 1987. It was at that time clear that there was a lack of maintenance of the public housing stock. The Home Rule did not have the long-term economic capacity to maintain the public housing stock.

A strategy to encourage the tenants in the public housing stock to become owners of their dwelling was initiated. The goal was a higher degree of privately owned houses and flats in the towns of Greenland.

In 1991 the first legislation was introduced (Landstingsforordning 1991). Since then, several legislative initiatives have been taken (Landstingsforordning 1998, 2002, 2005, 2007a, 2007b and 2008).

The legislation has primarily focus on the possibility of having cooperative housing and the possibility of going from renting to owning private dwelling. Some very attractive mortgage options were introduced. Best know is the 10-40-50 mortgage option – an option that was later changed into 20-40-40. One of the slogans introduced by the authorities has been "from tenant to owner" (Sermersooq [2013], Fleischer-Lyberth 2008).

The numbers; 10 (later 20) indicate that the owner must provide 10 % (later 20 %) financing of the construction costs. The municipality and the Home Rule (later Self-Government) jointly provide 50 % (later 40 %) financing free of reimbursement and interest for typically 30 years. The remaining 40 % has to be a normal mortgage loan from a bank, a building society or a mortgage credit institution. These very attractive possibilities have resulted in a growing number of privately owned houses in the larger towns.

During the same decades, Greenland has experienced a steady growing urbanisation (Rasmussen and Hansen 2013). So the era of international industrialisation has on the housing market been characterized by growing private ownership of dwellings and a marked increase of the urbanisation process.

Housing in Nuuk.

During the first years of Home Rule and through the 1980s, a small group gained a huge wealth. The group consisted of Danish private business directors and members of some of the Greenlandic upper class clan families. Some of this wealth was put into large, private houses of some 200 square metres, which constitutes a luxury house in Greenland.

In all of Greenland's towns, specific areas are dominated by a few such houses in the smaller towns, and in number up to fifty plus in the town of Nuuk. Ever since the 1950s, there has been and indeed there remains a small and stable market for these luxury houses. Supply and demand for them has more or less been in balance since the early 2000s.

People living in these houses include successful entrepreneurs, trawler owners, directors in the public owned organisations, top civil servants, and politicians. Thus, their wealth comes from very different sources, and this group of citizens with high incomes does not share much except their taste for more luxurious surroundings in their everyday lives.

At the end of the 1980s, a new economic reality began to emerge. Previously the Danish state and the Hole Rule owned almost 90 % of all houses on the transferable housing market aimed at the middle-income groups. As already described, the system has however proved to be simply too expensive to maintain and had to be changed.

The new system had focus on the housing co-operative and on privately owned houses. Here, the middle-income group could become house owners – with a little help from Home Rule and the municipality. Of paramount importance here to the former public owners was, the fact that building maintenance was no longer the responsibility of the public administration. The Home Rule and the municipality supported the establishment of cooperative ownership with up to 50 % of the costs financed through special loans.

At the beginning of the new millennium, a new and financially stronger middle-income group began to dominate the housing market primarily in the four largest towns (Qaqortoq, Nuuk, Sisimiut and Ilulissat), and most visibly in the capital, Nuuk. In Nuuk for the first time a whole area, Qinngorput, was established with only privately owned houses and flats operating more or less on market terms.

The process of developing a growing housing market operating more or less on market terms, which could be expected to be replicated in the three other new 'administrative' towns (Qaqortoq, Sisimiut and Ilulissat), one in each of the municipalities created by the municipal reform in 2009.

The world economic crises in 2008 did not affect Greenland much, as Greenland is partly immune to fluctuations in the global economy as consequence of the stable yearly block grant from Denmark. Especially in Nuuk, the house prices have been relatively stable since 2000. Compared to the rest of Greenland, Nuuk has developed a house price bubble. At this point of time, it is impossible to say whether or not the house price bubble in Greenland will burst.

Since the late 1980, a large group of high middle class families have moved from tenant to owner. During these years there has been a stable growth in percentage of house owners in the group of high middle class families. The tenant/owner ratio is about to stabilise now. The houses sold to this segment of buyers, have for years typically been in the area between 2.6 and 3.2 million DKK.

A new group of potential new house owners is the lower middleclass. This group will be able to buy houses in the prize between 1.8 and 2.6 million DKK. Not many houses have been sold to that prize, but as a number of the privately owned houses are getting 25-30 years old. The expected lower prizes of these houses might begin to appeal to families in the lower middleclass.

The description here does not reflect any expected impact on the housing market, especially in Nuuk when the first large-scale global economy rooted projects are being realized. It will almost certainly create a new kind of impact on the housing market in Nuuk and in other places in Greenland that are directly in contact with these new projects.

The aluminium project

As previously described, the inquiry by Alcoa in 2006 can be seen as the ultimate introduction of the era of global industrialisation to the Greenlandic society. It is therefore worthwhile to have a closer look at the process which the inquiry by Alcoa in 2006 started and thus the creation of the aluminium project that is still going on.

The aluminium project that currently is being developed in Greenland has – as already mentioned – its genesis in the beginning of 2006, at which time Alcoa, a USA based Aluminium Company, contacted the Greenlandic authorities. Alcoa wished to initiate preliminary surveys with the objectives of assessing the potentials for establishing an aluminium smelter at the coast somewhere in the central parts of West Greenland, in the area between Sisimiut to the North and Nuuk to the South.

As the aluminium project is potentially the most extensive industrial project ever to have been undertaken in Greenland, it will obviously potentially have a huge impact on the Greenland society. The proposed aluminium project is also the first real major international industrial project in Greenland. Almost all mining activity has so far been isolated projects and often far away from the inhabited places in Greenland. The only exception from that might be the coal mine in

Table 2: *Milestones for the project on the first aluminium smelter in Greenland.*

Spring 2006	First enquiry by Alcoa
July 2006	Joint Action Plan (JAP) between Greenland and Alcoa
April 2007	First open political decision in the Parliament regarding the project (Go on)
May 2007	Memorandum of Understanding (MoU) between Greenland and Alcoa
May 2008	Open political decision in the Parliament on placement (Maniitsoq chosen)
2014 (exp.)	Open political decision in the Parliament on ownership (partner/concession)
2014 (exp.)	Final political decision in the Parliament on the project (start/not start)
2020 (exp.)	Earliest possible commencement of production (if project is approved)

Qullissat until the town was closed down by the authorities in 1972 (Rasmussen 2004; Rasmussen 2009; Haagen 1977).

The most significant project milestones in the on-going aluminium project are listed in Table 2.
The Greenlandic parliament, Inatsisartut, is expected in 2014 to make decisions on whether or not to give the final approval for the aluminium project to be realised. In the initial stages of the project, it was planned that the final decisions would be made as early as in 2008, but the scheduling of the final decision has been postponed several times.

The MoU does not have an expire-date for the fulfilment of each of the phases described in the MoU. During the summer of 2013, the Government of Greenland and Alcoa had still not reached a final agreement. One of the main disagreements at this stage is probably the model for the financing of the housing and the infrastructure in Maniitsoq – see Box 2.

Development of hydropower

When Alcoa in 2006 contacted the Greenland authorities, Greenland was not prepared for such an industrial megaproject outside of the realm of the mining and petroleum industry. The Danish and Greenlandic mining and petroleum sector in Greenland had since the early days of the Home Rule been working with large mining companies, but the same development had not been seen in the business and industry sector. The important division between these two sectors will be discussed in the next chapter.

If the aluminium project is realised it will be the largest industrial project in Greenland so far. Taking that into consideration, it makes sense that the on-going aluminium project has caused many new actions to be taken by the authorities.

The development of the hydropower sector in Greenland can serve as an illustration for the development of the business and industry sector in Greenland since the beginning of the 1950s.

In spite of the rapidly growing fishing industry in the first part of the 20th century, it was not until after the Second World War the Danish authorities launched a massive modernization process for the Greenlandic society. Thus the first public power station was not started in Nuuk until October 1949.

Within an almost entirely technical-economical driven development frame with rolling five years of planning, GTO decided in the early stages of the modernization process to create a one-string energy solution, which was based on oil. The provision of energy for heating and electricity was thus based on oil based facilities. This 100 % oil based energy production was maintained for 40 years.

The political responsibility for developing the infrastructure was transferred to Greenland in 1979. But it was in the beginning still the same employees in GTO who were responsible for decisions and actions. It took some years to restructure the organization to the changed political reality.

The first preliminary field studies for Greenland's first hydropower station started in 1981, 40 km south of Nuuk. This first major hydropower station began to supply Nuuk with energy in 1993. During the following 20 years, Greenland has gradually increased its production of energy from hydropower plants.

Since 2012 when the Ilulissat hydropower station started, has 70 % of the energy production for the households in Greenland been produced by the hydropower. The potential for even an higher percentage of energy production that comes from the hydropower is documented. It is only waiting for a political decision to start new projects. The Aasiaat/Qasigiannguit hydropower plant is expected to be the next non-industrial hydropower plant that is to be built.

Table 3: *Public hydropower stations in Greenland. The estimated "Cumulated share" is the hydropower; generated energy share of the total consumption of energy in Greenland by domestic housing and smaller industries. The Aasiaat/Qasigiannguit hydropower station is not yet politically decided upon. The preparatory work has been going on since app. 2010. * = estimated. The utilisation rate is calculated on the basis of: (X GWh x 100) / (Y MW x 8,760 hours) = Z %.*

Town	MW	GWh	Utilisation rate	Start year	Cumulated share
Nuuk	45.0 MW	192 GWh	48.7 %	1993	39 %
Tasiilaq	1.2 MW	6 GWh	57.1 %	2005	41 %
Qaqortoq/Narsaq	7.2 MW	27 GWh	42.8 %	2007	46 %
Sisimiut	15.0 MW	52 GWh	39.6 %	2010	57 %
Ilulissat	22.5 MW	65 GWh	33.0 %	2013	70 %
Aasiaat/Qasigiannguit	13.0 MW	*45 GWh	39.5 %	20??	*88 %
Total	103.9 MW	387 GWh			

The plans in Greenland on shifting from 100 % dependency on oil as fuel to as much hydropower as possible was until the aluminium project was born in 2006 by the inquiry from Alcoa solely focused on production of electricity for domestic housing and smaller industries. The production of hydropower electricity for huge energy intensive industries has not been part of the previous plans to be realised for constructing the existing hydropower plants. When planning the hydropower plant for Nuuk in the 1980s, it was considered that the hydropower plant also might be able to produce energy for an energy intensive industry. A Zinc processing plant was part of the discussions, but the project in Nuuk has never had the capacity to produce energy for both the households in Nuuk and an energy intensive industry.

The proposed aluminium smelter will be placed 20 km north of the town of Maniitsoq. It will be a middle size smelter with a capacity of producing around 400,000 tons of aluminium per year when the smelter is at full production capacity. The aluminium project operates with two industrial hydropower stations. They are to be placed in the inland north east and south east of Maniitsoq close to the inland ice cap. The projected total capacity for the two industrial hydropower stations is 700 MW or 3,000 GWh (utilisation rate of 48.9 %). As it can be seen from Table 3, it is almost ten times more than the total capacity of all the five existing hydropower stations in Greenland for households and small industries.

The proportions that are described here is also an illustration of why places like Greenland and Iceland are of interest on a global market to these giant international companies with energy intensive productions. Almost everywhere in the world, these companies must compete with the surrounding societies on the consumption of the energy potentials. But in isolated places with huge unutilized energy-potentials with a small population, these companies are not exposed to the same type of competition on the consumption of the energy.

Two separate sets of legislation on the environment

The 1979 regulation about the Home Rule in Greenland operated with three categories of legislation. First, there was the legislation covering the Kingdom of Denmark (Denmark, the Faroe Islands and Greenland) and with the Danish Parliament, Folketinget, as the sole legislative body where Greenland and the Faroe Islands each are represented by two out of the 179 members. The legislation within this category is called "rigsanliggender" – "matters for Danish parliament alone". It included the currency, the monarchy, the foreign policy, the armed forces and other areas.

Secondly, there was the legislation covering areas for which the legislative powers could be transferred to the Greenland Home Parliament, Landstinget. The legislation within this category is called "hjemmestyreanliggender" – "matters for Greenlandic parliament alone". It included areas are like environmental protection, education, social care, health etc.

Finally, there was a very specific area of legislation where the legislative body was the Danish Parliament but with a Danish Greenlandic commission ("Udvalget vedrørende mineralske råstoffer i Grønland") where both parties had the right of veto. The legislation within this category is called "fællesanliggender" – "matters for Danish parliament but both parties have the right of veto". It covered the activities in relation to petroleum and minerals including environmental protection

related to these activities. The commission was in the beginning placed in Denmark but was moved to the Bureau of Minerals and Petroleum (BMP) in Greenland in1998.

The historical reason for the third category ("fællesanliggender") was a Danish unwillingness to let Greenland get full authority over the petroleum and mineral resources in the Greenland subsoil.

Because of this division, two set of separate legislation on environmental protection had to be implemented, one within the second category ("hjemmestyreanliggender") and one within the third category ("fællesanliggender"). During the 1980s the 1990s and the 2000s, the commission and its administration were very active attracting foreign oil drilling and mineral mining companies to start operating in Greenland. They therefore had to develop their own legislation on environmental protection in relation to the oil drilling and mineral mining activities.

Within the second category, the Home Rule implemented legislation on environmental protection for all other activities in the society including industry and business. However, this Home Rule implemented legislation was not prepared for any major foreign industrial activity in Greenland.

When Alcoa in 2006 announced its interest in establishing an aluminium smelter in Greenland the authorities realised it had to be defined as an industry within the second category and not as a mining activity within the third category.

At that point, it became clear that Greenland in its legislation in the second category was not prepared for that kind of international mega industrial activity. It applied not only to the legislation regarding the environmental issues; almost none of the Greenland Home Rule sections were prepared for such major foreign industrial activities in its legislation.

In consequence of the Greenlandic interest in the realisation of the aluminium project since 2006, huge efforts have been made in the Greenlandic administration to modernize and globalise the second category of legislation and bring it up to date and make it capable of managing major foreign industrial activities. This is a still on-going process.

The legislative unpreparedness from the Greenlandic side towards the introduction of a major foreign industrial activity has permeated the way Greenland has handled the aluminium project since its very beginning in 2006. It has been reflected in a numerous of ways in the different parts of the administration of the Government of Greenland. In several cases, the necessary procedures have been invented on the run. On the one hand, it illustrates the flexibility and innovativeness in a relatively small administration which the administration of the Government of Greenland in fact is with about 600 civil servants all together in the central administration. On the other hand, a sever consequence has been that the huge international industrial company, Alcoa, in many cases has had an easy play. There were in the beginning of the process examples of Alcoa directly pointing at which kind of requests they have been met with in other parts of the world. Just to help the administration of the Government of Greenland handling Alcoa's own inquiries.

At a specific public meeting in Nuuk, Alcoa directly asked for the NGOs to play a more active role. Naturally, Alcoa did not request the NGOs to be more active solely to be a well behaving company. It has from the beginning been in the interest of Alcoa to be prepared for as many as possible of the different kinds of public obstacles the project might run into during the improvement process.

It has been characteristic for the whole process that Greenland almost all the time has been tacking behind as the process has progressed – for good and for bad. The implementation of the strategic environmental assessment (SEA) illustrates well both the flexibility in the administration and the fact that the administration has tacked behind.

Strategic Environmental Assessment

Alcoa's first contact came in the early spring of 2006. Alcoa made its first preliminary fieldwork in summer 2006. At that initial state, only a few people in the entire administration was involved in maturing the contact into a more formal project. Not until the last part of 2006, more departments became involved.

I December 2006 the Ministry of Environment and Planning was assigned to present a preliminary white paper on the possible environmental and societal consequences of an aluminium smelter in central West Greenland. The white paper was presented for the Parliament in April 2007. One of the main recommendations in the white paper was to conduct a full-scale of strategic environmental assessment (SEA). The Parliament adopted the white paper, and a SEA process got started right away.

Table 4: *The SEA process from 2007 to 2010.*

May 2007	SEA start
August 2007	Prior public consultations
December 2007	Draft SEA in public hearing
March 2008	Presentation of first version of the SEA
2008-2009	Further research, data collection analysis
January 2010	Final public meetings
June 2010	Final version of the SEA

When the SEA process is presented, as it is in Table 4, it looks like it has been planned like that from the very beginning, but that was not the case. On the contrary! The timetable was expanded several times during these three years. At first, the deadline for the final SEA was in spring 2008. As the project matured, not only the SEA had to apply for more time and resources.

Already when the white paper with the recommendation of the SEA was presented, it was clear that Greenland had no formal regulation regarding a SEA process for industrial projects. In spite of that, the Parliament sanctioned the SEA process to start. At first, the SEA budget was around one million DKK. Several times more resources were allocated and in the end, the SEA had had a total budget of 15 million DKK. This is only to illustrate the dynamics in the SEA process and to show how unprepared the administrative and the political system was for such a task.

The final SEA came up with a series of areas, which potentially will be impact if an aluminium smelter is established. As shown in Table 5, the SEA focused on the environment in a broad sense.

The final SEA also recommends a serious screening and monitoring programs for the following ten years to be initiated, even before the aluminium smelter would be up and running. The recommended screening and monitoring programs were focused on wild life and game, on public health, and on regional development. None of these programs recommended by SEA seem to have been realised. It might lead to a conclusion that the SEA had no effect, but that would be too simplified to conclude.

Anne Merrild Hansen points out in her PhD thesis that one of the most important results of the SEA seems to be the illustration of the need to include strategic decision making tools "at both the project, programme and plan levels of decision-making in Greenland to promote sustainable development" (Hansen 2010,83). Again, it is visible that Greenland is learning its first lessons in the field of being integrated in the global economy.

Housing and infrastructure

Another example of an ad hoc process Greenland has experienced during the first years of being seriously exposed to the global economy is in the field of spatial planning and specifically when it comes to the planning of housing and infrastructure in Maniitsoq as part of the aluminium project process.

Early in the negotiations between Greenland and Alcoa, the question of the financing of the infrastructural development of the town of Maniitsoq came up. These negotiations were placed in the hands of the 100 % Greenlandic Home Rule owned company Greenland Development (GD). GD was created in 2006 with the only purpose to handle the contact between Alcoa and Greenland. During the aluminium project process, the construction of GD was changed several times and in 2011, GD was terminated as a company.

With the aluminium smelter established, Maniitsoq is estimated to grow with at least 1,000 new inhabitants. Housing for these newcomers has to be provided. Individual and private building and financing would not be an option in Maniitsoq in the way it had partly been in East Iceland in relation to the opening of the aluminium smelter at Reydarfjordur.

In 2008 a commission was established with the task to analyse the scale and the planning of the infrastructural development in Maniitsoq. In the commission, there were representatives from the Home Rule administration and from the municipality, Qeqqata Kommunia (covering the former Sisimiut Kommune and Maniitsoq Kommune).

When the Maniitsoq housing and infrastructure commission was set up it became clear that during the early negotiations the Greenland negotiating partner, Greenland Development had accepted the financing of the infrastructural development of the town of Maniitsoq would be undertaken by the Greenland Home Rule.

In its mandate, the commission was among other elements asked to analyse the total economic consequences of the infrastructural development of the town

Table 5: *The SEA's list of areas potentially affected by an aluminium smelter (Hansen 2010, 25).*

Parameter	***Potential significant environmental impacts of aluminium smelter in Greenland***
Nature	Disturbance of breeding areas for several bird species Disturbance of reindeer paths and breeding areas Disturbance of areas of muskoxen Destruction of rare plants Disturbance of areas of common seal Disturbance of trout species
Environment	Change in water environment and suspended materials in fjords. Change of river structures and sedimentation. Reduction of the water resource for drinking water Wastewater SO_2 emissions to air Fluoride emissions to air CO2 emissions to air Other particle emissions to air PFC gasses to air PAH emissions to air Nitrogen oxide emissions to air Carbon monoxide emissions to air Cyanide emissions to air Noise
Culture	Changes in landscape Destruction of cultural heritage Attrition of cultural trails
Regional Development	Increased migration Changes in mobility of labour Changes in settlement patterns Changes in economical balance Changes in social networks Change in cultural coherence

of Maniitsoq. At no point, a possibility of financing by Alcoa of the infrastructural development of the town of Maniitsoq is mentioned.

Among the work in the commission there were calculations showing that the expected public investments cost for the infrastructural development of the town of Maniitsoq would be around two billion DKK during 3-5 years of construction prior to the opening of the aluminium smelter. At the same time, the estimated tax revenues from wages related to the aluminium smelter during the period of construction would be about 0.5 billion DKK.

This disproportion in the public expense and income created a concern on the Greenlandic side, but Alcoa referred only to the agreement that it already had made with Greenland Development. The commission did not reach a final conclusion on how to solve this disproportion in the public expense and income in relation to the infrastructural development of the town of Maniitsoq.

The General Manager (CEO) in Grønlandsbanken Martin Kviesgaard discussed the question of financing of infrastructural development of the town of Maniitsoq at a conference arranged by Grønlands Økonomiske Råd in January 2013. Here, Martin Kviesgaard

Housing and infrastructure in Maniitsoq

Early in the process of aluminium project, the work was done of creating a vision about the new housing and infrastructure, which will be needed in the town of Maniitsoq in the operational phase if the aluminium smelter project is realised. The operational phase is expected to be at least 50 years and may even continue up to 100 years.

During the operational phase, about 650 permanent jobs are expected at the aluminium smelter and at the hydropower stations. Besides that, another 500 or 600 jobs are expected to be created in direct or indirect relation to the aluminium smelter. It gives all together around 1,200 new jobs (Aluminium 2010; Departementet 2010,6). The needs and challenges during the construction phase are not discussed here.

In January 2008, two architects Niels Bennetzen and Anders Lonka delivered a report to Greenland Development of the infrastructure and housing consequences if the aluminium smelter is realised (Bennetzen and Lonka 2008). In its approach to housing the report has a traditional smelter and local community integration scenario – a scenario for building a new town for the new permanent citizens. The visionary parts of the report are found in the vision of a sustainable new town in harmony with the landscape and the climate and being considered as a pioneering example on sustainable spatial planning in Greenland and in the Arctic (Bennetzen and Lonka 2008,51).

It is estimated that 40 % of the newcomers will be single persons and 60 % will be families. In 2008, an average family is set to 1.72 economically active persons (Bennetzen and Lonka 2008,31) whereas it in 2010 is set to 1,5 (Departementet 2010,15).

In both reports, the estimate is that the need for new houses in Maniitsoq with the aluminium smelter in operation is around 450-470 houses. Greenland Development has in 2010 estimated the total cost for needed infrastructure and housing will be about 2.3 billion. DDK (Aluminium 2010). Besides the houses, that will include kindergartens for 100 kids, a school for 200 kids, a swimming pool, a cultural centre with a cinema, a football field etc. The possibility of Alcoa financing the general infrastructure and the housing directly related to the aluminium production is not discussed in any of the reports looking at the need for housing and infrastructure in Maniitsoq.

Neither the vision from 2008 (for good reasons) nor the report from 2010 include the results from the mobility study (Rasmussen 2010) which points at interest among people to have distance work and to commute between a home town or settlement and Maniitsoq. 30 % of the respondents in the mobility of the study replied that they would be interested in the town they live in now and could commute to and from Maniitsoq if they had a job at the aluminium smelter. The possibility of migrant workers is not discussed in any of the reports looking at the need for housing and infrastructure in Maniitsoq.

In the report (redegørelse) to the Greenland Parliament, Inatsisartut, in autumn 2010 it is mentioned that in the beginning of the operational phase of the aluminium smelter it is estimated that 50 % of the employed will be workers from outside of Greenland. The implications of this for the planning of housing and infrastructure are not discussed in any of the reports looking at the need for housing and infrastructure in Maniitsoq.

Today Maniitsoq has a relative big numerical imbalance between the sexes with more male than female inhabitants. The challenge with an even larger numerical imbalance than today between men and women when the aluminium smelter is in operation is not discussed in any of the reports looking at the need for housing and infrastructure in Maniitsoq.

As these examples indicate, the visions for the housing and infrastructure strategy for the new town in Maniitsoq are not much more that qualified and wishful visions for a possible growth of Maniitsoq if the aluminium smelter will be realized at some point in the future.

made it clear that it is not realistic to expect public financing of infrastructural development projects in direct relation to large-scale industrial projects such as Alcoa's aluminium smelter in Maniitsoq (Kviesgaard 2013).

The shift from early in the project when Greenland Development promised Alcoa a 100 % public financing of the infrastructural development in the town of Maniitsoq in direct relation to the aluminium smelter, to the General Manager (CEO) in Grønlandsbanken is in 2013 pointing at the impossibility for the Government in Greenland to engage in such a huge infrastructural investment, is just one more example of the fact that Greenland even some years into the project process was not fully prepared to deal with an international company as Alcoa and its large-scale industrial project.

An equivalent example is that at one point when the question came up of supplying the town of Maniitsoq with electricity from the industrial hydropower plants which will be produced electricity for the aluminium production, many in the administration were surprised to learn that Alcoa could not see any natural logic in providing electricity for the town. The amount in question is less than 1 % of the production of the electricity, but for Alcoa it counted as 1 % lesser production of aluminium, and Alcoa demanded full compensation for that loss in the production.

'Normally' – that means under the logic of the pre-global industrialisation era (the national industrialisation era) – it would be considered as a natural gesture to ensure environmental friendly electricity for the town, as almost all activities in Greenland during the era of national industrialisation would have the society of Greenland as its realm of reference.

This is not necessarily the case when projects are developed during the era of the global industrialisation. Again, Greenland was not properly prepared for that type of challenges when it crystallised in the dialogue with Alcoa.

Chaos or just a dynamic process?

The SEA process and the housing and infrastructure process are only two examples of many, which basically illustrate the same; legislation and administrative processes were not prepared for such an international industrial project such as the aluminium project. The mandates were developed as the project progressed and the uncertainty about the division of resort responsibility was obvious just to mention a few aspects. It applied to the Home Rule (later the Self-Government) owned external administrative body, Greenland Development. It applied to the internal body in the ministerial administration, Den Administrative Koordineringsgruppe (AKG) – the Administrative Coordination Group. It applied to the administrative cooperation between the Home Rule (later the Self-Government) and Qeqqata Kommunia (the municipality where the aluminium smelter will be placed), and it applied to other initiatives.

Here, the SEA can serve as an illustration of the consequences of a missing general plan. The mandate for the SEA was changed at least three times. Another kind of adaption to the developing aluminium project was the several related fact finding projects, which were launched alongside with the SEA.

One of these related projects was the conducting of a life cycle analysis (LCA) (Schmidt and Thrane 2009). The conclusions from the LCA fuelled the discussions between Greenland and Denmark on the question of CO2 emissions from the aluminium smelter. These discussions revealed that there in some aspects still exists a strong dependency between Denmark and Greenland. In the case of CO2 emission, the official Danish level of emission, which Denmark has to report to the UN, includes the emissions in Greenland, so Denmark has a very strong opinion on weather or not Greenland should increase its CO2 emission with about 100 %. In the Danish CO2 budget, Greenland only counts for about 1 %, but with an ambitious CO2 reduction plan even 1 % counts for Denmark.

Greenland has – with reference to the LCA – argued from a global point of view that an aluminium smelter in Greenland based on hydropower, globally seen, is a much better investment than an aluminium smelter in for example China which has its production based on energy from a coal plant. Denmark finds this point of view irrelevant. There is still no final agreement between Greenland and Denmark on the CO2 emission form a potential aluminium smelter in Greenland.

Another project related to the SEA is the mobility study (Rasmussen 2010). This study was not planned from the beginning of the process but it became obvious that Greenland had an acute need for more specific knowledge about the past, present and possible future mobility trends in Greenland plus in and out of Greenland.

The mobility study revealed new aspects of the mobility of people in Greenland and of Greenlanders in Denmark, which has influenced the discussions on who to expect to be interested and actually be willing to move to Maniitsoq to work in the aluminium smelter.

The two SEA related studies discussed above point at ad hoc decisions, which have dominated the process in the aluminium smelter project. There were no general plans to relay on from the beginning of the process. Greenland had to invent the rules of the process alongside with the progress of the project itself.

Lack of legitimacy and of democratic processes?

The two SEA related projects mentioned above – the LCA and the mobility study – can also throw light on another aspect of the aluminium project; the democratic public involvement in the conducted studies and surveys and the political decisions and thus the legitimacy of the project.

As indicated in Table 2 four important political decisions in the Parliament are involved in the aluminium project. In April 2007, the first political decision was to approve a Memorandum of Understanding with Alcoa. The second political decision was in April 2008 when it was decided the aluminium smelter will be placed in Maniitsoq. The last two political decisions in the Parliament about the aluminium smelter will take place at the earliest in spring 2014. It is expected that the Parliament in 2014 will make three important decisions. The first decision will be about the economic constructions around the aluminium smelter and the two hydropower plants. The second decision will be whether Greenland will be partner in the smelter and the hydropower plants or Alcoa will be the sole owner. The last decision will be on the question of giving the final approval to the start of the construction of the aluminium smelter.

Prior to the first decision in April 2007, there were no public discussions at all. It was different prior to the second decision in May 2008. Several stakeholders took part in the public discussions. In spring 2012, the pro-

ject was again debated in the public media but it led not to any final political decision, though the final political decision actually at that time was expected to take place in 2012. There is obviously reluctance amongst many of the politicians to proceed to the final decisions. It is difficult to point at one specific and common reason for this reluctance.

In a study on the decision-making process in spring 2008 it is concluded, that the timing of the public debate did not correspond with the actual time of the real political decision in the Government but was only focused on the timing of formal political decision in the Parliament. That created a democratic deficit compared to how the process could have been with a public debate prior to the reel political decision in the Government (Hansen 2009).

Following the ongoing public debate in the early spring 2012, it was a similar situation to the public debate in spring 2008. In the public debates, there is still no focus on and no awareness of when the political decisions really are being taken in the Government in relation to when the public debates are going on. In the public there is no awareness of the fact that the de facto political decisions often are taken prior to the public debates on a specific subject.

Here the conclusion must be that the still relatively fragile culture of public debating in Greenland will need to be strengthened if a real democratic process is intended in relation to crucial political discussions and decisions like the aluminium smelter project. Again, it can be pointed at the fact that it is the first time the country is trying to discuss the societal consequences of such a huge international industrial project.

At no time in the public discussion, any of the stakeholders have shown any capability in a constructive and engaging way to make references to situations elsewhere in similar societies with a limited population in huge sparsely populated areas and a harsh climate.

One example of such a reference could be to the northern parts of Australia. The most striking difference between Northern Australia and Greenland is the average temperatures with Australia being tropical and Greenland being arctic. Lessons learned from aluminium projects in northern Australia might possibly be helpful in the Greenlandic case. In a recent article Andrew Taylor et al. are pointing at the fact that almost none of the local population has maintained a permanent job in the aluminium industry (Taylor et al. 2011,17).

The most frequent reference in the public debate is made to the history of the aluminium industry in Iceland. Comparisons are made between the present day situation in Iceland and the expected coming situation in Greenland. In that discussion it is often neglected that the present day situation in Iceland is based on more than forty years of interaction with international mega industrial projects.

As a final illustration of the segregation between "hjemmestyreanliggender" og "fællesanliggender" can be mentioned that during the late 1990 the Bureau of Minerals and Petroleum (BMP) completed a number investigations and reports on the impact on the society of large-scale industrial activity in Greenland (Jensen 1998, Udvalget 1997). But all that did never include any kind of a broader public hearing or other kinds of public involvement. The activities within the framework of BMP did at that time never involve the public. In that sense, BMP acted more like an independent and not integrated part of the Greenlandic society, which it actually also was.

When analysed, the public debate in Greenland in some aspects can still be characterised as immature, at least concerning the frequency of mutual discussions based on agreeable facts. The discussions are typically based on a narrow position pro or against the establishment of the aluminium smelter.

Some of the reason for this discussion atmosphere must be subscribed to the fact it is the first time such a huge and complex project has been discussed during a number of years. In that respect, it is directly concerning that in the latest survey about the general knowledge about a view on the aluminium project shows that in the fall 2011 only 37 % considered that they well informed about the aluminium project through the media. That is 1 % less then compared to the first time the same question was asked in the same type of survey in 2007 (HS Analyse 2011). Surely, the press has an important role to play in the democratic process but in relation to Greenland a question that might have to be asked is whether the Greenland press has the means to carry out investigative journalism.

Future perspectives

In this paper it has been argued that a number of indicators point at that Greenland was not fully prepared for its first experience with a foreign mega industrial project when it began in 2006. The studies primarily pointing at that relevant legislation and administrative procedures were missing and that the public hearing processes can be improved from a democratic point of view.

Pointing at these missing elements does not lead to a conclusion that Greenland should not inter more intensively into the global industrial market. It is generally conceived as not being a realistic political option in

Greenland today.

On the other hand, it must be pointed out that still much can be done in order to be better prepared for the societal effects of the more intensive involvement in the global industrial market in order for Greenland to be better suited for survival as a unique Arctic sparsely populated society.

If Greenland is to develop as a modern society there is basically no alternative to entering the global economy in one way or another. It is the unpreparedness in itself politically, administratively and publically that attracts most concern from a social science point of view.

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