

Artikel 5

**New Economic Activities and Urbanisation:
Individual reasons for moving and for staying
– Case Greenland**

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26. New Economic Activities and Urbanisation: Individual reasons for moving and for staying – Case Greenland

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1.0 Introduction

It is generally recognized that the Arctic is a region of economic contrasts. While the international economy supports modern large scale activities involving capital intensive production at one end of the scale, the informal and traditional economy occurs through small individual or family groups at the other end, and in between there are mixes of modern and traditional methods of production. In this context the empirical evidence clearly shows the effects of changing local and global markets but also shows the importance of bringing forward the political norms on vulnerability that this may generate (Young 2002; Keskitalo 2008).

The Arctic economy basically contains three distinct but related parts: the international resource economy, the transfer economy, and the traditional economy. The international resource economy serves worldwide markets utilizing resources such as diamonds, gold, zinc, oil, natural gas, and fish. The traditional economy is also centred on resource utilization, but here the utilization, through fishing, hunting, herding and gathering, is primarily for local consumption. Finally, the transfer economy brings funds into the region from other levels of government. The transfer economy supports services, generate benefits and also contributes to income for many (Rasmussen 2010; Huskey and Southcott 2010).

When drawn into the globalisation process, the Arctic economies – including the economy of Greenland – are having important impacts. Fisheries, especially modern ones, generate systematic changes in the exploited marine ecosystems. There are expectations in relation to further expansion of potential exploitable fish stocks moving northward due to climate change. In this connection there will be impact and eventually

a reduction in the biomass of target species and other species taken as by-catch. This again will affect the benthic habitat and may lead towards a downward shift in the size distributions of caught fish as well as shift in the mean trophic level closer to primary production (Hamilton, Brown, and Rasmussen, 2003).

The consequences of the above described changes would probably benefit different groups with different capitalization, licenses and location, generating a link between ecosystem and social system change, while another link – competition from other global sources generating seafood produces and cheaper protein sources – will be adding to the complexity (Rasmussen 2010).

Since Home Rule was established in Greenland in 1979 a focus for economic development in Greenland has led to reduced dependence on Denmark. Suggested means and measures have been different through time. Industrialisation of fisheries and exploitation of valuable resources such as shrimp fisheries was in focus during the first decades. Realizing, however, how the world market has been dropping due to intensive development of aquaculture and with most of the renewable resources used close to its maximum – for some species even beyond this point – the need of alternatives in order just to maintain the living conditions has become obvious (Winther 2000). With ambitions of increased level of autonomy based on a reduced dependence of transfers the need of alternatives becomes still more urgent, with mineral and energy resources among the most obvious means of promoting this process. The success so far, however, seem to be limited. In spite of many known resources which eventually would serve as an economic base the interest among the multinational companies which are able to undertake the exploration has for many years been limited.

There has, however, been an important shift in the level of interest during the last decade and now not only in relation to minerals and energy resources, but also exploitation of the rich sources of hydro power available in Greenland. Hydro power has in Greenland been recognized as a substantial potential for decades. In 1983 an overview report on earlier reports on hydro power potentials in Greenland was published (Råstofferforvaltningen 1983). In spite of that the hydro power potential in Greenland has only recently begun to be recognized by the global industries. This has now happened, however, and the take-off for a proposal for a new economic initiative took off around 2006 in the shape of an inquiry from the company Alcoa.

2.0 Why, where, and how an aluminium smelter?

The idea of initiating an aluminium industry in Greenland is not new. In May 1979 – when the Greenland Home Rule was born – a report titled “Aluminiumsindustri ved Godthåb og Sisimiut” [Aluminium Industry at Godthåb and Holsteinsborg] (Hoff & Overgaard 1979) was published. The report describes socio-economic aspects of a potential, large industry in central West Greenland. Part of the inspiration to look into the possibilities of starting an aluminium industry in Greenland came from Iceland. In 1969 the Icelandic Aluminium Co. Ltd (Ísal), a sole subsidiary of the Switzerland-based Alusuisse, had started production at Iceland’s first aluminium smelter, the Straumsvík smelter, close to Reykjavik (Jonsson and Wiestner 2013).

In the late 20th century none of the identified potentials for an aluminium smelter in Greenland was realised. Caused by the economic downturn in the beginning of 1990’s partly due to the disappearance of the cod from the waters west of Greenland, planning for large scale industries was set on hold. Among other activities the continuous monitoring of hydro power resources stopped.

With the creation of the Home Rule and the joint ownership of mineral and hydrocarbon resources and the construction of the shared Danish-Greenlandic resource management (in Danish called “Råstofforvaltningen for Grønland” and from 1998 “Bureau of Minerals and Petroleum”) focus was on the extraction industry. Large scale production industries such as aluminium smelters were a Home Rule responsibility, but large scale production industries were not classified as a high priority in the economic development for the Home Rule.

It was not until the USA based aluminium com-

pany Alcoa approached the Government of Greenland in the beginning of 2006 that the idea of developing large scale industrial activities was initiated again. Alcoa wished to initiate preliminary surveys whose object was to assess the potential for establishing an aluminium smelter in the central West Greenland in the area between Sisimiut to the North and Nuuk to the South. The Government of Greenland was basically not prepared for such an inquiry but the administration responded positively, and a protracted – and still ongoing – process was started.

A short list of the most significant project milestones includes the following:

Spring 2006	First enquiry by Alcoa;
July 2006	Joint Action Plan (JAP) with Alcoa;
April 2007	First open political decision regarding the plans (Go on);
May 2007	Memorandum of Understanding (MoU) with Alcoa;
May 2008	Open political decision on placement (Maniitsoq);
2013?	Open political decision on ownership (partner/concession);
2013?	Final political discussion on project (start/not start);
2018?	Earliest possible commencement of production – if the project is approved.

The Government of Greenland has undertaken a number of significant administrative initiatives during the different project phases. One of the most important of these initiatives was the creation of Greenland Development. Greenland Development was formally incorporated on 1st November 2006 as a wholly owned subsidiary of Greenland Tourism and Business Council. In June 2007, the Government of Greenland decided to convert Greenland Development to a public limited company under the auspices of the Government of Greenland. Greenland Development A/S’s tasks included undertaking contact to Alcoa on behalf of the Government of Greenland. Greenland Development A/S also produced a number of surveys and reviews primarily in the financial and socio-economic area. In spring 2012 Greenland Development A/S was discontinued.

Since 2011 another and competing large scale project has developed quickly. It was the Chinese owned company London Mining’s interest in starting a huge iron ore mine north of Nuuk close to the hydro power station B (see the map).

It has not officially been fully recognised politically

but these two large scale projects obviously are competing for the same hydro power potentials and for the same – limited – potential Greenlandic work force just to mention a few of the potential conflict areas between the two projects. The slowing down of the process in the aluminium smelter project and the speeding up of the process of the iron mine project during especially 2012 indicates the probability of the iron mine project being completed first.

When it comes to the needs for basic elements like hydro power access and man power access the two projects are comparable. Here some of the considerations regarding the aluminium smelter will be discussed in greater detail.

Prior to the political decision in spring 2008 regarding the location of the potential aluminium smelter several parameters were analysed and based on an evaluation these parameters the Government of Greenland pointed to Maniitsoq as the most favourable place for a smelter (Government of Greenland 2008).

Analyses of the potential harbours recommended Maniitsoq because the other possible locations were expected to be more exposed to harsh weather conditions. Regarding the access to the hydro power potentials, focus was primarily on the lake Tasersiaq, located between the Hydro power station A and the Ice Cap (see the map). Tasersiaq represents the largest single hydro power potential in West Greenland. Here the report from the Government of Greenland concluded that Maniitsoq would be the best place to locate the smelter. If the smelter would be placed near Sisimiut or near Nuuk it would generate additional challenges in relation to the power transmission lines (Government of Greenland 2008).

The analysis was based on a traditional approach when analysing the access to manpower. The main part of the workforce was expected to live close to the smelter. If the smelter were to be placed near Nuuk the report pointed out that it would lead to enforcement of an even stronger mono centric societal development than already experienced with Nuuk as the single metropolis in Greenland. At the political level the majority did not want to strengthen that development (Government of Greenland 2008).

Analysing the potential consequences of the planned smelter an important issue has been the assumption that a positive consequence of the new activity would be bringing persons depending on transfer payments or on low income jobs into the group of middle and high income jobs at the smelter or at jobs associated with the smelter activities (NIRAS 2010). It would of course generate better economic conditions for the workers and their families, and it would also generate tax revenues for the involved communities and nationally reduce transfer payment costs.

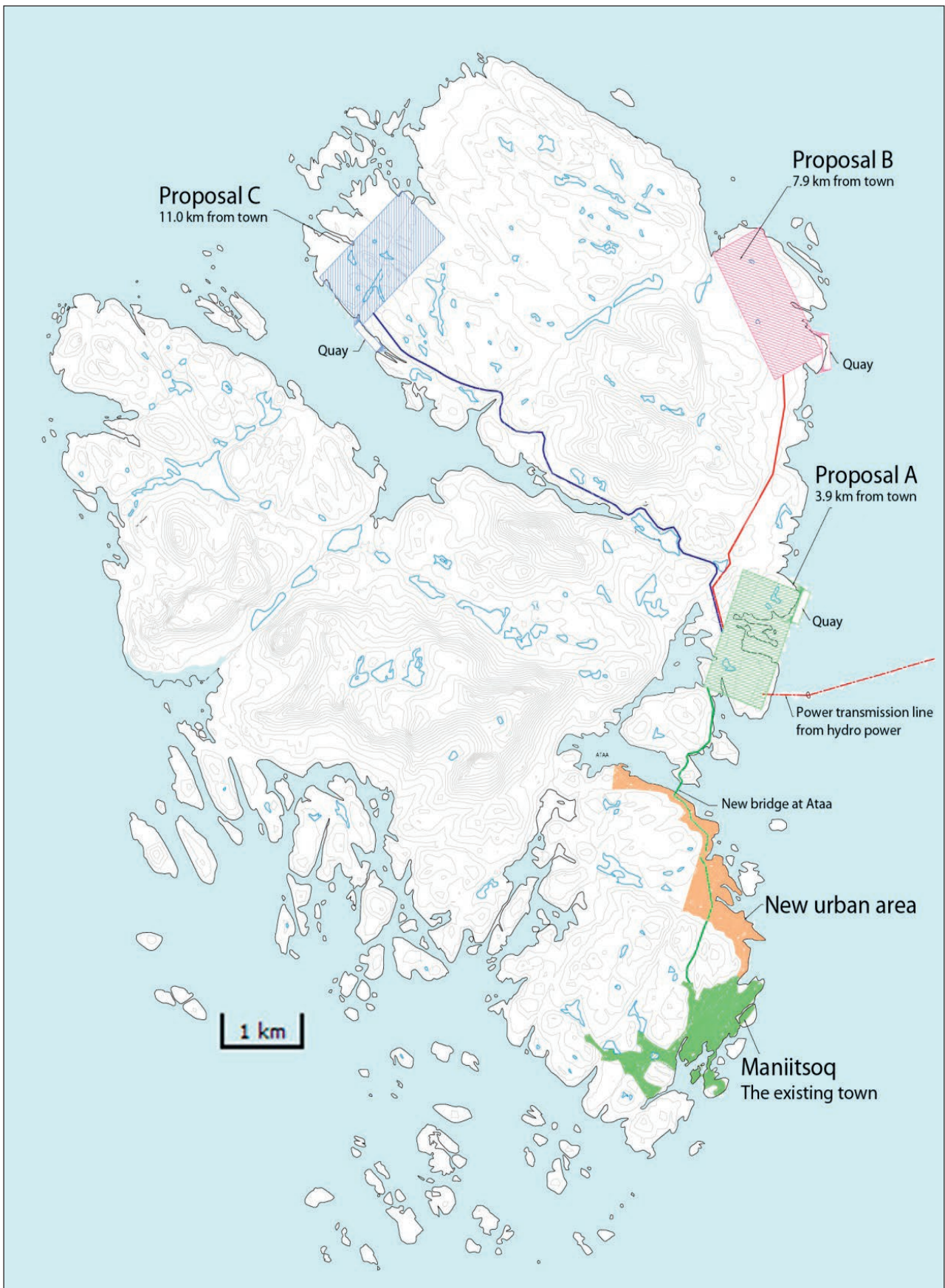
Consequently, it has been a vital argument for the project that it will create a significant number of jobs for the Greenlandic workforce. In addition that number of jobs should be fairly stable during the operational phase as the production is expected to be kept going at a high, stable level for many years. At some point in the early phase of the discussions in Greenland, it was predicted that the involved people from Greenland would be dominated by people who otherwise would be depending on social support or low incomes from for instance small scale fisheries.

Based on the assumption that a total of 1100-1200 workers would be employed, and they would be persons who otherwise would receive public assistance. Calculations show that the impact on the public finances on jobs would be around 300 million DKK per year, due only to improved job conditions. In a worst case scenario, i.e. a situation where all 1100-1200 positions are held by persons who would otherwise be middle-income recipients or even would come from outside of Greenland, the net revenue of the activity on the public finances would be zero or even negative (NIRAS 2010,14).

Critical for the option of generating positive results for the community is therefore a labour market policy preventing foreigners from getting involved, preventing skilled labour from other sectors to take the jobs, and ensure an upgrading of qualifications among people outside the labour market or in low income groups. All three criteria are debatable, based on the present job and educational situation in Greenland combined with the interests of Alcoa.



Map 1: The map shows Central West Greenland from Nuuk in the south to Sisimiut in the north. The green and yellow parts are the ice free areas of the coastal land.



Map 2: The town of Maniitsoq is situated to the south on an island. The island is approximately 10 km in diameter. If Alcoa builds an aluminium smelter near Maniitsoq the site for the smelter will be at “Proposal C”. Today no infrastructure exists on the island outside the existing town of Maniitsoq. The “new urban area”, the roads outside of the existing town, and so forth, will have to be constructed, if the aluminium smelter project becomes a reality.

3.0 The labour force requirements

Mining and energy extraction projects are normally progressing in five phases in which business and employment requirements have specific characteristic (Jensen and Rasmussen 1998; Jensen 1998).

In the first phase – feasibility studies – the main objective is to ascertain the extent, availability and size of commercial interest in the findings and the degree of present and future competition about the local energy resources. While some jobs may be established in conjunction with the analyses, the activities require special skills and are usually taking place primarily at the company headquarters.

The second phase – financing and establishment of economic conditions – will in practice often take place at the same time as the first phase, and with similarly limited impact on the local labour market. It also typically includes political discussions.

Third phase – building infrastructure and construction phase – includes planning and construction of physical facilities to perform directly or indirectly related activities such as construction of drilling rigs, transportation facilities at sea, port facilities, supply facilities, training and new education initiatives as well as the establishment of new residential areas, child care centres, etc. Since this phase will be labour intensive, the duration will usually be 2-5 years, and therefore needs to go beyond the local labour market to find the skills and hands needed.

Fourth phase – the short-term development perspective and production phase – includes the period with start-up of the activity and generates major change to existing business structure, resulting in large local population and employment effects on the new business activities. Depending on the size and lifetime of the resource and the technology, the duration of this phase may be from 30-50 years or more.

Then there is the fifth stage – the long development perspective – which may be analysed from two angles. It may either be through a *laissez-faire* attitude, which means not carrying out a thorough management of the development, and therefore with no or limited investment in new growth areas, or alternatively with focus on political control and on the basis of assessments of the size and lifetime of the mineral and energy resources aim at planning a stepwise downsizing and abandoning of the initial activity and instead move the gravity of activities toward other productions.

Large scale activities in the Arctic will be sought located close to the resources of raw materials or energy in order to reduce the energy and costs related to transport. The beauty of aluminium smelting is that this

activity is less dependent on where the raw materials are produced as long as there are proper harbour facilities and access to plenty of cheap power and labour force (Rasmussen et al. 2011). In the case of Greenland, cheap power means hydro power.

In the traditional approach – for instance in *Norway and Canada* – attempts have been made to establish new smelters in connection with places where all three components (harbour, power, labour) would be available, and typically therefore places with an existing labour market of a proper size, able to ensure the needed labour force during the production phase.

Sør-Norge Aluminium A/S (SØRAL) being one of Norway's seven aluminium smelters was established in the 1960's in the town of Husnes with proper harbour facilities, access to hydro power and a population of 5.500 inhabitants. Similar conditions were present when the aluminium smelter was established during and after WWII. In this case the town had a population of 5.600 inhabitants. In both cases, the need for labour during the construction phase was beyond the capacity of the towns, and attracted temporary workers from neighbouring towns and cities, and even from Denmark. (See Rasmussen 2009 for further discussion of the examples)

Since the first environmental policy objectives on Sustainable Development was established in Iceland in 1993 (Ministry of the Environment 2002,10) the focus has been on the use of renewable energy, and especially the exploitation of hydro power resources. This policy has encountered both positive and negative reactions in Iceland. Positive, not least in relation to the decentralisation of certain activities as hydro power and geothermal energy are decentralized energy resources. For many municipalities it is seen as an opportunity for local business, but the development of hydro power has met some resistance because of the potential adverse effect on the continued development of tourism potential and recreational fisheries exploiting the same rivers which would be used for hydro power (University of Iceland, Institute of Social Sciences, & Gallup 2003). Such questions were not important when the first smelter was established in Staumsvík at Hafnarfjörður just south of Reykjavik in 1969 and with energy supply from the in 1969 commissioned Búrfell 210 MW hydro power plant (Landsvirkjun 2007). Even situated with some distance from Reykjavik the localization could take advantage of accessible labour force within commuting distance to nearby populations' potential. The workers were transported to and from the smelter in company operated busses. The busses even brought the workers home for lunch.

The decision on the establishment of Fjarðal in East

Iceland situated in Reyðarfjörður which took place in 2002 was, however, in many ways deviating from the previous patterns. Neither a sufficiently large labour market, nor the needed energy resources and harbour facilities were available. Only blessed with a deep water fiord the Government of Iceland, Landsvirkjun and Alcoa signed a MoU between them, and together with the Fjarðarbyggð municipality in 2003 they signed a definitive agreement which included the building of the Kárahnjúkar hydropower station, the Fljotsdalur transmission line to the future smelter, the smelter itself, and the construction of a harbour.

The construction of the hydroelectric power plant initially comprised in the order of 120 people, of which 85 came from Iceland while 35 were foreign workers, but during the drilling of supply and drain channels the work involved about 700 workers and the total labour force was estimated to include over 3,300 man-years. In addition there were also the administrative staffs. It has been estimated that about 25 % of the construction was carried out by residents of eastern Iceland which meant about 100 to 200 jobs for residents of the region.

In the design and construction phase the involved local workforce was relatively limited. Three-quarters of the workforce came from elsewhere. The approximately 2,200 workers who remained in the workforce comprised between 20 and 25 % from Iceland, while about 75 % came from Poland, and thus constituted the largest single group. In addition staff came from elsewhere, for example, there were more than 80 Canadians involved the establishment phase of the smelter.

At one point in time, the population mix in Reyðarfjörður was characterized as covering the largest number of foreign labourers in Iceland. To accommodate the workforce a shantytown was established between Reyðarfjörður and the smelter. The city was provided with almost all facilities such as restaurants, recreation facilities, a gym, an internet café, and some shop facilities. Compared with Reyðarfjörður's population of approximately 700 inhabitants, one would assume that the shantytown would be the dominant trouble spot, but planning and cooperation between the city and the shantytown and the company meant that there was general agreement that the three communities were aiming at living smoothly side by side. A rumour often referred to tells that workers from the shantytown had limitations on visiting the city, such as the time limits which would mean that they were not welcome in the city in the evening. Other sources point out that the main problem was visits from the town to the shantytown, especially by young people at late hours. The reason for this was said to be the good facilities for

sports, internet café and the like. However, there is no systematic registration of conflicts and problems which should point to the shanty town's size and position as a real problem, and the general impression today seems to be that the process has developed rather flawlessly.

Alcoa Fjarðál had early on set the target of equal distribution of employment between women and men. In 2011, there were about 450 employees of which 28 % were women, approx. 50 % came from the local community or the region, 50 % came from the rest of the country, and of this group more than 75 % were from Reykjavik. Between 3-6 % were Icelanders who had returned to Iceland in search of jobs in the aluminium industry. There were in 2011 only a few foreigners, mostly Canadians and a few technicians who helped at the start of production, and whose expertise is still considered necessary. One of the factors that have been important in recruitment is the requirement that you speak Icelandic in the company. Among other things related to the security of the company, it is a requirement that there is an official language because the mixing of different languages when delivering commands can pose a security risk. At the same time there is also a desire that employees are reasonably familiar with English at a basic level, because employees may be exposed to different instructional materials in English.

Since 2008, the majority of workers in the shantytown have left the region, most of them for good, but some of them have chosen to establish themselves in the region. Some stay for work, in some cases they stay because there has been established a more lasting connection, such as marriage, between former employees and local people.

4.0 Debates in Greenland

The new economic and employment opportunities have been debated politically, publically and not least in the private sphere. The opinions are varied. It depends on which issues to debate and what opinion to have on single issues.

A study has analysed the public debate in Greenland regarding the aluminium project from April 2006 to November 2008. During that period of time the aluminium project was heavily debated and during the period 639 different opinions related to the debate about the aluminium project have been identified. A total of 225 written contributions have been analysed. Each written contribution typically contained several opinions related to the topic (Hansen, Sørensen and Jeppson 2009).

Topic	Number of opinions	Opinion index
Project process	121	3.33
Societal issues in general	121	3.18
CO2	110	2.67
Employment	97	2.92
Finance	96	3.13
Decision making process	86	3.17
Environment	84	3.18
Information process	48	3.14
Training	43	3.00
Regional changes	27	3.44
Social and health issues	25	3.04
Independence	19	3.00
Cultural and historical issues	17	3.06

List 1: Ranking of the 639 different opinions in 13 selected topics. Opinion index: < 3.00 = positive, 3.00 = neutral, > 3.00 negative. From (Hansen, Sørensen and Jeppson 2009, 79).

List 1 shows a listing of the 639 different opinions on 13 selected topics. The topics are ranked according to the number of expressed opinions about the topic. This ranking indicates the relative interest given to each of the 13 topics in the public debate.

The primary topics, related to job opportunities and mobility are within the categories of ‘Employment’ and ‘Regional changes’. The employment is the fourth most debated topic indicating a relatively high interest in the topic. Employment is furthermore one of only two topics which show a general positive opinion in the debate. As mentioned in the legend of the table an index of 3 indicate a balanced opinion while an index below 3 shows a positive attitude while an index above 3 shows a negative ditto.

The other topic related to job opportunities and mobility is ‘Regional changes’. Here the interest has not been very high, but those who have discussed the topic are in general showing a negative opinion, ‘Regional changes’ is actually the topic which shows the most negative opinion in the debate. This could indicate a general and intense concern regarding a possible migration of the Greenlandic workforce towards areas with new industries.

From 2010 one of the most debated topics has been the possibility of the international companies operating in Greenland employing foreign workers and possibly even to a lower wage than normally paid in Greenland. In the debate this option has primarily been related to the construction phase of the proposed large scale industries, and there seems to have been a remarkable evolution towards a clear convergence of interests between employers’ organisation (Grønlands Arbejdsgiverforening) and the employees’ organisation (SIK). In March 2012 the two organisations delivered a joint response to the Government of Greenland in the hearing process for a new law for large scale industries which expressed their concerns regarding the possible consequences for the Greenlandic companies and workers (GA & SIK 2012).

The many years of debate especially regarding the aluminium smelter project has shown a wide spectrum of different opinions about the possibilities for the Greenlandic workforce to have access to the many new jobs which are expected to be created when these large scale industrial projects are realized. The possibilities have created awareness among citizens, organisations, politicians and other groups. Debates have brought varying points of view to light.

One of the mayor challenges is to transform all these different and fragmented opinions and thoughts into structured information which can be used as input in an informed political process where decisions have to be made on how to manage all the new opportunities to the best advantage of the workers, the investors and the Greenlandic communities.

5.0 The surveys

In order to provide a better understanding of the present mobility characteristics of the Greenland population as basis for analyses of the possible consequences of major interventions in the economic basis, such as establishing of an aluminium smelter, a series of mobility studies have been conducted (Rasmussen, 2010).

5.1 Register based data

The basis of the analysis has been a register-based analysis of population movements in Greenland from 1995 to 2008. The population registers, located on Statistics Greenland in Nuuk, provides information on each individual person, including information on wherefrom and whereto the persons move their addresses in case it is considered to be more permanent. “More permanent” means a move where their registration by the authority is changed from one

address to another, whether it is within the municipality or between municipalities, and to what extent it is from towns to towns, from villages to towns, from towns to village, or eventually leaving or entering the country. By means of these data, it is possible to see the more general patterns of mobility. In addition it is possible to connect the place based population registers with additional information, for instance in relation to gender, age, family situation, income and other social and economic factors which enables the creation of hypotheses about why and description of how they move. These statistical data do, however, not provide information about reasons or thoughts about moving which therefore requires additional approaches.

5.2 Thoughts about mobility

Added to the basic data a survey among a representative sample totalling 1,551 persons of the total labour force in Greenland has provided the requested information. The survey was carried out in 2008-2009. The individuals in the survey have been selected in such a way that they are representative of gender, place of birth (in Greenland, outside Greenland), settlement type (town, village), and place of residence. By means of the questionnaire, the respondents have been asked a series of basic questions in addition to the register information related primarily to issues such as qualifications and affiliations. In addition, emphasis has been placed on respondents' wishes, goals and interests in relation to a future in their present home community, or alternatively, the ability to move, and if so whether they were aiming at living alone or with family and relatives somewhere in Greenland. In addition, a series of questions looked into reflections in connection with a number of new activities, for instance whether or not they are perceived as being activities as attractive opportunities in the future. In this connection the information regarding gender, age, family situation, income and other factors are significant issues in the analysis of the responses.

5.3 Quantitative and qualitative approaches

Furthermore, a third level of analysis has focused on a specially selected group of 220 people for in-depth semi-structured interviews. The persons have been selected based on their responses to the questionnaire, and out of the group a total of 171 interviews have been concluded with answers to all the questions. In this connection questions have been asked about details re-

garding attitudes and wishes for the future. Through the interviews it has been possible to go in depth with many of the personal issues, which are often decisive for whether to choose one or the other solution in terms of future prospects – issues, which can not immediately be revealed through a questionnaire. Through the interviews issues such as belonging, places, personal preferences in relation to the future role of the family, local and regional networks etc. have been taken up as focal points.

5.4 Greenlanders in Denmark

Finally a survey among Greenlanders living in Denmark has been undertaken in close cooperation with the North Atlantic Group – consisting of the two politicians from Greenland and one of the two politicians from the Faroe Islands elected to the Danish Parliament by their respective constituencies. The purpose of this analysis was to look into the relationships between Greenlanders in Denmark and in Greenland in relation to issues such as belonging and attachment to a particular social group and their relations with Greenland and Greenlanders. Included in this survey were also questions about which role the new economic activities in Greenland might have in relation to this group's future mobility.

5.5 Triangulation

In addition to the questions related to individual interests and preferences all of the above mentioned surveys were aiming at clarifying the possible regional consequences of changes in business structures as a result of the introduction of new activities, looking into attitudes to mobility in relation to jobs, employment and the like. The surveys were at the same time aiming at providing data – as discussed above – in relation to gender, age and qualification structures in different settlement types.

Important in this context was the question of whether the respondents had heard about other forms of employment, including the possibility of staying with the family and then working as a migrant, what arrangements could be considered, what would be attractive work and workplaces, what would be of interest etc. in relation to wages, housing, transportation, social activities, etc. . In relation to the issue of relocation the focus of the survey was on what would be considered as a “good life” – types of work, wages, employment options for accompanying family members, quality in terms of types of housing, social infrastructure, environment, offers of public facilities, etc.

While a register-based analysis is able to say something about how people move, how long they stay in specific places, and also provide indications on possible connections between various socio-economic parameters and mobility, it is not able to say anything about the intention behind the movements. Questions on what determine choices regarding staying or moving, choosing between different places, or which thoughts are behind the choice etc. require other methods.

In this case two approaches – questionnaires and interviews – have been chosen in addition to the register data as they provide overview and in-depth insight into what is behind the decisions. It does, however, not make the register data redundant because there is not always a clear link between what people think they will do and what they actually do in practice. All three approaches have their individual limitations and advantages (Bryman 2004), but by triangulation, most of these limitations are resolved. Triangulation is usually defined as the use of multiple – very often qualitative as well as quantitative – methods in studying the same phenomenon for the purpose of increasing study credibility (Ashatu 2009; Bryman 2004). As this – as described above – implies the combination of different methodological approaches and theoretical perspectives in the investigation of the same phenomenon it may on one hand enable a more precise data background for the analyses. This is on the other hand with the risk that using both qualitative and quantitative paradigms in the same study by some social scientists may be considered unacceptable as the two paradigms differ epistemologically and ontologically (Ashatu 2009; Creswell 2003). In this context, however, by having total coverage of the population through the register analysis, which ensures a clearly representative sample in the questionnaire and out of the latter providing in-depth interviews with coverage of variations reflected through the previous datasets it is very difficult to point to any potential limitations in the outcomes.

5.6 The main questions addressed in this paper

In the following presentation of a selection of highlights from the report with an analysis of mobility in Greenland analysis (Rasmussen 2010) the focus is on a number of issues related to mobility in connection with new economic activities in Greenland. In some cases, this means that the data presented here provide relatively unambiguous and straightforward answers, but in the discussions the emphasis is on the relationship

between the patterns of mobility as identified in the individual analyses in the original report, by combining register data with input from interviews or questionnaires which can help to explain the patterns observed. This paper therefore does not pretend to be complete, but focuses on key characteristics of mobility in Greenland, with focus on these characteristics' relations to the new economic activities related to large scale mining, energy production and industries, and as selected issues are the following:

- Who are interested in moving?
- From where would they come, and where would they go?
- What would be their interest in moving?
- What would be their requirements at the place they might move to?
- What may prevent them from moving?
- What impact might be the result at the site?
- What impact might be the result in other parts of Greenland? and
- Are Greenlanders outside Greenland interested in moving back to Greenland?

An important issue in this connection is to realise that the reasons for staying or moving are not static! There seems to be a tendency towards considering reasoning behind decisions on staying or leaving is stable over time. What has been proven time and again, however, is the fact that such decisions are dependent on the context. In Greenland a shift in economy from fisheries to fishing industries and to services and now probably towards a higher degree of dependency of large scale production of minerals and energy, has very different implications on people's everyday life. The questions asked through the surveys have had variations in their foci. Some of the questions have been addressing broader perspectives in relation to moving, while other questions have been addressing very specific conditions.

6.0 The findings

As emphasized above, the new economic conditions for Greenland have become crucial for many reasons. And in this connection the large scale activities may become important in the upcoming years. In the international media – and not the least the Danish – there are ongoing debates on what may happen, and on what impacts these new activities may cause. See for instance the series of articles from the Danish newspaper Berlingske (2012) where issues such as Chinese migrant workers, rare earth elements and economic investments in large

scale industrial projects in Greenland are discussed.

This is, however, just one out of several discussions related to the issue. During the last year a monthly average of around 85 articles related to the keywords “oil” and “mineral resources” combined with “Greenland” have been published in the Danish media (based on a search in Infomedia) indicating the high pitched discussion.

6.1 How many are interested, and in what?

In connection with the questionnaire, a question concerning the interest in Greenland regarding job-search within the different sectors of large scale activities has been presented, and the results are reflected in Table 1:

Within which of the following activities would you be interested in looking for job opportunities?	
Fields of activities	% responses
Oil exploration	9
Mineral exploration	11
Mining	12
Aluminium smelter	13
Don't know	21
None of them	34
Total	100
<i>Note that the question allows for multiple responses</i>	

Table 1: Distribution of responses to question 37 of the questionnaire: Within which of the following activities would you be interested in looking for job opportunities?

When reading Table 1 it is important to emphasize that multiple responses has been allowed, which of course impacts the response pattern. When looking into details in this connection the responses indicate that almost 72 % of all respondents show no interest in any of the new options. Either by not knowing whether they would seek employment or that they positively know that it does not interest them, but the reverse applies to 28 % of the respondents who actually expresses interest in the activities, and would like to be involved in one or more of them. When looking at the percentage distribution among the new activities they add up to more than 28 %, reflecting that many of them may be interested in more than one of the listed options, on an average responding to at least two of the options.

Even if the above table exaggerates the interests due to multiple responses the interests are obvious and it is interesting how the discussions about an aluminium

smelter are reflected in the response by being the activity with the highest number of responses. At the same time it is important to note that oil exploration is represented by the lowest number of responses. It is important to recognize, however, that the fact that the survey took place at a point in time when the focus in the media was on the potential construction of an aluminium smelter, while the question of oil exploration was more or less absent from the agenda. If a similar question had been addressed to the public today the distribution between the fields of activities might have been different. It would, however, not have changed much in the division between who might or might not be interested.

How the positive responses are regionally distributed in relation to the four options is presented by further detail in Table 2 below. As mentioned it is important to remember the time of the survey.

Looking at the differences between town and village it turns out that working at an aluminium smelter or at an offshore oil rig is – relatively speaking – more popular among those living in towns whereas working in mines is – again relatively speaking – more appealing to people in villages. The lower level of education in general among people from the villages might be part of the explanation for this difference. Mining activities like in the Black Angle might be better known than working at a smelter or on a rig, and that might also be part of the reason for mining to be more appealing to people in villages than to people in towns. They are perhaps more willing to try what is lesser known working situations – at least for Greenlanders – such as working at a smelter or on an oil rig.

People in the South (from town and from village) show the greatest interest in working at a smelter. On the other hand people from towns in the Middle show the least interest in working at a smelter. At least the last part can sound surprising as it is in one of the towns in the Middle the smelter is going to be placed. Instead people in the Middle show the greatest interest in working on an oil rig. At the time of the survey an oil rig was known to be under development west of the coast of North Greenland. No obvious reason for these patterns can be pointed out. Much more information will be needed to understand this pattern. Here it is important to stress that the further information which is needed has to show differences in the pattern over time. To be able to generate this kind of information the survey has to be repeated over time for instance every second, third or fourth year.

In this way the analysis can begin to relate changes in the different districts and settlements to specific events or changes in focus or plans and thus we can

begin to link changes in preferences to changes in the real activities in the society. Through this analysis it will most likely be possible to identify patterns between preferences and activities in the communities. This will

at best make it possible to come up with some predictions on what preferences people might have for being engaged in the new economic activities.

The distribution of positive responses to becoming engaged in the new economic activities. Percentage of responses on each of the four industry categories					
Region	South	Middle	Disco	North/East	Greenland
Towns					
Aluminum	33,2	27,2	28,4	30,8	29,0
Mining	26,4	23,1	26,3	29,7	25,3
Mineral production	20,6	25,8	24,3	20,9	23,9
Oil	19,8	23,9	21,0	18,6	21,8
	100,0	100,0	100,0	100,0	100,0
Villages					
Aluminum	36,8	30,9	29,8	23,8	28,2
Mining	29,7	26,2	26,1	30,1	28,8
Mineral production	15,8	23,8	26,3	27,9	24,7
Oil	17,6	19,1	17,8	18,2	18,3
	100,0	100,0	100,0	100,0	100,0
<i>Note that the question allows for multiple responses</i>					

Table 2: Regional distribution of responses to question 37 of the questionnaire: Within which of the following activities would you be interested in looking for job opportunities?

While the above reflections relate specifically to the new economic activities, the focus hereafter will be on the general trends in mobility. Both due to the importance of seeing the new activities in the perspective of general trends and concerns, and at the same time because these more general trends serve as a good starting point for the interpretation of which options may be generally available in connection with the specific activities.

6.2 Who moves, and who would be interested in moving in the near future?

Based on register data it is shown that on a yearly base around 1/5 of the population are moving either temporarily or permanently. Among those who have moved the survey shows that about 23 % have left villages in order to move to towns (15 %) or to other villages (8 %). In contrast, almost half of the movements that have the city as a starting point, a total of 18 %, have moved from cities to villages while the largest group of all, namely 29 %, has moved from one city to another. Movements from Denmark constitute a significant proportion with 27 % of which 21 % has been to cities while 6 % has been to a village. The final 30 % has moved from either villages or towns in Greenland to

Denmark.

For the vast majority (47 %) the reasons for moving have been related to own work while another substantial part (19 %) has been due to a partner's work. Another group includes people where education has been the main cause (18 %), either own education (14 %), partner's education (3 %), or children's education (1 %). In a third group family relations accounts as the major reason, for instance changes in the family structure (9 %) or relations to parents (6 %). And a fourth group (4 %) indicating that one or more of the family members have not felt at home at the previous place. The final group (19 %) indicates various reasons for moving. First and foremost the need for changes in life, the desire to try something new, and perhaps the hope that the new place might give experiences differing from those provided at the current location, or in some cases having bad experiences at a new place and therefore returning to the well-known conditions in their previous home town. A predominant pattern in relation to this last group is relationships with family – positive as well as negative – which in one way or another has been decisive.

The following tables can readily be seen in the above context by focusing on expectations for any movement within a five years' time horizon in relation to detail of the responses in relation to age and gender:

Age group response to the question: Do you expect to move within the next 5 years?						
	Number of persons			Percent		
Age group	Yes	No	Total	Yes	No	Total
0-15	223	496	719	0,6	1,3	1,9
16-25	3 174	4 222	7 396	8,5	11,3	19,8
26-40	4 301	6 595	10 896	11,5	17,7	29,2
41-60	3 749	14 509	18 258	10,1	38,9	49,0
Total	11 447	25 822	37 269	30,7	69,3	100,0

Table 3: Age distribution of responses to the question on whether or not one expects to move within the next 5 years.

Gender response to the question: Do you expect to move within the next 5 years?						
	Number of persons			Percent		
Sex	Yes	No	Total	Yes	No	Total
Men	6 098	13 977	20 075	16,4	37,5	53,8
Women	5 349	11 859	17 208	14,3	31,8	46,2
Total	11 447	25 836	37 283	30,7	69,3	100,0

Table 4: Gender distribution of responses to the question of whether or not one expects to move within the next 5 years.

As indicated by the tables there are about 1/3 of the respondents to the questionnaires that expect to move within the next five years. This number – when compared to the approximately 20 % accounted for in the overview over moving during previous years – is a relatively high percentage. It might very well be in keeping with the general trend towards greater mobility in society, and just as much in the fact that movement is increasingly included as part of many people's – especially the younger ones' – planning horizon.

As would have been expected, it is clearly the group aged 16-25 that is dominant in relative terms, with just under half of this group expecting to move. However, it is perhaps most noteworthy that in the group 26 to 40 years, nearly 40 % of the group are expecting to move. When digging into more details it is possible to see that especially the younger part of this group are ready to move, while the group of more established persons with family and with slightly older children makes the

group less mobile, a pattern, however, that changes when the children leave home. Not infrequently, it is the children's choice of residence, which is decisive on where to move, a finding which has been realized in connection with the interviews that have been made in conjunction with the questionnaires.

Regarding the question of gender, Table 4 shows that women are generally more mobile than men. The percentages shown in the table are based on the percentage of the total population in the working age 15-64, but calculated gender-wise 31 % of the women versus 30 % of the men are expecting to move. There is clearly not a large percentage difference but being a persistent difference during the last decades it is enough to make a substantial long-term difference. This is clearly substantiated in the absolute numbers where the labour active gender distribution shows a total of 54 % men and 46 % women for Greenland as a whole.

6.3 From where would they come, and where would they go?

Settlement group response to the question: Do you expect to move within the next 5 years?						
Settlement	Number of persons			Percent		
	Yes	No	Total	Yes	No	Total
Town	9 589	21 968	31 557	25,7	58,9	84,6
Village	1 858	3 867	5 725	5,0	10,4	15,4
Total	11 447	25 835	37 282	30,7	69,3	100,0

Table 5: Settlement group distribution of responses to the question of whether or not one expects to move within the next 5 years.

Regional response to the question: Do you expect to move within the next 5 years?						
Region	Number of persons			Percent		
	Yes	No	Total	Yes	No	Total
South	2,411	3,907	6,318	6.5	10.5	17.0
Mid	3,635	12,459	16,094	9.8	33.4	43.2
Disko	3,381	5,431	8,812	9.1	14.6	23.7
North/East	2,019	4,009	6,028	5.4	10.8	16.2
Total	11,446	25,806	37,252	30.7	69.3	100.0

Table 6: Regional response distribution of responses to the question of whether or not one expects to move within the next 5 years.

Table 5 and Table 6 show some important mobility characteristics related to place of residence, both in relation to residence in town or village and to residential region in Greenland.

Table 5 shows first of all that there are unexpected small differences in the response patterns between persons living in towns and in villages. In towns around 30 % express positive expectations regarding moving, while the situation in the villages shows a little higher percentage – 32 % – interest in moving within the next 5 years. As most of the population are living in towns around 26 % of the positive responses stem from persons with residence in towns while 5 % are living in villages. This part of the survey does not consider which type of moving has been considered. In other parts of the mobility analysis it has been shown that especially the male village residents tend to make use of short distance and short term moving, for instance for temporary jobs in nearby towns, while females from villages are looking for more permanent opportunities.

In the towns both men and women are aiming at more permanent opportunities, and usually in larger towns than the one they come from.

With regard to the regional differences it is interesting to see that there are marked differences between the responses in the four regions. In the Disko region 38 % of the work force express interests in moving, followed by region South just behind, and then region North/East a bit lower with 33 % showing interest in moving. The absolute lowest level is found in the Central region where only 23 % express interest in moving within the next 5 years.

The low number in the Central region is relatively simple to explain, as this is the region to which most of the intended movers are heading. In the Central region one of the major objectives in moving is to look for opportunities in Nuuk, or to leave the country, either temporarily in pursuit of education mainly in Denmark, or more permanently in search of jobs matching the skills of the persons responding to the questionnaire.

As the Central region is the region with most temporary workers from outside Greenland, primarily from Denmark, the objectives of moving are of course very much influenced by this group as many of them – if not most – eventually will return to Denmark. Another reason for the low number wanting to leave is of course that the Aluminium smelter – if it becomes a reality – is expected to be situated in this region!

The high numbers from the Disko region indicate that initiatives are being taken in this region for development of new activities, but also that the proposed site of the aluminium smelter in Maniitsoq is relatively close to the region. What may contribute further to the openness towards moving is the fact that the most recent large scale mineral resource exploitation has been taking place just north of Disko bay and with partici-

pation of workers from this region.

Among the reasons for lower interest in moving from the southern region may be the fact that the work force in this region is considerably older than in any of the other regions. As was shown in the table regarding age structure in relation to “willingness to move” the older age groups were less reluctant to pursue activities that would make it necessary for them to leave their region.

The very low percentages in North and East show that these regions to a considerable extent have been disconnected from many of the processes of change that have been influential on the west coast region in general induced by the modernisation processes in fisheries during the last half century or more.

Primary target for moving in accordance to both old and new municipalities			
Target, old municipal structure	Percent	Target, new municipal structure	Percent
Denmark	18,2	Denmark, Greenland outside municipalities or don't know	32,6
Don't know	13,6		
Greenland outside municipalities	0,8		
Nuuk	20,1	Sermersooq	24,1
Ammassalik	2,3		
Paamiut	1,1		
Ittoqqortoormiit	0,6		
Ivittuut	0,1		
Ilulissat	8,3	Qaasuitsup	18,5
Qaanaaq	2,3		
Qasigiannugit	2,3		
Uummannaq	2,2		
Aasiaat	1,7		
Upernavik	0,9		
Qeqertarsuaq	0,5		
Kangaatsiaq	0,3		
Sisimiut	10,8	Qeqqata	14,5
Maniitsoq	3,7	Kujalleq	10,3
Qaqortoq	6,8		
Narsaq	2,3		
Nanortalik	1,2		
Total	100,0	Total	100,0

Table 7: Primary target for moving in accordance with both the old and the new municipal structure.

Responding to the question “Where are you interested in moving to?” made it possible for the respondent to choose between municipalities using the old municipal structure as well as a few targets outside Greenland. By using the old municipal structure much more detail became available, and it illustrates that the choice of target is actually very much focused.

As shown in Table 7 the municipality of Nuuk and Denmark are the most dominating targets for moving. With percentages of 20.1 and 18.2 respectively they are close to 40 % of all responses. At a lower level are municipalities with larger towns such as Sisimiut, Ilulissat and Qaqortoq, sought by 10.8 %, 8.3 % and 6.8 % respectively. A general characteristic of all of the above mentioned places is the access of different types of education which is an obvious attraction for the younger persons. For all other municipalities the numbers are low, from 3.7 % in Maniitsoq down to 0.1 % in Ivittuut and 0.3 % in Kangaatsiaq.

The image of a marked increased concentration of population appears very clear. It comes from the combination of a strong desire to move, the interest in education opportunities and the major cities in the middle of Greenland being the obvious attractive places to go to. Interesting is also the fact that the town of Maniitsoq – the expected location of an upcoming aluminium smelter – shows such a low level of attraction compared to for instance Qaqortoq in the South. Both places used to be regional centres for fisheries, but they have been affected by fisheries going off-shore. But in contrast to Qaqortoq where other business activities and education opportunities have been available for a long time, Maniitsoq has been defined as a place that relies on fisheries, and it has therefore also been exposed to a massive out-migration, and it has a very low attraction taking the size of the town into consideration.

Besides asking whether to move or not, additional questions have been focusing on the differences between whether one travels alone or together with others. As around one third expects to move alone – among them many young people pursuing education – by far the most dominant categories are expecting to travel with others, for instance spouse / partner is mentioned by 56 %, which is followed by the option of travelling with child / children by 40 %. It is a pat-

tern which has also been documented in the registry-based analysis. Movements are increasingly happening as collective actions including parts of or entire families or households. It is important information which needs to be included when the possible consequences of new activities – for instance an aluminium smelter established in Maniitsoq – are considered. The need to think in family context is much more demanding than finding individual relocation solutions. Jobs for spouses, kindergartens, education, public services etc. need to be included.

6.4 What would be their interests?

Table 8 presents an overview of some of the most important wishes and aspirations Greenlanders have regarding work related to large scale activities. In the table there is a sub-division of responses according to settlement type and gender.

The table encompasses a wide range of activities and at the same time it indicates that the respondents are open to a wider field of options. As a consequence there are no individual activities which actually account for the lion's share of all the activities.

One of the things that are remarkable with regard to the distribution of responses is the differences within the gender based and settlement based issues. The darker versus the lighter colours highlight the main differences, and it is clear that precisely the qualification issue and its position relative to future labour markets are recurring themes. Women have the absolute major group with 18.2 % responses in relation to administration, book-keeping etc., but also with a higher representation in the group with academic work compared to men, and in both types of work the respondents from towns are clearly dominant compared to the inhabitants of villages.

Female over-representation compared to that of males is found in what is often characterized as being female work. For instance catering which shows up in one third of all female responses, a number which is ten times the responses from males. Also nursing, hospital work and related activities are dominated by women. Both types of work are mostly wanted by representatives from villages.

Wishes/aspirations in relation to work connected to large scale industries.				
Percent of responses from types of settlements and gender.				
Activity	Settlement		Sex	
	Town	Village	Men	Women
Administration (office work such as book-keeping, travel arrangements)	8.5	6.7	4.6	18.2
Academic work (Ingineer, Biologist, Geologist, Law, Economy etc..)	8.2	3.5	6.0	6.8
Drilling and blasting	6.6	8.9	9.2	2.0
Catering (cleaning, cooking)	8.8	13.1	3.8	33.8
Skilled work (electrician, carpenter etc..)	15.7	12.1	17.8	1.4
Harbor work	5.8	9.9	9.2	2.0
Management responsibilities (shop-steward etc..)	9.3	5.3	9.0	3.4
Working with machinery (caterpillars, dumpers etc..)	11.3	7.8	12.0	2.0
Nursing, hospital work etc.	1.6	3.5	1.0	7.4
Transport and logistics	11.0	4.6	9.8	3.4
Unskilled work	13.2	24.5	17.6	19.6
Total	100.0	100.0	100.0	100.0

Table 8: Wishes and aspirations among Greenlanders in relation to work connected with large scale industries.

The major male choices are typical “male” vocations, for instance drilling and blasting, skilled jobs such as electricians, carpenters, working with machinery, transport and logistics, harbour work and similar activities. The divide between towns and villages in these groups show that basically most jobs requiring training of longer duration such as management responsibilities, working with machinery, skilled work and transport and logistics are dominated by respondents from towns. In contrast to this the unskilled jobs are the absolute dominating group sought by the inhabitants of villages.

One thing is the option of adjusting the work force to the specific job types within the mining and industrial sector. As indicated above there are clearly interests in basically all major groups of work, and in that sense the labour market may be considered ready for these challenges.

In addition to this, however, is the adjustment to the specific working conditions. The vast majority of experiences from the labour market in Greenland show that the workforce is accustomed to working within normal office or shop opening hours and to some extent also

with shift work. For many with these experiences the new challenges in relation to mining, manufacturing and hydrocarbon production may come as a surprise.

But by taking part in such activities as fishing one is also a part of the workforce, with experience of being on the job for a long time and then being home for a similar period. Similarly, the special insular nature of the Greenlandic labour market has added a higher degree of flexibility and increased local and regional mobility, an issue which has been recognized in the register-based analysis. There is no doubt that these experiences may play a significant role in a more open and integrated labour market in which different forms of commuting can be crucial. In other parts of the survey it has been shown that there is relatively much interest in various alternative forms of employment, such as the type of work where you may be working on weekly or monthly shifts. What role such interest may have on future activities will depend on the precise conditions established around the large scale activities. The problem may, however, be that those with experience in labour market flexibility don't have the qualifications, while those with qualifications have limited flexibility.

6.5 What would be their requirements?

In relation to this question which is asked in the questionnaire, there are marked differences in the responses from women and men, as shown in Table 9. The table has been organised to enhance the gender based differences in the responses. While many women are pointing to education – their own and their children’s – as well as family relations and recreational opportunities as primary causes, more men than women point to issues of career, work and employment, and also to partner’s education as reasons to look elsewhere. Of similar

importance are the issues of the opportunities the site offers, for example, public transport, housing and more. Thus one can to some extent determine the gender characteristics when it comes to the specific causes of a desire to move.

From a close reading of the table’s background data it can be seen that there are difference between the genders when it comes to the number of different reasons for moving. The men indicate an average of 20-30 % more different reasons than women. The women in this context are thus more focused on individual reasons while the men spread over a wider spectrum.

Most important issues in relation to moving				
Gender distribution and differences of answers				
	Percent of responses		Differences in responses	Gender characteristic
	Men	Women		
Carreer opportunities	9,9	7,5	2,4	Clearly male dominans
Partner's education	4,9	2,8	2,0	
Withdrawing from labor market	2,9	1,3	1,6	
The option of getting a job	9,9	8,4	1,4	
The option of getting better working conditions	7,4	6,4	1,1	
The option of getting another (better) job	12,3	11,2	1,1	
Improved public transport options	2,9	2,1	0,9	Equal importance
Does not feel "at home" where I'm living now	3,4	2,6	0,8	
Public service options	4,7	3,9	0,8	
Better salaries	8,6	7,9	0,7	
(Better) housing options	5,2	4,5	0,7	
Improved health conditions	2,1	1,5	0,6	
Improved leisure time options	7,0	8,1	1,1	Clearly female dominance
Better education options for children	6,0	9,0	3,0	
Family matters	5,7	10,5	4,8	
Better own education options	7,3	12,4	5,1	
Total	100,2	100,1		

Table 9: Most important issues in relation to moving.

6.6 What impact might be the result at both sites?

What may happen in case new activities are introduced in Greenland is extremely difficult to provide a more precise insight into. But when characterizing the impact of new activities it is important to focus on which character the new activities have in relation to the settlement structure. As discussed by Rasmussen (2003) there are basically three typical forms of involvement, each with dynamics of their own:

Enclave economies,

- Adjacent activities, and
- Community Integrated activities.

In order to get an idea of the potential consequences a number of examples from Greenland and other Arctic regions could provide some input to a discussion.

Enclave economies are characterized by situations where all activities at the mine and energy production site are isolated from the surrounding communities, so that the only interaction is through the royalties paid by the mining companies, and possible short or long term employment of persons from the communities is on an on/off basis, for example two weeks on and two weeks off. This situation has been the case in sparsely populated areas with limited accessibility – a situation characterizing Greenland and further elaborated on in the discussion of the Josva copper mine and the Am-itsoq graphite mine in South Greenland as well as the mining activities at Mestersvig in East Greenland. There are many similar sites in the Circumpolar North, accounted for among other things, by the dispersed population and the character of the mineral and energy resources as being both dispersed and of such size that it would be too costly to develop a more permanent settlement. Therefore a substantial part of the on-going activities can be characterized as enclaves.

The fact that the activity is considered an enclave does not prevent positive interaction with settlements in a specific area. For instance in connection with the establishing of the “Red Dog” lead and zinc mine close to Kotzebue in NW Alaska one of the requirements by the NANA development corporation was, that the workforce should include a substantial number of workers from nearby settlements, and that the mining activity should contribute to the economy of the remote settlements (Rasmussen 2000; Rasmussen 2003; Storey and Hamilton 2003). In spite of the objectives,

however, the reality has been that the economic opportunities created by the mine instead have led to an out-migration to larger communities such as Anchorage.

There are, however, cases where enclaves, after they have been discontinued instead of being abandoned as originally planned eventually have been turned into more permanent settlements. It is the case with the iron ore mine at Schefferville in Northern Quebec where the production officially started in 1950. At its peak the settlement had a total population of around 4.500. But when the mining activity halted and the equipment was dismantled 1982 the place was in principle closed. The situation, however, has been that parts of the place have been taken over by indigenous groups in the area, primarily the Montagnais and Naskapis and the town has become an important centre for tourism in the region.

Adjacent activities emerge when the mining activities have developed a certain degree of interacting with nearby communities, for instance through the involvement of local workers. This could be as employees of the mining company, or it could be occasional provision of local food for the miners. It could also include services rendered for the miners and the mining company when miners visit the communities in connection with leisure time activities, or it could be the larger settlements acting as major communication and administration centre for the mining company.

Among the cases from Greenland the situation of “The Black Angel” mine in Uummannaq as well as the mine in Ivittuut both show this characteristic pattern of relationship with the communities, the latter even developed characteristics that also could be characterized as those of an integrated community. Similarly there are many larger settlements in the North situated relatively close to mines and energy producers which have been enjoying similar positive relationships. In the case of Prudhoe Bay oil development in Alaska, Fairbanks is an important link to the activities, and not only to this single resource development, but also to a number of placer mining sites in the adjacent areas, or in NWT where Yellowknife, which was partly developed on local gold mines and administrative activities related to the NWT, which presently is in a process of developing adjacent activities related to the wave of diamond mining activities within a radius of a few hundred kilometres (Rasmussen 2000).

Community integrated activities have been developed in situations where the mining and energy production have become an integral part of the life of the community. It means that the community includes many other activities which relate to the general characteristics of a community, such as shops, schools, oth-

er types of industries, renewable resource exploitation etc., and at the same time it interacts with the mine through labour exchange and rendering of services to the company etc.

While many settlements in the South throughout history have been known through their economic base in mining, this type of settlement is relatively rare in the North. The explanation for this is the same as the reason for the existence of many enclave mines, namely the dispersed character and the short life span of the resource. In Greenland, however, the town of Qullissat was more or less a role model for that type of relationship. Even though it could be characterized as a mono-economy due to the dominance of one single activity, namely coal mining, the economy was nevertheless multifaceted involving many other types of businesses. In the Russian North this type of settlement is more common than in other parts of the Arctic. That is the situation with settlements such as Nikel, Zapolyarne, Norilsk, and others. Longyearbyen on Svalbard is also an example of a place, where the town originally was based on coal mining, while today the mining activity is of minor importance, while administration, research, and education have become the major activities – and not the least tourism!

In Canada Dawson City used to be a major city with its activities integrated with gold mining activities, and gold mining still plays a certain role, in fact its present existence is primarily due to the continuous flow of tourists. In the case of the iron mining in Fermont in northern Quebec where production started in 1974 and was supposed to have gone through the same process as Schefferville, i.e. abandoned by 2000 after the iron ore resource had been depleted, and the inhabitants (peak employment 860 persons, total population around 3.500) eventually relocated. But in contrast to Qullissat and Schefferville, the citizens have fought for their town, and this public resistance seems so far to have been successful. With no more iron ore, the inhabitants are considering turning the town into a regional centre primarily based on tourism.

Among examples in Canada regarding a successful creation of integrated activities there has been the recent development of the oil and gas activities in Atlantic Canada where the integration of local communities in the development process has been crucial. The key factor in this process has been The Atlantic Accord which has acted as an important tool for the promotion of a clear focus on the potentials of a positive interaction between the project and the surrounding communities, which has been a vital part of the process (Rasmussen 2000; Canada – Nova Scotia Offshore Petroleum Board 1999; Department of Industry Trade and Technology

1998; Storey and Hamilton 2003).

7.0 Conclusions and Perspectives

As outlined above, there is not a simple answer to the questions raised above of what may happen in case new activities are introduced in Greenland. Basically it is a situation placed somewhere between two dimensions: On the one hand there is the choice of approach regarding settlement type:

- Enclaves, which would imply some kind of FiFo – Fly in, Fly out – arrangement;
- Adjacent activities where a combination of FiFo and involvement of population from adjacent communities may become the solution;
- Community Integrated activities where direct impact on the community is obvious, but may just as well include FiFo involvement.

On the other hand the development is depending on the choices and preferences made by the population regarding interests and abilities in involvement.

The answer may be seen as reasonable and straight forward in the sense that the first dimension would be depending on a political decision, while the second dimension will depend on the preferences and abilities in the population and may be read out of the results from a number of surveys as the ones described above. Both dimensions will, however, be impacted by some level of uncertainty.

To illustrate the complexity of the answer an example is presented in the next section.

7.1 Micro-simulating the future based on survey responses

A micro-simulation of the potential consequences of introducing an aluminium smelter in Maniitsoq has been developed in order to give a forecast of what demographic results as such might be the outcome in Greenland (Rasmussen, 2000).

In the simulation a division of the population in 6 ten-year age groups has been applied, i.e. the age groups 0-9, 10-19, 20-29, 30-44, 45-64 and 65 years and above. In order to manage the regional structure four regional units have been used, encompassing: Centre towns, Centre villages, Peripheral towns and Peripheral villages. The Centre towns include the large towns around Maniitsoq, i.e. Maniitsoq itself, Nuuk and Sisimiut, and also the towns in the Disko Bay. Centre villages are the villages adjacent to the centre towns, while the Peripheral towns and Peripheral villages basically encompass all other towns and villages in Greenland.

In addition the gender parameter has been included, as well as the major demographic parameters, such as the natural reproduction parameters, as well as national and international migration parameters. In order to trace details on the latter parameters, all internal mobility has been based on mobility patterns between the mentioned types of towns and villages during the last 20 years.

The micro simulation has been outlined like this:

A large scale industry – in the example an aluminium smelter – is expected to be introduced in Greenland at its earliest in 2014. In the construction phase an unknown number of persons but probably around 5,000 will be involved, but the company is supposed to ensure a substantial part if not all of this number.

During the construction phase with an expected duration of five years a total of 800 permanent jobs will be established. It is expected in the forecast that the vast majority of these jobs will be taken by workers from Greenland and that the necessary training for these jobs will be done in Greenland.

In the planning of the future development the following was assumed:

- The company is established in a city centre area in the middle of West-central Greenland.
- Half of the jobs will be held by members of the local labour force, the other half will be held by labour com-

ing from villages in the centre area or towns and villages in peripheral areas.

■ Two thirds of the jobs are considered to be jobs primarily aiming at and mainly attracting male workers, while the remaining jobs will be jobs that are more appealing to women.

■ Half of the jobs will be filled by people who come as singles, and half the workforce will be one or two persons from existing families going to the place leaving the rest of the family at home.

■ In the group of families two out of three would be families without children while one out of three families will be families with two children on average.

Besides the direct attraction of new employment opportunities, a significant side effect would be brought about by the accompanying spouses or partners as well as the accompanying children which would become important parameters in the demographic consequences. In some cases two persons in the same family may be looking for jobs in the new industry but for many of the accompanying persons the situation would be an additional contribution to the local labour market in the town with the new industry.

Using the model under these constraints will result in an output which is shown in Figure 1.

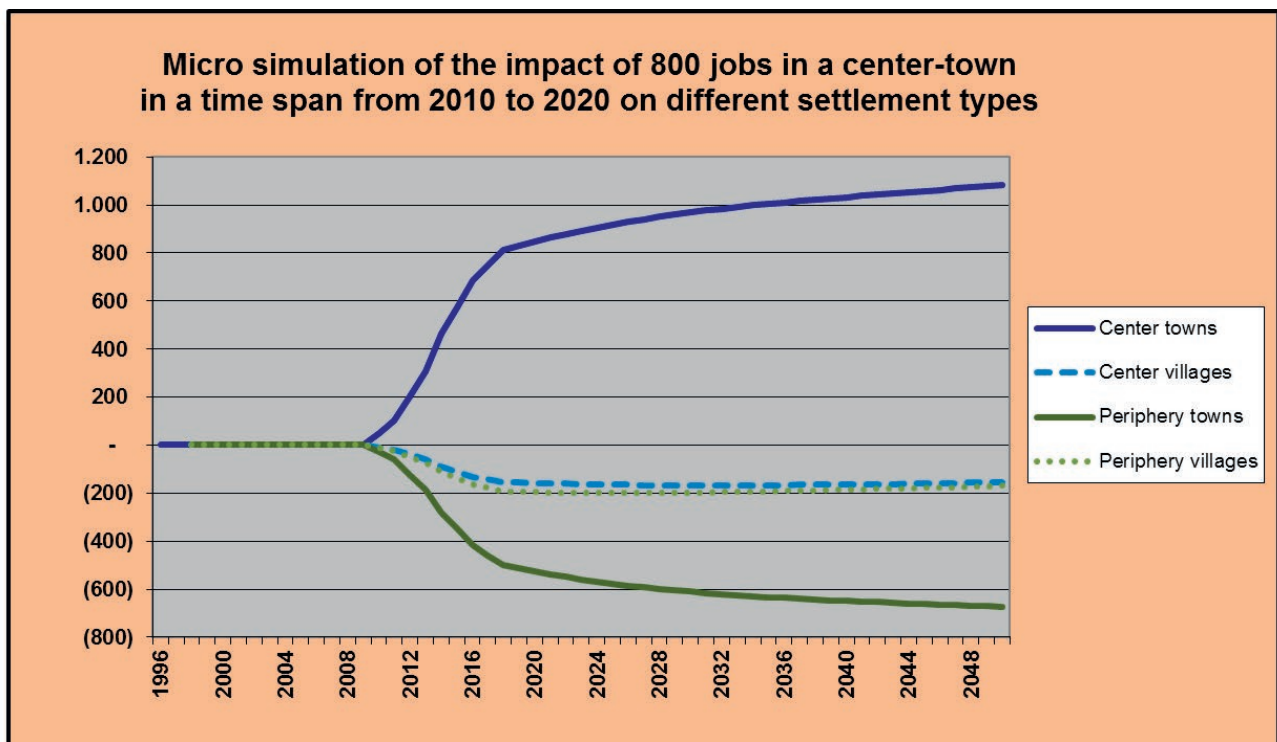


Figure 1: Micro-simulation of the potential impact of the introduction of 800 jobs in a Centre-town in a time span from 2010 to 2020.

While the jobs are offered in one of the centre towns both the lack of qualifications and available persons leads to an influx of persons from other towns and villages. The lowest numbers of people will come from the villages in the Centre region because the job opportunities in the Centre towns have already been exploited, leaving the Centre villages either with a lack of people in the relevant age groups because they already have moved, or the villages are in such a strong position job-wise that only a limited number of persons will be tempted by the new opportunities.

The situation is much different when it comes to what are characterized as “periphery towns”. These towns have marked limitations in what kind of jobs are offered, so a substantial number of persons will make use of the new opportunities and choose to move. A similar situation characterizes the villages in the periphery. So from these regions a substantial number of persons would also choose to move.

The moving of several hundred persons from towns in the periphery and around a hundred or so persons from the peripheral village is in itself a problem for these places. What is the most challenging problem, however, is the fact that those choosing the option of moving will be the part of the population who are

among the best trained and most skilled persons, leaving both towns and villages with voids in these fields, which it may be extremely difficult to compensate for because these places may be much less able to attract replacements from other towns and villages.

The potential long term consequences mentioned in the above example have been generated by means of the model; and the results are shown on the graph. The direct effects of the introduction of the new activity are seen just before and after the introduction date. But it is quite clear that the long term consequences are much more substantial than the immediate effects. While the introduction of a new group of young well-qualified workers in the Centre town has a continuous positive multiplication effect throughout the whole period; and eventually it results in a situation where 600 jobs bring about a population increase of around 1200 persons. The exact opposite process has been the result in the case with both towns and villages in the periphery. A continued state of flux and decline in the population in both settings has been the consequences; and embedded in these changes is at the same time a general loss of qualification in the population due to the attraction of qualified persons away from these places.

7.2 An alternative to the micro-simulation – lessons learned from “The Black Angel”

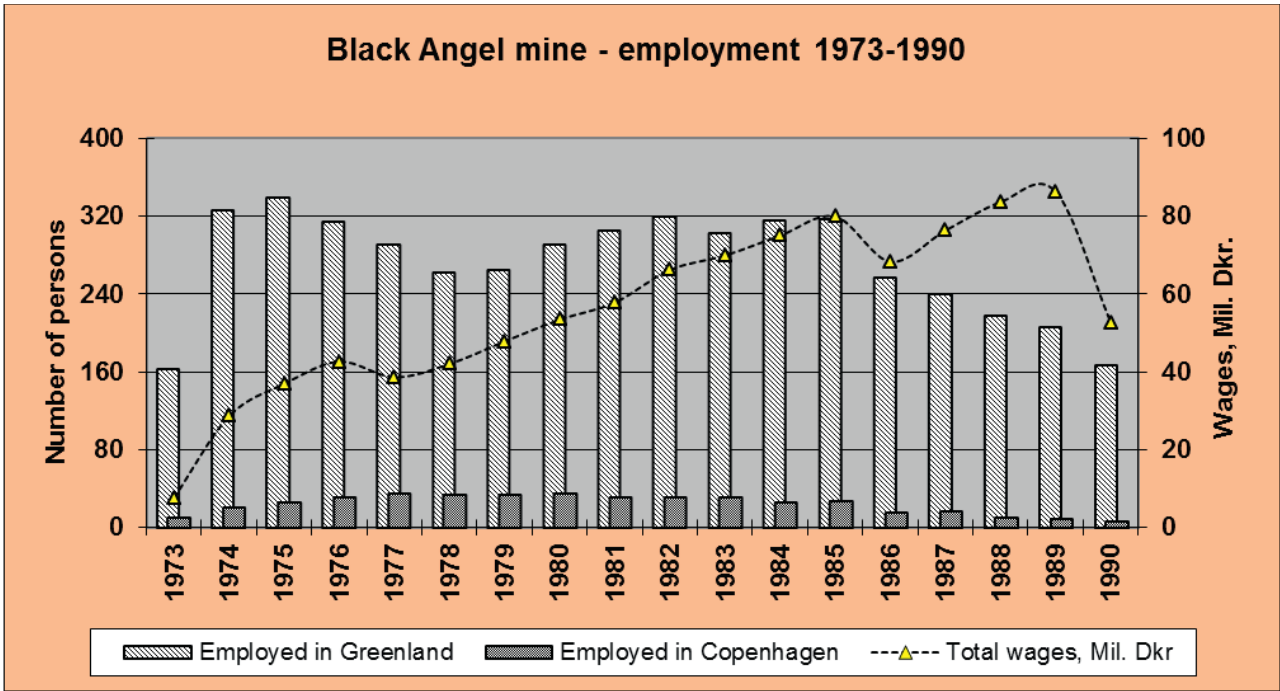


Figure 2: Development in employment at the Black Angel mine from 1973 to 1990.

Lessons learned about “The Black Angel” mine in Uummannaq, which was active from 1972 to 1990 are interesting in this context. First because it was the first major private mine which employed Greenlanders, and secondly because analyses (Rasmussen 2000) made it possible to identify which persons from Greenland were involved, and what impact they had on the communities in Greenland during and after the mining activities took place. The analysis has been based on registries since 1977 which have made it possible to establish a comprehensive list of persons who have been registered residents in the mining area.

Figure 2 show the development in employment in the mine and at the headquarters in Copenhagen from 1973 till production ceased in 1990.

In the construction phase, all construction work was based on imported workers and encompassed around 400 persons. After the involvement of Greenlandic employees in the early 1970s there was a gradually increasing involvement of Greenlanders in the mine. Figure 3 shows the birthplace of the Greenlandic workers who were employed by the mine.

Place of birth in the municipalities (prior to the reform in 2009)	Percent
Uummannaq	51,3
Aasiaat	11,8
Nuuk	6,7
Ilulissat	6,7
Unknown	5,0
Qaqortoq	3,4
Maniitsoq	3,4
Qeqertarsuaq	3,4
Narssaq	2,5
Sisimiut	2,5
Qasigiannguit	0,8
Avanersuaq	0,8
Tasiilaq	0,8
Ittoqqortoormiit	0,8
Total	100,0

Figure 3: Overview of the place of birth of the Greenlandic workers involved in the mining activities.

As shown, a considerable proportion – over 50 % of the total group – came from Uummannaq municipality. The remaining half came, with a relatively even proportion, from a large number of other municipalities.

A relatively larger proportion – almost 12 % – came from Aasiaat, but also a somewhat higher figure – almost 7 % – came from Nuuk and Ilulissat respectively.

The adaptation of the Greenlandic labour force to work in “The Black Angel” was in many ways quite successful. The salaries from the jobs at the mine became an important augmentation to the household economies, and also to the development of a more efficient fishing fleet in the settlements. When the mine closed one consequence was a marked decline in average income for the people who were involved, as shown in Figure 4:

Year	Number of persons	Average Income	Indexed values, 1988=100
1988	308	259.174	100
1989	286	317.867	123
1990	254	301.113	116
1991	138	202.822	78
1992	129	182.984	71
1993	122	179.733	69
1994	120	194.277	75
1995	117	216.825	84
1996	115	223.328	86
1997	111	242.131	93

Figure 4: Average income level among employees in the mine before and after the mine was closed. The personal incomes have been traced for the 308 workers identified in 1988 and the following years up till 1997. The decline in the number of employees is due to permanent or temporary out-migration, death and other reasons that no longer were noted in the registry.

Average income while the mine was active clearly was higher than after the mine was closed. Immediately after the mine was closed, there was a fall in the average income to a level that was less than 2/3 of the previous level; and this lower level seems to have continued for several years, after which the general income increases took off again. Part of the explanation for the decline is partly due to the fact that the former miners have had difficulty finding jobs in their area of qualifications. Another part of the explanation has to do with the generally higher wages in mining and production, among other things, on the basis of a greater number of hours worked.

Then after a couple of years a slow rise in income levels appears again, however, without reaching the level it was at when the mine was active. The last increase is

partly due to the general wage and price increases, but this cannot explain the whole increase. According to reports from a survey conducted among former miners an important part of the explanation was that almost all of them have returned to the type of job they had before they started working in the mine; and in that connection they used some of their surplus income as investment capital in better boat and fisheries equipment. Only a few have made it a career to work in mines and sought employment in this industry after the closure of the mine. But the general impression is that the trajectory that was established initially was followed, and that working in the mine has been just a short or prolonged interruption of another business career.

Virtually all respondents to a survey, which was conducted after the mine closed, were positive about getting an equivalent job or going back if the mine reopened. Working in the mine was remembered not only as a means to earn a good salary and financing major purchases such as fishing boats, but also remembered as an interesting experience.

7.3 And what could be foreseen?

... when looking at the present situation in Greenland. Probably none of the above examples!

The micro simulation reflects the present on-going demographic changes combined with the population's choices as the situation is today. When reflecting on future situations it is important also to include the visions that have been central in the discourse in Greenland during the last decade. This also implies adding large scale mining activities as a factor affecting future mobility. This may cause changes in overall mobility patterns within a relatively short period of time. Similarly the political focus may shift when negotiations with a company about such things as salaries, royalties, use of local versus foreign labour etc.

Taking an example from the 1970ies and 1980ies where important positive impacts have been identified should not lure the reader into believing that history might be repeated. The period during which the Black Angel mine provided jobs was also characterised by a major increase in fisheries where small boats and village based fisheries was an important contributor to an advance in the Greenlandic economy. Neither small boats nor small scale fisheries are major players in the fisheries "game" anymore, so private investments in boats and equipment which is fundable by excess incomes from mining activities can no longer be considered a major push towards competitive fisheries investments when the competitor is the large scale offshore

fisheries, and the world market price is constantly declining.

The examples may serve as illustrations of potential consequences, and they may be used as an inspirational basis for further analyses. But it is important to keep in mind that such examples are time specific, and only to a limited extent able to cast light on the present and future situation:

- Increasing mobility has become an issue of both political and economic importance. It generally raises the questions of reasons why some people move while others choose to stay.

- Concerning to economic development and urbanisation focusing on new types of industrial activities opens up the important question of who may be interested in participating in these activities, and of what the geographical implications are of people moving in order to look for new opportunities.

- Even such opportunities do not necessarily lead to permanent relocation, as migrant workers come in various forms, for instance 2-4 weeks on the job followed by a corresponding number of weeks at home from which it nevertheless has impact on both the receiving community and the community the migrants originate.

- A key issue has furthermore been what would be considered a "good life" – types of work, wages, employment options for accompanying family members, quality in terms of types of housing, social infrastructure, environment, offers of public facilities, etc., and how these considerations would have significant impact on tendencies in relation to both mobility and demographic characteristics in the near future.

The above analyses have been initiated because of the possible intentions of establishing an aluminium smelter in West Greenland. The survey was conducted in order to get a more in-depth understanding of the potential regional consequences of such an activity. It was focused on clarifying the possible regional consequences of changes in business structures as a result of the introduction of new activities, looking into attitudes to mobility in relation to employment and the like. At the same time it was aiming at providing data in relation to gender, age and qualification structures in different settlement types, and furthermore the survey was also contributing responses to the respondent's reflections on other forms of employment, including the possibility of staying with the family and then working as a migrant, what arrangements could be considered, as well as questions of what would be attractive work and workplaces, what would be of inter-

est etc. in relation to wages, housing, transportation, social activities, etc.

It is obvious that such surveys and analyses provide not only a concerned but also an educated basis for the upcoming discussions that are going to help shape the future of Greenland. But it should also be emphasized that such mappings and surveys have to be repeated frequently in order to make it possible to reflect on the new challenges that are due to the pace of the on-going changes!

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