

Sustainable Planning of Megaprojects in the Circumpolar North



**broadening the horizon, gaining insight
empowering local stakeholders**

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The project team has put together the material in this report with care, but does not warrant that this information is free of errors. Next to that, the co-funding organizations do not necessarily agree with the statements made on the project website and in its electronic publications. The user assumes the entire risk of the use of any information contained on the project website and in its electronic publications.

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The authors

1. Summary

- The two projects studied in this report; the Kearl Oil Sands near Wood Buffalo, in Alberta, Canada and the Kárahnjúkar hydro project and Alcoa aluminium smelter in East Iceland materialized in the Circumpolar North for similar reasons, i.e. higher energy prices on the world market.
- Increase in megaprojects in fields such as energy harnessing, energy exploitation, mining and transportation can be expected in the Circumpolar North in the immediate future. Communities will have to prepare for those and estimate whether the respective communities and areas can accommodate the project – and if so minimize the negative impacts and maximize the positive.
- In the case of East Iceland there were high expectations of the social and economic impacts resulting from the projects. People in the region had been waiting for some 30 years for a project similar to the one that materialized in 2003. Overinvestment in housing in the central impact area and disappointment with impacts further away from the projects may be related to this.
- Pressure for economic development, both for the region of East Iceland and also for the country as a whole, was the main driving force behind the Icelandic case. As such, the project seems to have largely met expectations.
- Due to environmental reasons the project in East Iceland was highly controversial, in fact more than any other project in the country's history. This created a large divide between different social groups.
- The planning process of the projects in East Iceland was criticized; this applied to both the hydro power project and the aluminium plant. The current minister for the environment is due to start an enquiry into the decision making process of the Kárahnjúkar project.
- In Iceland there seems to be more scepticism and awareness with regard to various projects than there was prior to the undertakings in East Iceland and thus increased empowerment may be noticed.
- The study of the Kearl Oil Sands project focussed on the planning process. It also had important socio-economic impacts in Fort McMurray, such as shortage of housing, exponentially increasing population, which burdened the town's services and created imbalances between people working for the oil sands and the rest of the population (e.g.: increasing real estate prices).
- The Kearl Oil Sands project implied major environmental uncertainties that needed to be addressed within the planning process. However, the study of the planning process shows that understanding of and ways to deal with environmental uncertainties differ between groups.
- This impaired the functioning of the planning process, resulting in a new kind of participation through a judicial review of the environmental impact assessment, led by civil society organizations.
- Various similarities in the planning process were observed, such as increased general awareness of the projects when they were materializing and had reached a point of no return; this applies to both cases in this study.

- In both cases, the megaprojects were met with stark opposition after the planning process. Thus it may be reasoned that more time and resources for debating and voicing opinions should be allowed before a project is approved.
- The comparative study was complemented with a broader study of publicly available information on megaprojects in the Circumpolar North. This study has resulted in a special map view (layer) of such projects in the existing *Arcticportal* Interactive Map view, as well as a series of “Infosheets” for use by local civil servants, or any other persons, to broaden their knowledge and become aware of the impacts megaprojects have had on the region until today.

2. Introduction

This report is prepared for the partial fulfilment of the project *“Mega-project planning in the Circumpolar North - broadening the horizon, gaining insight, empowering local stakeholders”* which commenced in the spring of 2010. The project was financed by the Nordic Council of Ministers’ Arctic Cooperation Fund. Two institutes take part in this project: University of Akureyri Research Centre in Northern Iceland¹ and Ecologic in Berlin.

The aim of the project is to assess the planning processes of Arctic mega-projects in the light of sustainable development. It will assess the potential social, economic and environmental impacts of mega-projects in the Circumpolar North and provide insight and lessons learnt as regards sustainable planning of mega-projects for the benefit of decision-makers and the general public. To this end, we will compare two case studies: the construction of Kárahnjúkar hydro project and an Alcoa aluminium smelter in East Iceland and the development of the Kearl Oil Sands near Wood Buffalo, in Alberta, Canada. In comparing the case studies, we will make use of social and economic indicators, environmental management indicators of construction projects, and alternative land use scenarios. Even though there are only two cases in the study, the authors believe that they will provide valuable insight into the development of the processes that take place while mega-projects are being planned and constructed, see e.g. Flyvbjerg (2006). An example of such projects is a proposed aluminium plant in Maniitsoq, Greenland. Planners of that project have, for example, turned to UARC for advice and drawn from their experiences from East Iceland. Most of the material from the East Iceland study has, however, only been published in Icelandic until now. This report will be a part of efforts to make this research also available to an English speaking readership and to put it into a regional or even global perspective. These two cases are in many ways interesting and valuable lessons can be learned.

The Kárahnjúkar-Alcoa project was probably the most heavily protested construction project in Iceland’s history and the issues raised by its opponents have not been settled. Furthermore, the project was carried out in rural Iceland and therefore various social impacts were stronger than if the project had taken place in the capital area or its immediate hinterland like previous megaprojects in Iceland. These facts make it a particularly interesting case, both in the context of the planning process and the socioeconomic impacts. Experiences from the project can be transferred to many locations in the circumpolar North.

The Kearl Oil Sands project was the first oil sands project that was delayed due to a judicial review of both its environmental impact assessment and subsequent approval. At the core of the controversy were omissions in the environmental impact assessment, which led to the discovery of fundamental differences between various stakeholders’ understanding of risks and uncertainties, as well as ways to deal with them. The Kearl Oil Sands project is only one of many oil sands projects being carried out in Northern Alberta. The impacts of and the reactions to this project alone provide an indication of the

¹Hereafter referred to as UARC

issues such megaprojects bring to light regarding risks and uncertainty. These issues will play out in megaprojects in the Circumpolar North.

In the autumn of 2010 changes occurred in the project as one of the initial partners, Aalto University, dropped out which resulted in amendments to the overall planning of the project which had then to become more limited in scope. However, emphasis was maintained on adhering to the overall criterion of making relevant and valuable information on Megaproject planning available to citizens and local civil servants in the Arctic. To achieve this, our general approach for a revised project became twofold and as follows².

A. Comparison of scientific findings from two cases. The emphasis here is on the two projects used as examples, i.e. Kárahnjúkar hydro project and Alcoa in East-Iceland³ and the Kearl Oil Sands in Alberta. In both cases we were able to build on scientific research which members from both institutes, UARC and Ecologic, have been involved in. In the former case there were primarily scientific findings on socio-economic impacts and in the second case the emphasis was on critical issues regarding the decision making process. UARC focused on this former part of the project. However, scientific findings on the Kearl Oil Sands were provided by Ecologic.

B. “The Megaprojects’ Universe of the Circumpolar North”. This part of the project consists of the compilation of a database of previous Megaproject planning in the circumpolar North. Some of these projects were actually built, some were not. As this overview was not based on our own scientific research, information on these cases is general in nature and to a large degree shaped by availability of data online. We aimed towards providing at least one example from each of the countries in the Circumpolar North and these examples were to focus on different critical issues regarding the planning or implementation of Megaprojects. Ecologic was responsible for this part of the project.

The interactive map “*The Megaprojects’ Universe of the Circumpolar North*” as well as this report and other material created in the project is published on the project’s homepage on the Arctic Portal.

2.1. Structure of this report

In this chapter we will highlight the main characteristics of the two cases studied in the project; that is Kárahnjúkar-Alcoa and Kearl Oil Sands. Chapter three contains an analysis of the cases from two different perspectives, i.e. socio-economic impacts and participation by different actors in the planning process. The cases will be compared for similarities and differences in each of these two main perspectives. Chapter four contains main findings and recommendations based on the analysis of these two cases. Chapter five includes a portrayal of the “Megaproject Universe of the Circumpolar North” which consists of examples and short descriptions of several different megaprojects across the

²This resulted in delays and the revised project plan was formally accepted by the office of the Arctic Cooperation Fund, March 18 2011.

³Hereafter referred to as Kárahnjúkar-Alcoa.

Circumpolar North. Summary reports on socioeconomic impacts of the Kárahnjúkar-Alcoa project in East Iceland⁴ and on the environmental impact assessment of Vuosaari harbour near Helsinki, Finland⁵ are made accessible on the web page of this project on the Arctic Portal ⁶.

2.2. The two case study regions, their local particularities and regional similarities

Northern Alberta, Canada - Kearl Oil Sands

In the province of Alberta, Canada, lie the second largest known oil reserves in the world after Saudi Arabia: the Albertan Oil Sands. In the last decade of the 20th century, with the international geo-political tensions, decreasing crude oil reserves, and rising oil prices it has become profitable to invest in the oil sands. In 1995 the report *The Oil Sands: A New Energy Vision for Canada* laid out an exploitation strategy over the next 25 years and in 1997, the Albertan provincial and the Canadian federal governments implemented tax breaks to facilitate the development of oil sands mines. This resulted in intensive industrial development in the oil sands leading to more than \$52 billion injected in 81 oil sands projects between 2000 and 2008 (SEMP, 2008).

⁴ See: Megaprojects in the Circumpolar North. Broadening the horizon, gaining insight, empowering local stakeholders - Social impacts: The case of the Kárahnjúkar power plant and Alcoa Fjarðaál plant in Iceland.

⁵ See: Mega-project Planning in the Circumpolar North, Environmental Impacts and Eco-social Reliability Ex-ante Review of the Vuosaari Harbour case.

⁶ <http://megaproject.arcticportal.org/>

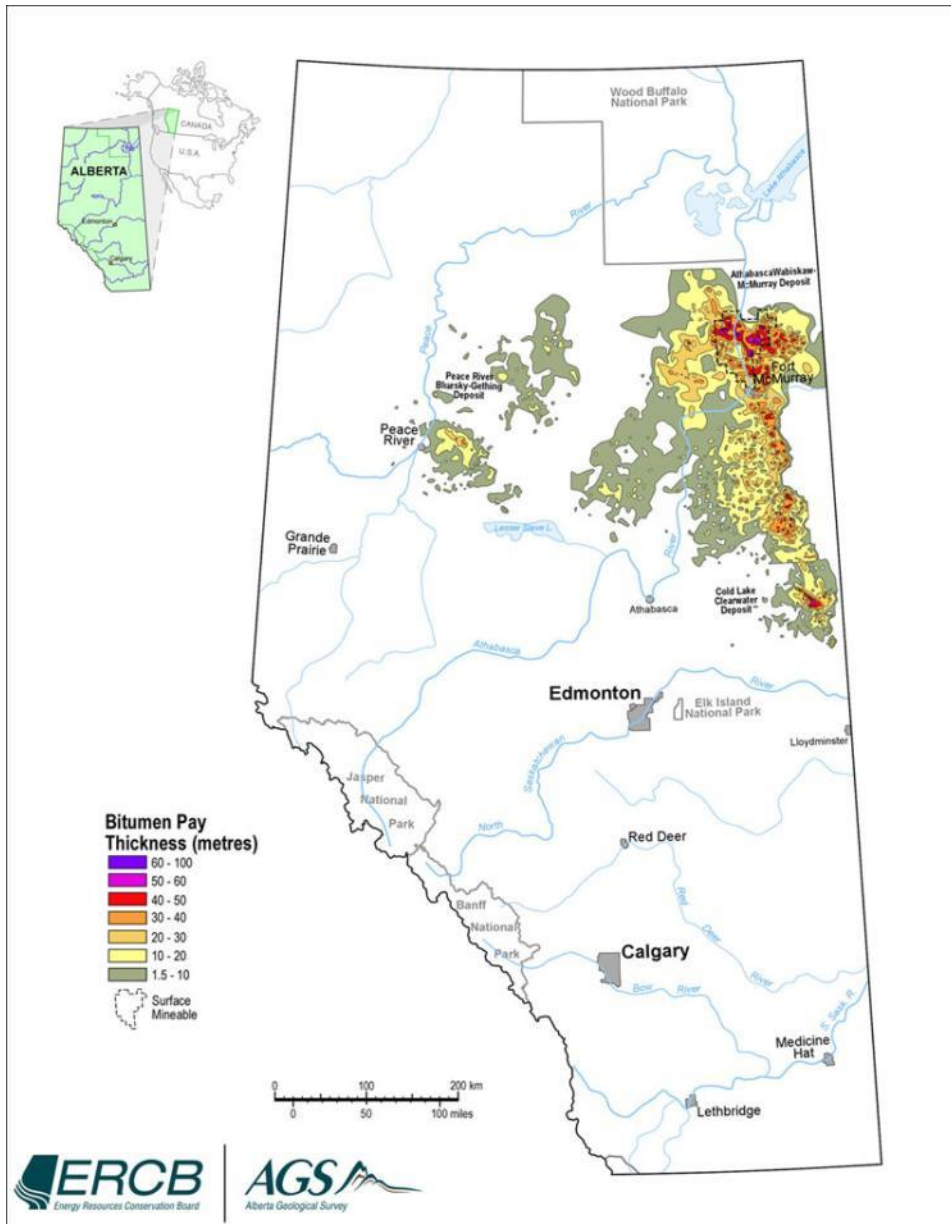


Figure 1. Map of oil sands fields in Alberta, Canada (Source: Alberta Geological Survey)

Needless to say, such an intensive industry affects surrounding ecosystems and does not go without environmental issues. Among other things, the mining processes involve heavy landscape modifications, important water intakes, the creation of toxic tailings ponds and a significant contribution to greenhouse gases emissions.

Oil from oil sands, contrarily to crude oil, cannot simply be pumped from the ground. Oil sands are also called tar sands and contain a heavier form of oil called bitumen. The commonly used technique in the current oil sands exploitation projects is open-pit mining, which functions as follows: The oil sands are located closely under the surface of the earth. After the forest is cut, the overburden is removed to

uncover the oil sands, which will be also dug out to undergo a simple process of extraction, which requires significant amounts of water and a number of toxic chemicals. Just to have an idea of how this technology works, the Alberta Energy website states, “about two tons of oil sands must be dug up, moved and processed to produce one barrel of oil. Roughly 75 per cent of the bitumen can be recovered from sand; processed sand has to be returned to the pit and the site reclaimed.” Tailing ponds result from digging and are filled with toxic water and sand remaining from the separation process.

The exploitation of oil sands had been taking place at an exploratory phase since the mid 1960s. Consistent exploitation only started at the beginning of the 1990s, when oil barrel prices reached a high and open-pit mining became a viable technology. Until that point, no other technology had proved efficient enough. Currently, there are over 80 oil sands projects taking place or being prepared in the province of Alberta using either open-pit mining or in-situ technologies. There are three main oil sands fields: Athabasca, Cold Lake and Peace River. The Athabasca oil sands fields, located around the city of Fort McMurray, are the most abundant in resources and also are the ones hosting the largest oil sands open-pit mines although other kinds of extracting technologies are also used there. The extent of the Albertan oil sands and their potential industry can be seen in the figure above (Figure 1).

The emergence of environmental problems caused by oil sands exploitation can be summarized in three phases. A first phase took place between the 1990 and 1996, where scientific studies drawing attention to the emergence of environmental degradation started to raise concerns. Secondly, from 1997-2005, the risk claims seemed to be solidified by more conclusive studies as well as the creation of a Cumulative Effects Management Association (CEMA) especially for Albertan Oil sands (Spaling et al., 2000). The third phase started in 2006, where scientists finally succeeded in voicing their concerns in a less marginal fashion within the scientific community (Schindler and Donahue, 2006) accompanied by more social and environmental activism around oil sands exploitation. Very recently, the official Canadian watchdog, the Commissioner of the Environment and Sustainable Development pointed out that the federal and provincial authorities provided insufficient monitoring of cumulative effects of oil sands exploitation, leading to poor decision making in the management of oil sands projects in the region⁷.

Eastern Iceland - Alcoa aluminium smelter and Kárahnjúkar hydro power project

Two interconnected cases are the focus of the Icelandic part of this project. These involve the hydro power station, Kárahnjúkar delivering 4,600 Gwh of power to the Alcoa-Fjarðaál aluminium plant in East Iceland and are, for the purposes of this study, treated as a single mega-project referred to here as Kárahnjúkar-Alcoa.

The Kárahnjúkar hydro project involved harnessing, in a single hydro-power plant, two glacial rivers which originate in Vatnajökull glacier and water from several rivers in the eastern part of the highland. This represents 7% of Iceland’s total watershed. The natural impact area includes the highlands by the

⁷ Report of the Commissioner of the Environment and Sustainable Development: http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201110_00_e_35759.html

glacier as well as land along the rivers in question and the eastern coastline. Due to automation, only 13 are employed in direct jobs running the power plant.

Aluminium production is highly energy intensive and this is the prime reason for choosing Iceland as a location as energy has been relatively inexpensive in this country. The process of making aluminium involves separating alumina (aluminium oxide) into its component parts of aluminium metal and oxygen by so called electrolytic reduction. This is a continuous process where alumina is being dissolved in cryolite bath material (sodium aluminium fluoride) in large electrolytic cells called pots and with oxidation of carbon anodes. This bath is kept in molten state by the resistance to the passage of a powerful electric current. Pot temperatures are usually between 920° and 980°C. The aluminium which has been separated by electrolysis is regularly removed for casting of diverse types, depending on customer needs. The pots are connected electrically in series to form a so called “potline”. In the Alcoa Fjarðaál plant there are 336 pots producing around 350,000 tonnes annually. The alumina is transported mainly from Australia and Brazil in large bulk ships and in 2010 just over 680,000 tonnes were used (Alcoa Fjarðaál 2011). The production is being shipped in container ships mostly to the European market.

The Alcoa-Fjarðaál smelter was built during the period 2004-2008. Building of the project commenced in 2004 and was finished in 2008. It has personnel of close to 500 and just over 300 workers are employed by diverse firms providing outsourced services, such as transportation, maintenance, catering and utilities for the aluminium plant. Thus, there are around 800 people working on the site. The annual production capacity is around 350,000 tonnes of aluminium. In 2012 a new addition to the plant will be opened, a Pot Relining Shop⁸ providing 70 additional jobs⁹.

⁸ The aluminium is produced in 336 pots which need to be replaced every 5-7 years.

⁹ http://www.alcoa.com/iceland/en/news/whats_new/2010/2010_11_potlining.asp



Figure 2. Kárahnjúkar power plant, transmission lines and Alcoa-Fjarðaál plant (Source: www.Karahnjúkar.is)

These interconnected projects are located in the eastern part of rural Iceland (see figure 2). In fact this is the first mega-project in Iceland where both the energy harnessing and the energy usage of such harnessing takes place in rural Iceland. Previous megaprojects of a similar kind all have been located in the outskirts of the capital, Reykjavík. This, along with the sheer scale of the projects compared to the size of the Icelandic economy makes them unique in the Icelandic context. In the region of East Iceland fisheries and agriculture has been the mainstay of the economy.

The Alcoa Fjarðaál aluminium plant was built just outside the town Reyðarfjörður which had a population of just over 600 when the project commenced in 2003. Some 8,000 persons, however, live within around 45 minutes driving distance. During the construction period, the region in central East Iceland witnessed huge changes. Foreign citizens became the majority of the workforce and huge investments also took place in the housing sector and infrastructure, especially the transportation network and the electricity grid.



Figure 3. Alcoa Fjarðaál aluminium plant in Reyðarfjörður nearly finished, November 2007 (Photo: Hjalti Jóhannesson)

2.3. Introduction to the two case studies and a summary of their specific methodology

Kearl Oil Sands

Canada's oil industry is thriving thanks to rising oil prices that have made the exploitation of the Albertan oil sands economically viable. Not everyone agrees, however, on whether the oil sands exploitation should be considered a success story. Some opponents have argued that social and environmental threats are among the largest ever experienced in Canada by a single project. During the planning phase of the Kearl Oil Sands project, a significant controversy over which level of environmental uncertainty was acceptable became a major milestone in the process (for more details about the controversy, see part 3.2). The impact of the controversy was felt beyond the negotiations and legal procedures in that it also sparked a public debate about how to deal with uncertainty.



Figure 4. Kearl Oil Sands (Source: Pembina Institute, Photo: David Dodge)

To look further into the different perceptions people have, the debate focused, among other things, on the different approaches to uncertainty that the parties had. Roughly speaking there are two main positions about uncertainties. A discourse analysis helped to understand the characteristics of these two positions and how they diverge from each other and lead to different ideas on how the planning process should be carried out. The key themes investigated were: uncertainties, scientific expertise, the precautionary principle and adaptive management. The groups that were looked at were: environmentalist groups, the oil industry, the review panel for environmental assessment and the government. Rhetorical strategies as well as interactions between the groups were analysed in the different contexts as a result of the case developing over time.

The part of the planning process that was studied consisted of two phases; one before the legal pursuit, and one which eventually closed the debate. Documents examined comprise letters, reports and official statements, as well as legal documents pertaining to the trial¹⁰. Semi-structured interviews (cf. Leech, 2002) were carried out with members of the different aforementioned groups. The interviews were primarily meant to gather and explain already available information and to clarify positions regarding the key themes.

The output of the Kearl Oil Sands study of the planning process was a detailed discourse analysis of the different actors involved in the case, their viewpoints and their strategies before and during litigation.

¹⁰ Simon Dyer's affidavit (January 11, 2008), Justice Lamer-Tremblay's ruling (March 5, 2008) and the Panel's response to the decision (May 6, 2008).

The different viewpoints on uncertainty and risk were the central focus of the analysis. The participation of different interested parties and their increased involvement over time can be seen as a consequence of the controversy on risk and uncertainty. To systematically study the discourses, a model inspired by Peter Wehling's dimension of non-knowledge was used (cf. Wehling, 2006, p.116ff). These dimensions are 1) *knowledge*, within which different degrees go from unknown to specified; 2) *intentionality*, which ranges from *unintended* to *intended* uncertainties, *temporal stability* of uncertainties, which ranges from *temporary* to *stable*.

For the analysis of socio-economic impacts of the Kearsley Oils Sands case, a qualitative frequency analysis of sources was carried out. On the basis of the outcome of this frequency analysis some socio-economic issues emerged as most significant, different from those in the Kárahnjúkar-Alcoa case. The Pembina Institute in Canada did a significant amount of work on future socio-economic impacts; their viewpoints have been challenged or supported by other sources that will be cited appropriately throughout the text.

Alcoa aluminium smelter and Kárahnjúkar hydro power project

The University of Akureyri Research Centre (UARC) carried out socio-economic studies in East Iceland during the period 2004-2010, monitoring the impacts of mega-projects on the surrounding region. The emphasis was on the construction period which commenced 2003 and finished in 2007. The research, which was initiated by a parliamentary resolution in 2003, was financed by the government and the Icelandic Institute for Regional Development. The research had a sociological emphasis with the purpose of seizing this unique opportunity during the construction of the large scale projects in East Iceland to monitor their diverse effects on the local communities¹¹. The findings might then be used to minimize negative impacts of future large scale projects and maximise the positive impacts. Furthermore, the research has been considered important for the field of regional studies in Iceland as much scientific information was collected on the region and its people.

Three surveys were carried out among individuals and two surveys among companies. Qualitative interviews were taken with individuals and experts. Statistics on demographic development and similar matters were collected and analyzed. Data from municipalities and main contractors were collected and analyzed. The research was formally completed in September 2010 with the publication of a final report covering the main changes during the period 2002-2008. A total of nine reports in Icelandic were published during the period 2005-2010¹².

In cooperation with local actors, the impact area was defined as the eastern part of Iceland, divided into three sub-regions; a central impact area within two hours' average driving distance from the main

¹¹ The interviews in 2002 were part of another UARC study, but as some of the themes in the interviews overlapped, this gave important information on issues such as expectations towards the projects before they commenced.

¹² These reports are all available in Icelandic on the website of UARC:
http://www.rha.is/is/page/rannsokn_a_samfelagsahrifum

building sites and northern and southern impact areas beyond this distance. This geographical division can be seen on the map below.

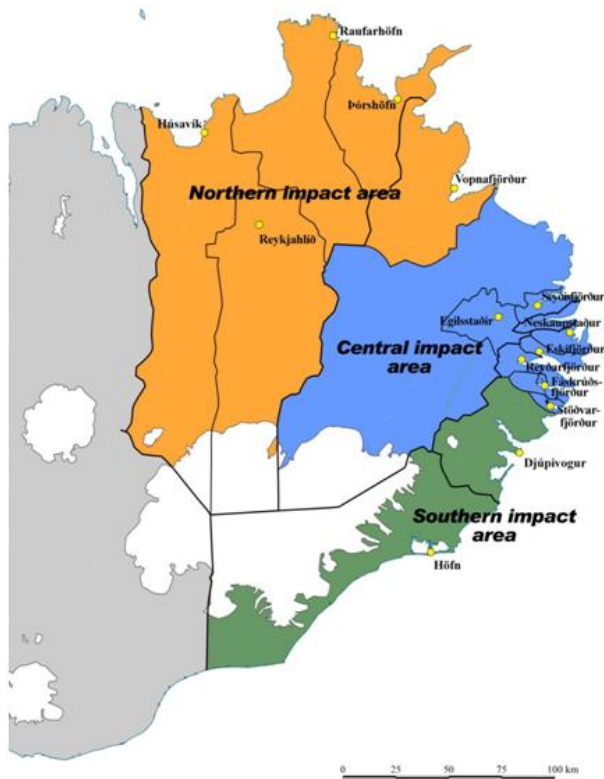


Figure 4. The impact area and its three sub-regions (Source: Jóhannesson et.al. (2010))

Generally the broader division into central-, northern- and southern impact areas was used for data analysis in the research, but another geographical division into 14 smaller sub-regions can also be seen on the map. These sub-regions derived their names from the main urban settlement within their boundaries. This was not based on an administrative division and the problem with using this geographical division was a low population number in the smallest areas. Furthermore, many mergers of municipalities took place during the period. In 2002 there were 26 municipalities but in 2008 only 15 remained.

Certain spheres of society were expected to experience relatively high impacts and, furthermore, impacts could be expected as a result of sociological proximity where certain actors might be involved due to close contact with contractors or by direct participation in the project. Beforehand, it was difficult to define exactly which spheres would be exposed to the strongest impact. The following domains were identified, however, similar to those of the socio-economic impact assessment (SIA) carried out during the planning phase:

- Economy and earning potential
- Labour market
- Population development

- Municipal affairs
- Housing
- Private services
- Public services
- Land use and resources
- Infrastructure
- Tourism
- Lifestyle and social spirit

When planning the research work, it was decided to make use of diverse data sources and build upon ideas on methodological triangulation (Denzin, 1970; Silverman, 1997). In this way, both qualitative and quantitative data were used to search for a better understanding of the processes taking place in the communities. The emphasis was on data sources that shed light on changes in the communities while they were actually taking place.

Primary data to a large degree consisted of three mail surveys carried out in 2004, 2007 and 2008. The 2004 survey was carried out only among persons living in the impact area, while the 2007 survey was carried out in the whole of Iceland and the 2008 survey focused on East Iceland, but also included a district in North Iceland; the Akureyri region (with 25,000 inhabitants) for comparison purposes. These three surveys used the same questionnaire with little changes which enabled monitoring of changes between rounds. Mail surveys were sent to companies in the impact area in 2005 and 2008. Other primary data consisted of semi-structured interviews with individuals living in the central impact area. These were carried out in 2002, 2004, 2007 and 2009. Interviewees were chosen on the basis of location; both in towns and the countryside, a mix of different economic sectors and gender. Each time, 15-20 individuals were interviewed. These interviews were meant to give an insight into how individuals experience changes in their community. They also proved important for the purpose of guiding the study into certain directions. Furthermore, expert interviews were carried out regularly with individuals from the municipalities, different sectors of the economy and government institutes.

Data from Alcoa-Fjarðaál, Landsvirkjun¹³ and the contractors building the projects were also obtained. However, it proved difficult to obtain some of the requested data. This may be a consequence of the short time span of the projects and their relative complexity reflected, for example, in a high number of contractors and subcontractors and many nationalities involved. This kind of data appeared to be less accessible than in former projects in Iceland, which is probably related to the above-mentioned complexity, as well as increased globalization reflected by companies and workers coming from all over the world to take part in the project.

Statistics on issues such as demography, economy, labour market, housing and municipalities were obtained, but the nature of such data and delays in making them available may cause them to be better

¹³ The national power company and owner of Kárahnjúkar power plant

suited for ex-post studies. Thus, some important data had not been published when our data collection and analysis was finalized and the project came to an end.

As the objective of the research was to study the changes taking place in a community, the researchers believe that their initial emphasis on using primary data from surveys and interviews was right. Relying to a larger degree on statistics and data from the companies and contractors would have resulted in a less satisfactory choice of information due to delays and unavailability.

3. Thematic synthesis of Megaprojects in the North

In this chapter a thematic comparison of the two cases will be carried out. These two cases are quite different as far as their size, setting and focus of background studies are concerned. However, there are several common threads we are able to trace and compare. The “leading” case concerning socio-economic impacts is East Iceland, since the background study there had that particular focus. Kearsal Oil Sands is however the “leading” case concerning participation in the planning process. The comparison here thus comprises these two different cases, each with its own focus area. Due to the different focus points of the background studies, one can expect more comprehensive discussion and analysis in the “leading” cases for each of the two main areas of emphasis.

3.1. Socio-economic impacts

The case of East Iceland, which the authors from UARC took part in, focused primarily on socio-economic impacts. Therefore, we have more accessible information on those kinds of impacts than for the Kearsal Oil Sands. The environmental impact assessment for the Kearsal Oil Sands, especially the section which focused on socio-economic impacts, provided valuable information and foundation for comparison of diverse social and economic changes between the two cases. It is also important to note that in the case of the Kearsal Oil Sands Project, the socio-economic assessment cf. Vol. 9 of the EIA report¹⁴ is officially part of the environmental impact assessment. Proponents of the project are required by law to carry out these assessments (see part 3.2). This introduces a bias that needs to be taken into consideration, but which is also counter-balanced by the participation process that takes place later on.

Kearsal oil sands

According to the EIA report for the Kearsal Oil Sands Project (2005) which included a summary of the socio-economic impact assessment report for the project, it was estimated that the oil sands industry had invested \$26 billion in new and expanded facilities. The bulk of that amount, or \$20 billion, was spent on facilities located in the Wood Buffalo region, an expenditure which was driving the expansion of the local economy. **As a result, the population in the Wood Buffalo region increased from 35,800 in 1996 to 60,300 in 2004 (68% growth), representing an average annual growth rate of seven per cent.**

During the period 1996 – 2004 the infrastructure of the Wood Buffalo region expanded, but not enough to keep up with population growth. This gap was most evident in the housing market, which saw continuously rising prices. **In 2005, it was estimated that there was a need for \$1.2 billion in new or expanded infrastructure over the next five years.**

¹⁴ http://www.ceaa.gc.ca/050/documents_staticpost/cearef_16237/KR-0007-9.pdf

This rapid population growth in the Wood Buffalo region also created a challenge for the service providers in private and public sectors. In areas such as health, education, transportation, water and sewage management, service providers were experiencing increasing difficulty in providing the necessary services. This was mainly due to the high cost of recruiting and retaining qualified personnel, which was then translated into higher operating costs.

Box 1. Forecast for population increase

As a result of a proposed enlargement of the oil fields as outlined in the EIA report (2005), the population of the urban area of Fort McMurray was estimated to further increase from 60,300 in 2004 to 77,020 in 2013. This forecast also suggested that the population was likely to stabilize at about 76,600 in the period 2015 to 2020, when new or expanded facilities would gradually transition into the operation phase. During the construction phase it was estimated that 95% or more of the workers would originate from outside the region, and most would live in an on-site camp. They would have some indirect effect, but most would not become part of the resident population.

During the operation phase the project was expected to have a limited negative effect on the local population. Imperial Oil planned to have a camp-based operation and thus **most of the operation's workers would live outside the region**. The workers would be flown to the construction site at the beginning of their rotational shift and live in the camp until the end of their shift when they would return home. This approach was estimated to significantly reduce the project's negative effect on the local population.

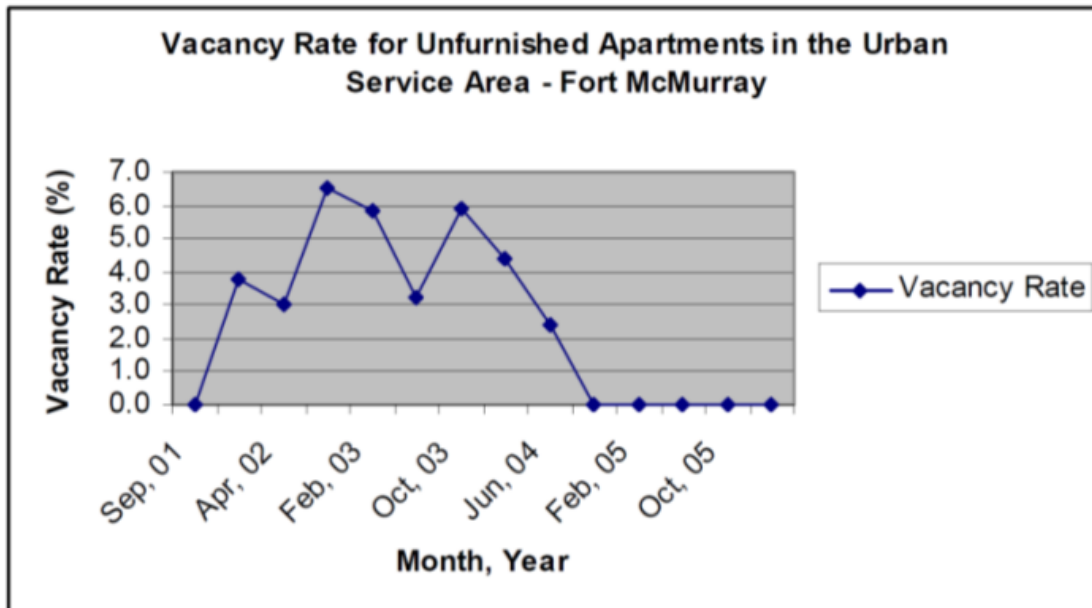


Figure 5. Oil sands' effect on housing availability (Source: Landlord and Tenant Advisory Board)

Effects on the local community of the development already taking place in 2005 were characterized firstly by increased pressures on the traditional land and culture of aboriginal peoples, secondly by increased traffic, both within the region and between the region and the city of Edmonton and thirdly a rapidly growing northern resource town economy, characterized by a wide variety of community stresses (RMWB, 2006: Part V). One stressor on the community is illustrated in Figure 5, which shows the decline in vacancy rates until zero between the years 2001 and 2005. According to an assessment by the municipality, the community stresses were much more pressing than reported in the EIA and should be expected to increase significantly beyond 2006 (RMWB, 2006).

In the EIA report from 2005, several countermeasures were planned, such as minimizing demands on local service providers by using full-service workers' camps providing workers with a range of retail, recreation, health and other services. This anticipated minimal impact on the local community during the operation, as was already mentioned earlier, turned out to be far from the actual situation 5 years onward. According to The Globe and Mail ("The Oil sands' silent boom", September 7, 2010¹⁵) a resurgence of activity after the 2009 recession resulted in such an influx of workers that a true "frenzy" on the housing market occurred. This situation 5 years along indicates that **workers' camps are not having the hoped for effect on the mitigation of pressures by oil sands development on the local community.**



Figure 6. Workers' housing near Fort McMurray (Photo: <http://workabove.com>)

According to an interview with the Mayor of Fort McMurray (conducted in 2005) the increase in population was more than expected. The EIA had actually noted an increased growth of the population prior to 2005. It further mentioned an expected continuous increase at even higher growth rates until

¹⁵ <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/the-oil-sands-silent-boom/article1703171/page2/>

2014 (SEIA, 2005:5-13). **Increased population drove up housing prices so that for example schoolteachers could not afford to pay a house since their salary is rather small compared to those of people working in the oil sands.** A comparison of housing prices for a single-family home in Fort McMurray one year before the recession (697,970 Canadian Dollars in 2008) and one year after (689,700 Canadian Dollars in 2010) shows that prices remain at an unprecedented high level.

Looking at the infrastructure needs, which were actually anticipated in the EIA (RMWB, 2006:3) but have not been met, and an industrial development that has exponentially increased over the past five years, it becomes clear that **there is a discrepancy between what needs to be done from a community perspective and what has been done in reality.** It seems to the authors, based on the material that they had access to, that the municipality did not succeed in being heard in the megaproject's planning process in the area. According to the Regional Municipality of Wood Buffalo, government agencies did not do what was needed to mitigate anticipated and reported socio-economic impacts as they emerged (RMWB, 2006). Substantial funding (\$700 million) at provincial and federal levels was injected in the infrastructure after the fact, yet this appears to remain insufficient.¹⁶ The current situation was to a large extent expected by the municipality, who therefore proposed a pro-active approach regarding community infrastructure in 2006 and published communications on infrastructure shortcomings as early as 2002 (RIWG, 2005). The 2009 recession may have contributed to stagnancy in the management process of workers' housing, but overall it seems that mitigation of socio-economic impacts did not take place sufficiently even before the global economic downturn.

Another socio-economic impact may be experienced beyond the life span of the megaproject. The reclamation of lands after the operation of the megaproject has come to an end. Interventions in the landscape and land-use changes had an immediate effect on the aboriginal communities living near the Kearl Oil Sands and it was planned to pursue measures to minimize negative impacts on the traditional land and culture of aboriginal peoples, e.g. by reclamation of lands used for mining purposes, so that they could be returned to the land base available for traditional practices as soon as practicable. However, **reclamation has turned out to be a very fluid issue since there are no clear standards or laws governing the process.** Figure 7 shows the increasing discrepancy between the disturbance and the reclamation. (Grant et al., 2008:7).

¹⁶ <http://www.albertaoilmagazine.com/2011/09/growing-up-bitumen/>

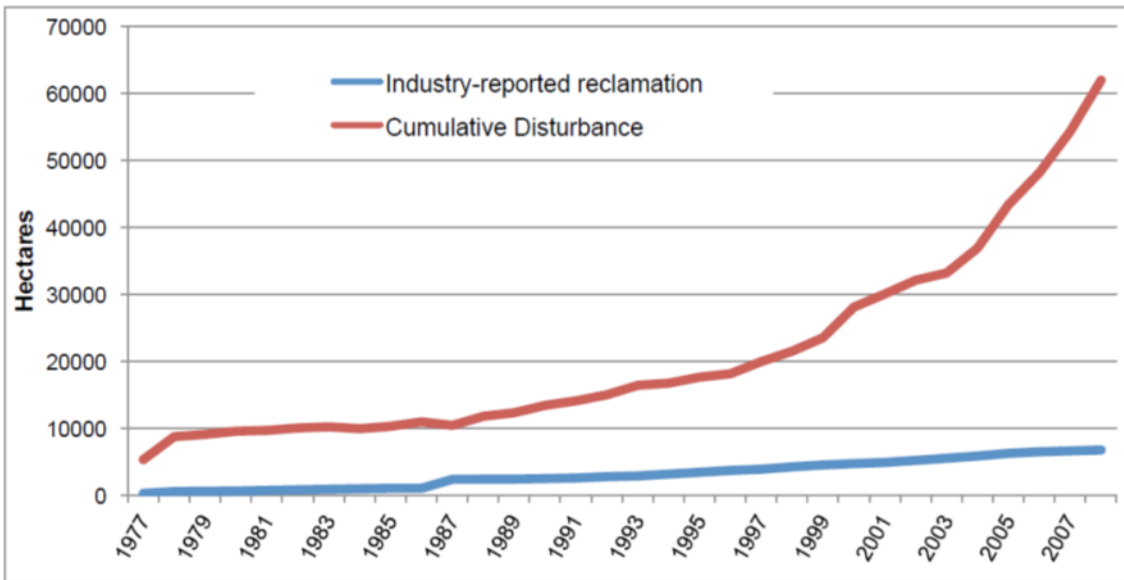


Figure 7. Industry-reported oil sands mine reclamation and cumulative land disturbance (Source: the Pembina Institute; data supplied by Alberta Environment)

The reason why it is so important to focus on this stage of the project is twofold:

- First, it should be clear who is responsible for reclamation of the land, and what the reclamation standards are.
- Second, it should be clear whether the polluter will pay for cleaning up (and if not, how the costs involved will be covered by government resources – ultimately this could mean a large socio-economic impact on the municipality).

Currently, the problem with addressing reclamation in Canadian oil sands is that the process is lacking transparency and publicly available documents. Estimates by the Pembina Institute suggest that security deposits put on the land are not sufficient for a proper reclamation effort and chances are that tax payers will indeed end up paying the bill (Grant, 2008:2).

Alcoa aluminium smelter and Kárahnjúkar hydro power project

The single most important finding of the study is how confined the **impacts of the projects were within two municipalities**¹⁷ closest to Alcoa-Fjarðaál and Kárahnjúkar power station (Jóhannesson, 2010). Individuals' responses in surveys indicate that there was much optimism in the region about the impacts. This had to do with issues such as personal income, diversity of jobs and diversity of services. Background information in the last survey in 2008 indicated, that a significant number of people commute to work to the town Reyðarfjörður where the aluminium plant is located. Similarly, there is much commuting to the town Egilsstaðir, which is the main service centre in East Iceland and some 30

¹⁷Fljótshálsa municipality 3,401 and Fjarðabyggð municipality 4,583 inhabitants in January 2011

minutes driving distance from Reyðarfjörður. Interviews indicated that individuals experienced much **change in the local spirit** i.e. more optimism and belief in the future of the region. Data from municipalities showed that financial impact was seen in only three municipalities¹⁸. The area defined as the impact area for the research counted, however, 15 municipalities at the end of the research.

In East Iceland¹⁹ there was a little population growth during the 20th century. During the first half of the century there was, however, little change and the population remained around 10 thousand. But after World War II population increase took off and until around 1980 there was a relatively steady growth. Then slow growth continued until 1989, and at the end of that year there were 13,243 persons living in the region. During the last decade of the 20th century the population declined, however, as was the case with rural Iceland in general, while the capital region grew rapidly.

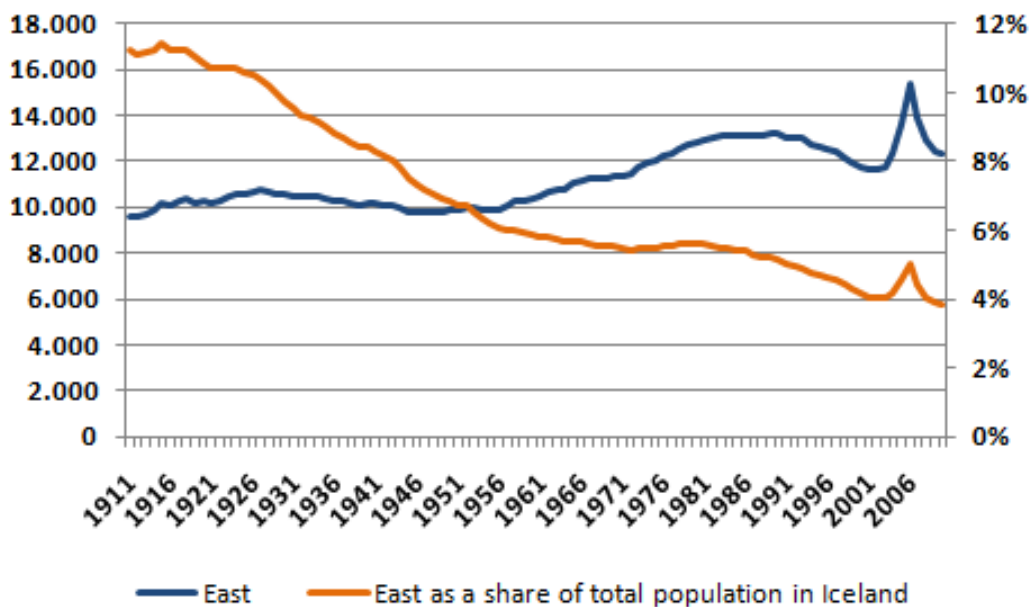


Figure 8. Population development in East Iceland 1911-2010 (Source: Based on data from Statistics Iceland)

Before the project commenced, demographic conditions in the research area were similar to those in other Icelandic rural areas. East Iceland had experienced out-migration, primarily to the capital region and this had left its impact. Males outnumbered females (52%); young adults and young children were underrepresented but older males overrepresented in the local population. The population pyramid below demonstrates this situation:

¹⁸The two former municipalities mentioned and also a very small one, Fljótshreppur, with merely 80 inhabitants in January 2011

¹⁹Note that this is not the same geographical area as the impact area of this study but a statistical region used by Statistics Iceland (see. appendix) and also one of the constituencies during the period 1959-2003

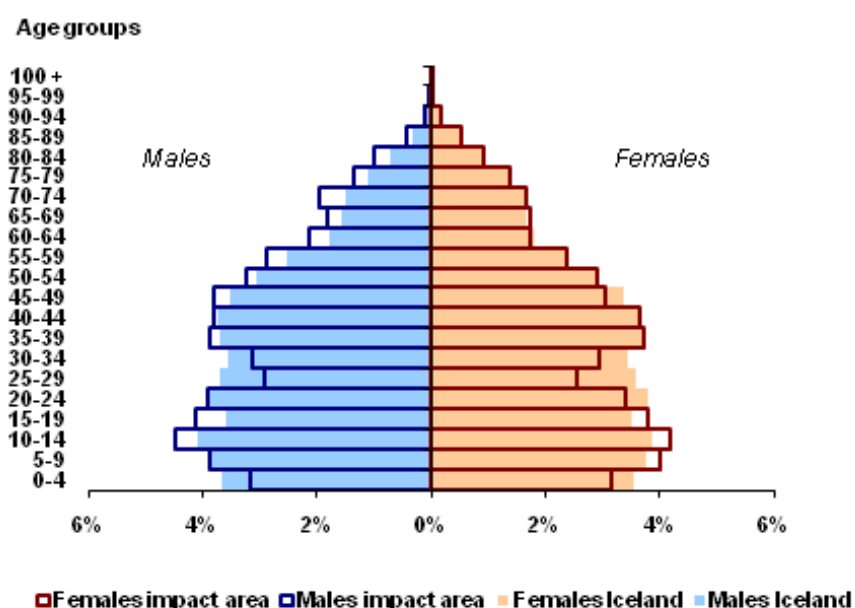


Figure 9. Age and gender structure of the research area in 2002 (Source: Based on data from Statistics Iceland)

Population increase as a result of the mega-projects was **confined to the central impact area**, whereas population decline continued in the southern and northern impact areas. The figure below shows this development in the three sub regions:

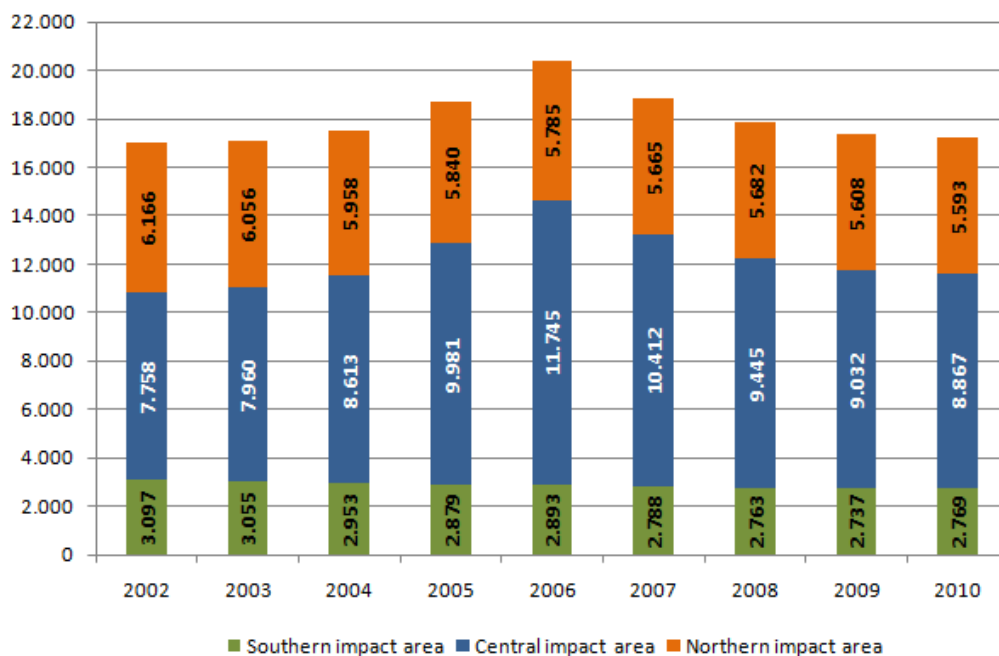


Figure 10. Population development in the three sub regions in December 2002-2010 (Source: Based on data from Statistics Iceland)

Population growth in the central impact area was to a large degree caused by **influx of foreign workers**. During the latter half of 2007 the maximum number was reached and around 11,800 persons were registered in municipalities of the central impact area. The population declined again and in 2008 population growth in the central impact area was 22%, counting from 2002. The southern impact area, however, saw a decline of 11% and the northern area 8%. Net population increase in the impact area as a whole was around 900 persons until 2008. By end of 2008 foreign workers remained on the population registry of municipalities, even though the bulk of the construction work was already finished and most of them had already left. By end of 2010, the net population increase in the impact area was merely 200 persons; an increase of 1,100 in the central part, while the more peripheral areas experienced a continuing fall in population.

In a SIA report from 2006 (Nýsir hf, 2006) it was estimated that number of inhabitants would increase to 11,400 in central East Iceland in 2007 and then decrease to just below 10,000. The end result was similar to this forecast, since in Dec. 2009 the inhabitants of the central area were 9,781. For those who wanted the impact area to be defined large this was a disappointment seen, for example, in responses of local politicians in 2007-2008 when it was becoming clear that the geographical distribution of impacts was very limited.

During the construction period most of the **guest workers lived in work camps**. These were primarily in two locations. A large camp and a number of smaller ones were located in the eastern highland for the construction of the dam, tunnels and related projects. Due to distance from inhabited areas on the lowland, camps in this location had little impact on the local population. The main contractors of the Kárahnjúkar hydro project were foreign firms, the largest being the **Italian** firm Impregilo. Similarly, the majority of workers in the project were foreigners who came to Iceland to work for reasons such as low unemployment rate and high value of the Icelandic krona. Cultural and economic aspects were probably highly influential regarding which nationalities came to work on the Kárahnjúkar project. For example there was not a single person of Portuguese nationality in East Iceland before 2003. But in 2004, a year after the project commenced, the **Portuguese** were the most numerous among foreign nationals, followed by Italians. Later in the project the **Chinese** became most numerous. In the Environmental Impact Assessment of the Kárahnjúkar project 2001 it was anticipated that some 20-25% of the workers would come from East Iceland (Eythórsson et al, 2001). This **prediction did not materialize, as 9 out of 10 workers were of foreign nationality** in the summer of 2007 at the peak of the project. The share of Icelanders became 50% at the end of the project in 2008 when only 22 workers remained. The staff that operates this largest power station in Iceland is very small or 13, thereof only one female.

It took some 2,100 man-years to build the aluminium plant. When workers were most numerous they were around 1,700. **Polish** was the most common nationality, or 70%, whereas only 17% were Icelanders. This was planned, since the main contractor, Bechtel, aimed at hiring only Polish, Icelandic and English speaking staff. The workers' camp for the aluminium plant was located just outside the village Reyðarfjörður which counted just over 600 persons when the project commenced. At the peak of the construction there were around 1,300 living in the workers' camp compared to some 700 in the village. There was much emphasis by Alcoa and the main contractor Bechtel on keeping the village and

the workers' camp as separate as possible to minimize impacts and possible conflicts with the local community. Therefore the camp was **self-sufficient for most service functions**. According to interviews with local people, this proved successful and **no major incidents of conflicts** between local people and the workers in the camp were reported.



Figure 11. Workers' camp in Reyðarfjörður and the village in the distance (left) (Photo: Hjalti Jóhannesson)

A large proportion of the migrant workers was transported **directly to East Iceland from abroad** and also via the main airport close to Reykjavík. As a result of this, traffic in the local airport in the town Egilsstaðir increased significantly.

Long-term impacts on the local economy relate first and foremost to the aluminium plant, for which the building of the power plant was a necessary premise. Otherwise, the direct impact of Kárahnjúkar power plant on the economy of East Iceland during its period of operation is limited, apart from property taxes and the 13 employees of the plant.

Surveys²⁰ showed an increasing number of people who were **satisfied with their income** in the central area. It is of particular interest to note that the survey in 2007, which was carried out countrywide, indicated that a proportionally larger number of people in the central area were very satisfied or rather satisfied with their income than in the capital area. In the survey in 2008 the inhabitants were asked whether they felt the megaproject had improved their financial situation. About 50% of the respondents in the central area, either strongly agreed or rather agreed, compared to just below 20% in the northern area and 13% in the southern area. This is among the indications of how narrow the impact area really was.

Crowding-out effects as a result of the megaproject proved hard to estimate. Jobs in fish processing plants fell sharply during the construction period, more than had been predicted in the SIA. The

²⁰ Carried out 2004, 2007 and 2008.

aluminium plant, however, is unlikely to have been the main cause. The crowding-out effects appear to have been for the most part positive; i.e. companies which previously had been under pressure to maintain the level of employment, were now given the opportunity to economise and reduce staff. With a view to a **steep reduction in fish processing jobs**, which probably would have occurred to a large extent whether the aluminium plant was built or not, the **population of East Iceland probably would have fallen significantly** without the advent of the aluminium plant - even by a thousand persons or more. This must be kept in mind regarding the relatively modest population increase in the region during the period.

As for the labour market, a highly significant aspect of surveys among the residents was their increased satisfaction with **diverse job opportunities**. One of the Achilles' heels of the provinces has long been monotony of employment and lack of opportunities for young people who have obtained an education. According to the survey in 2007, satisfaction with job diversity was high in the central area of East Iceland, second only to the capital region. In the northern and southern impact areas, attitudes to this aspect resembled those expressed in other regions of Iceland. When the survey was repeated in 2008, it was found that satisfaction in this regard had to some extent diminished in the central area.

As was to be expected, **participation in the construction phase was highest by far in the central area**, where approximately 30% of respondents aged 18-65 were directly connected to the construction project in 2007, according to the survey. Next in line were the capital area with 11% and the northern area with 12%. With regard to the strong impact in the capital area, the development of the transport- and communications system should be kept in mind. Air communications with Reykjavík are excellent and heavily used. Furthermore, the diverse industries and services of the capital area, as well as the relative size of its economy, are bound to contribute to a proportionally significant extent to a construction enterprise of this type.

The proportion of women in the total workforce of the aluminium plant has been high, peaking at 32% in autumn 2007. In February 2008 this proportion was at approximately 28% and 26% in December 2009, a considerably higher ratio than in other aluminium plants in Iceland, 20% in Norðurál aluminium plant in west Iceland and 18% in Rio Tinto Alcan aluminium plant in the capital region. In 2008 Alcoa-Fjarðaál received recognition by the Equal Opportunities Council for its successful recruiting of women. Certain objectives were established with regard to the level of education of the plant's workforce in the social impact assessment (SIA). Those objectives were very satisfactorily achieved and probably the company's recruitment policy has been decisive in obtaining a result so close to what was specified in the social impact assessment. When 400 employees had been hired, about 17% were university educated, 19% had an upper secondary certificate, 20% a trade qualification and 42% had completed compulsory school.

Work shift schedules are among those aspects which the researchers believe need to be carefully considered when a large employer is located in a small population area. In such a setting the place of employment has a decisive influence on the social rhythm. Interviews with municipal and state church employees indicate that situations may arise where the 12 hour shift schedules, originally chosen by the

Alcoa-Fjarðaál staff, are ill-suited to the needs of a family. In such cases, supervision of employees' children after school or playschool hours may be impossible to arrange. The researchers recommended a revision of these work shift schedules and their impact.

The survey among inhabitants in autumn 2008 demonstrated the importance of Reyðarfjörður as an **employment centre attracting people from other parts of the region**. Thus, it might be said that this former traditional fishing village has now been transformed into the main employment magnet for East Iceland.

Housing and land use planning are the policy areas where the most obvious mistakes were made during the construction period; the most striking of which being the excessive building of residential housing. Two specialist reports presented the assessment that 70-80 thousand m² of residential housing needed to be added in Central East Iceland in the wake of the aluminium plant construction. When the municipalities allocated building permits, however, little regard was apparently paid to those forecasts. When the end result was achieved in 2008, residential housing had expanded by 135,000 m², or 60,000 m² in excess of research estimates. Population growth in the central area, however, was 1,687 during the period 2002-2008, or similar to what had been forecast in the two specialist reports.

House prices rose dramatically at the outset of the construction period, but this trend had mostly reversed itself when the plant began operating. This is shown, for example, by comparisons with other provincial areas. Too many houses were built in the central area during the construction period, which has negatively impacted house prices.

In October 2009, 218 apartments were vacant in the area, thereof 73% in multi-dwelling buildings. Therefore the question is being asked whether the building of apartment blocks has not been placed too high on the agenda. The proportion of detached houses is higher in many outlying regions than in the capital area. In 2002, single family dwellings constituted 12% of all residential housing in the capital Reykjavik, whereas at that time this proportion was 57% in Egilsstaðir, East Iceland. The proportion was totally different in housing built during the construction period. In Reyðarfjörður, East Iceland, detached houses constituted only 17% of all housing built from 2003 until and including 2008. The proportion of single family homes in this case, therefore, appears to be more in line with the capital area, rather than the proportion of single family housing characterising regions like Central East Iceland. The experience of this house-building programme demonstrates that municipal councils must ensure, not only that a suitable quantity of housing is constructed, but also that the type of houses built conforms to community practice in each location. According to respondents, there appears to have been a certain amount of competition between the municipalities Fljótsdalshérað and Fjarðabyggð with regard to building programmes and new inhabitants settling down in connection with the construction project²¹. The opportunity to design population centres in the area, almost from scratch, as it were, as was the case in Reyðarfjörður could have been utilised in a more felicitous manner.

²¹ Fjarðabyggð and Fljótsdalshérað (4,583 and 3,401 inhabitants respectively in Jan. 2011)



Figure 12. Apartment buildings in Egilsstaðir, February 2009 (Photo: Hjalti Jóhannesson)

There were cases of **over-investment and general lack of prudence and caution** in other areas than that of the building industry. Some contractors acted unscrupulously and invested excessively. When conditions became tougher due to lack of available work and, later, with the addition of a poor state of the economy and the concomitant devaluation of the Icelandic krona, some people were unable to live up to their obligations.

The new infrastructure created by the construction of an aluminium plant and power station in East Iceland has been of use to the local communities in different ways and to differing degrees. New roads in the region of the plants would be used by those travelling in that part of the highland, and improved road conditions between towns are of the utmost importance. New port installations at the aluminium plant, along with regular import and export from that area, are among the most significant new developments. The port is the second largest in the country, with regard to cargo volume (1.3 million tonnes annually), and many jobs have been created in connection with this transport operation. Considerable work has been underway to build up a powerful telecommunications system on the building sites themselves and in the immediate neighbourhood. Many respondents, both experts and members of the general public, have expressed the opinion that to reap the best and most positive benefits from the plants, further improvements to the roads in the region will have to be made. In this connection, the aspects most often mentioned are tunnels to shift traffic from bad mountain roads between the towns. Flights to and from Egilsstaðir airport increased significantly because of the huge

construction projects, and domestic traffic through the airport doubled between 2002 and 2006. There was also some international air traffic as well as chartered flights carrying foreign staff connected with these major construction enterprises. Air communications constitute one of the aspects which could have gone better when planning the construction operations. For example, the extension of the airport facilities in 2007 came rather too late to meet the increased flow of passengers. With regard to overland communications, one of the most important undertakings has been a road tunnel connecting Reyðarfjörður with the town Fáskrúðsfjörður enlarging the plant's labour shed to the south.



Figure 13. Road tunnel in Reyðarfjörður, a part of new infrastructure related to the megaproject (Photo: Hjalti Jóhannesson)

The **income of municipalities in the central area rose** considerably; thus the increase in municipal income tax during the period 2002-2006 was proportionally highest in the country in three municipalities in the central area. The large number of foreign staff who paid income tax to the municipalities was the main reason for this increase. The municipalities in the areas around the construction sites would have received much less income if the staff had been made up of more Icelanders as they would have paid taxes in their home communities. Between 2007 and 2008, when the construction rate began to slow, the total income of municipalities close to the Kárahnjúkar power station decreased. The income of Fjarðabyggð, where Alcoa-Fjarðaál is located, however, continued to grow with the changeover from construction phase to operations phase.

Anticipating an increase in population, the municipalities grossly overinvested in facilities. For example, we may mention the planning and construction of new residential areas together with the relevant infrastructure and the development of buildings to house sporting activities. It is obvious that there was a certain degree of **competition between municipalities to attract new residents** to their respective areas with the evident result that many new houses now stand empty together with underused infrastructure in the form of roads and drainage systems. From this, the conclusion may be drawn that more consultation between municipalities regarding planning would have been desirable. Also, in connection with this, the advantages and disadvantages of further amalgamating the municipalities of East Iceland might be deemed worthy of consideration.

Among both politicians and the general public there were **high expectations** and, as far as can be seen, **little was done to dampen these down**. In such conditions, there is always a certain danger of disappointment if all does not go according to plan. Among those who were disappointed with the impacts of the mega-project were people living other municipalities than the three where the impact was felt most strongly. Depopulation continued and jobs in traditional economic sectors were being lost. Those responsible for making decisions and planning the construction work must draw up as realistic a picture as possible of changes which could occur and keep expectations within the limits of moderation.



Figure 14. The local store closed. In the village Stöðvarfjörður 44 km south of Reyðarfjörður in November 2007 (Photo: Hjalti Jóhannesson)

It appears that the tourist services have connected themselves in a rather positive way to the construction enterprises, in spite of negative forecasts by many relating to the alleged incompatibility of heavy industry and tourism. The construction phase seems to have brought operators in tourist services considerable extra income, especially those providing accommodation and restaurant facilities.

There has been interest among the many who have been involved in these studies to continue the socio-economic research into the operation period to give good indications about long term impacts.

Main similarities and differences - socio-economic impacts

These two cases represent different resource exploitation and different life-span of the operation phase. It has been estimated that the hydropower project in East Iceland can last for some 100 years with only modest maintenance; however the contract to sell energy to the aluminium company is for a period of 40 years. The energy will continue to be used for the same or other purposes during the lifespan of the structures. If energy usage changes, this may influence the location and nature of future socio-economic impacts. On the other hand, it is anticipated that mineable reserves of bitumen in the Canadian tar sands will have been fully exploited by around 2050 (Söderbergh, 2006). Therefore it can be expected that future socioeconomic impacts for the Wood Buffalo region and similar communities will be quite different which has to be taken into account when planning the exploitation of finite resources.

Population growth

One of the major differences between the two projects is the rate of population growth. **In the Wood Buffalo region, demographic growth was 68% during the period 1996-2004 or 7% per year. This is much more than experienced in East Iceland where the population increase between 2002 and 2010 was only 1.2% for the whole study area but 14.3% in the central impact area, or around 1.7% a year.** During the construction period, however, there was a significant increase in population, or 20%, between the years 2002 and 2006, approximately 5% per year. The construction and operation periods in East Iceland seem to have been more clearly separated than in the Kearsarge case where construction and operation are taking place simultaneously; also because development will take place in three phases, each phase consisting of construction and subsequent operation. This could partly explain the different patterns of population growth in the two cases.

The modest growth of the Icelandic case study area, at least into the operation period, probably also relates to the fact that East Iceland had been in a decline as other economic activities needed less manpower, especially the fisheries sector. This trend continued while new jobs were being created in manufacturing and related services, resulting in less overall growth. The growth in the Wood Buffalo region was due to the intensive migration of workers specifically for working on the oil sands. These workers came both from other Canadian provinces and from abroad. With the commencement of operation, the number of workers has only increased and the pressure on the local community even more so, with operations workers increasingly likely to live in the community than the initial fly in-fly out construction workers. In the longer term, when infrastructure needs will have been met, the municipality of Wood Buffalo would prefer operations workers to live in the community and become

part of it “to the benefit of all” (RMWB, 2006:2). Yet, planning remains difficult with the uncertainty of project timing, because of oil price fluctuations and problems in mobilizing a sufficiently large workforce. In addition, it has been difficult to produce estimations of the population in Wood Buffalo, because of its dynamic nature (RMWB, 2006).

Services and infrastructure

Development of the housing sector was very **different** between the Wood Buffalo region and East Iceland. In the former case, housing **shortages** were reported while in the latter case there **was almost twice as much housing built as there was needed**. Housing and land use planning were the policy areas where the most obvious mistakes had been made during the construction period in East Iceland, the most striking of which being the excessive building of residential housing. Two specialist reports presented the assessment that 70-80 thousand m² of residential housing needed to be added in Central East Iceland in the wake of the aluminium plant construction. Little regard was apparently paid to those forecasts by the municipalities. When the end result was achieved in 2008, residential housing had expanded by 135,000 m², or 60,000 m² in excess of research estimates. In October 2009, 218 apartments were vacant in the area, thereof 73% in multi-dwelling buildings. Therefore the question is being asked whether the building of apartment blocks has not been placed too high on the agenda. During the construction period most of the temporary workers lived in work camps. In the Kearl Oil Sands Project, the inverse has been observed to date (RMWB, 2006), thus it is not possible to compare the cases on this issue. Workers were placed in temporary housing and there is a shortage of proper housing rather than a surplus. This also begs to question the realistic approach of bringing in such a large amount of workers into a town, if they cannot live there properly.

Challenges for service providers in private and public sectors proved **similar** in the Wood Buffalo region as in East Iceland. This became evident in surveys in East Iceland, especially near the peak of the construction in 2007, most notably in health services, and interviews with inhabitants of the region supported this. According to them, lack of planning was apparent as the service was not manned adequately. Availability of diverse private services in central East Iceland increased as the number of inhabitants rose and subsequently the market for services.

Demographic origins

In the Wood Buffalo region it was estimated that during the construction phase **some 95% or more of the workers would originate from outside the region, and most would live in an on-site camp** (SEIA, 2005). They would have some indirect effect, but most would not become part of the resident population. This was very **similar** to the experience in East Iceland where **between 80 and 85% of workers were foreign and of the Icelandic workers some 90% originated from other regions**. A large share of the foreign migrant workers was transported directly to East Iceland from abroad to live in on-site camps in the highland and near the aluminium plant.

In the Wood Buffalo region the project was **expected to have a limited negative effect on the local population** during the **operation phase**. Imperial Oil planned to have a camp-based operation and thus

most of the workers would live outside the region. The workers would be flown to the construction site at the beginning of their rotational shift and live in the camp until the end of their shift when they would return home. This approach was estimated to significantly reduce the project's negative effect on the local population. This was **similar** to the **construction phase** in East Iceland but quite **different** from the **operation phase**, where "permanent" jobs were primarily in aluminium production and related services. Most of the workers live within commuting distance in East Iceland and considerable migration took place to the two municipalities closest to the project.

Observed community stresses

In 2005 several impacts were observed on the local community in the Buffalo Wood region. These included developments characterized firstly by **increased pressures on the traditional land and culture of aboriginal peoples**, secondly by **increased traffic**, both within the region and between the region and the city of Edmonton and thirdly by a **rapidly growing northern resource town economy** characterized by the **community stresses**. These included reduced sense of community, geographic isolation, prosperity gap, prevalence of dual income couples and employees working long hours, often on a shift basis, higher level of alcohol and drug abuse, gambling and crime, infrastructure deficit and service deficit. The community stresses only **partly apply** to East Iceland and among these is the rotational shift work, which may prove difficult for some employees and their families. It appeared that long shifts (12 hours) were not well suited for the needs of families. During the **construction phase** increased traffic was also a concern as well as service deficit, such as in health services. **Infrastructure deficit is apparent** in the region and has been a problem long before the projects started. This applies especially to mountain roads, which sometimes become closed during winter and has general impacts such as isolation and difficult transport of goods and people and more specific problems related to the projects such as disturbances in the work-shift pattern and road closures affecting commuting to the plant.

Box 2. Community stresses

Community stresses include: reduced sense of community, geographic isolation, prosperity gap, prevalence of dual income couples, rotational shift work (long hours), higher level of alcohol and drug abuse, gambling and crime, infrastructure deficit and service deficit.

In the Wood Buffalo region, due to the planned camp-based operation, further expansion of the project was expected to have less effect on the community stresses. Somehow, the expansion was faster than expected, however, and community stresses seem to be beyond Wood Buffalo's capacity to manage (RMWB, 2006:44). The project has impacts on the aboriginal communities and the plan was to pursue measures to minimize negative effects on the traditional land and culture of aboriginal peoples. Environmental impacts are beyond the scope of this report, although pollution effects on First Nations' lands and water ways will have socio-economic impacts. Socio-economic impacts from reclamation are yet to become clear. Camp based operation proved successful to lessen the impact/stress on local people in East Iceland, since, the camps were **self-sufficient for most service functions**. According to interviews with local people in East Iceland, this arrangement proved successful and **no major incidents of conflicts** between local people and the workers in the camp close to Reyðarfjörður were reported . In

fact, countermeasures such as separation of workers' camps were taken by the initiative of the project owners and their contractors.

In the EIA report for the Kearsarge Oil Sands Project from 2005, several countermeasures were planned, such as minimizing demands on local service providers by using full-service workers' camps providing workers with a range of retail, recreation, health and other services. Another set of measures related to working with local people on issues concerning regional development, aboriginal people, transportation and other infrastructure development. According to interviews, more might have been done on some of these issues in East Iceland. Locals, both non-specialist individuals and experts, have stated in interviews that not enough had been done in using the opportunity that Kárahnjúkar-Alcoa brought with it to further develop the community and its infrastructure.

Expectations towards the mega projects seem to have been higher in East Iceland than in the case of Kearsarge Oil Sands. In the Icelandic case this type of project had been long awaited and there were high expectations among the local people and municipalities that it would bring with it positive regional development as the region had been in decline, especially towards the end of the 20th century. In Alberta, the Kearsarge Oil Sands is one of many such large scale projects.

Table 1. Overview of main similarities and differences - socio-economic impacts

	Kearsarge Oil Sands	East Iceland
Population growth and demographic changes	High during the construction/operation phase	High during the construction phase, lower during the operation phase
Housing sector	Shortage	Surplus
Challenges for service providers in private and public sectors	Unprepared but offer for services subsequently increases Private companies try to provide most of the services themselves	Unprepared but offer for services subsequently increases
Community stresses	All of them (see Box 2)	Many types during construction but in operation phase rotational shift work and isolation linked to infrastructure deficit for transport

3.2. Participation in the planning process

The research on Kearsarge Oil Sands focused on the planning process (the environmental impact assessment and the different possible alternatives) and participation in the process. Therefore, that case has more detailed data on those issues, although information on similar issues has been collected for East Iceland which can serve as a basis for some comparison between these two cases. The East Iceland research

focused on socio-economic impacts. This main difference between the two case studies has to be kept in mind.

Kearl Oil Sands

The Regulatory Process

There are **two levels of regulation** in Canada: **federal** and **provincial**. When an oil sands project entails landscape modifications and overlaps federal and provincial authority, both authorities carry out an environmental assessment. In order to make the process more effective, the federal government has signed agreements with each of the provinces and territories to carry out a **joint environmental assessment**. For more information on the main actors involved in the Kearl Oil Sands controversy, see Annex II.

Box 3. Canada-Alberta Agreement on Environmental Assessment Cooperation

The Canada-Alberta Agreement on Environmental Assessment Cooperation was enacted in 1999 and lastly updated in 2005. It stipulates that environmental assessment should be conducted respecting two acts, the Alberta's Environmental Protection and Enhancement Act (EPEA) and Canada's Canadian Environmental Assessment Act (CEAA).²²

²² *The Legal Background: the EPEA and CEAA*

The EPEA and the CEAA are the two most important acts governing the environmental assessment of oil sands in Alberta. Both acts were first established in 1992 with various amendments over the years. They also describe the regulation of environmental assessment, the different organs and how they interact with each other. The highlights of the EPEA are the description of the purposes of environmental assessment in section 40 which are: "(a) to support the goals of environmental protection and sustainable development, (b) to integrate environmental protection and economic decisions at the earliest stages of planning an activity, (c) to predict the environmental, social, economic and cultural consequences of a proposed activity and to assess plans to mitigate any adverse impacts resulting from the proposed activity, and (d) to provide for the involvement of the public, proponents, the Government and Government agencies in the review of proposed activities." (EPEA, web). The roles of environmental protection and sustainable development are defined in section 2: "(a) the protection of the environment is essential to the integrity of ecosystems and human health and to the well being of society" and "(c) the principle of sustainable development, which ensures that the use of resources and the environment today does not impair prospects for their use by future generations". (EPEA, web).

At the federal level, the CEAA has the same fundamental principles as the EPEA in Alberta, i.e. "to achieve sustainable development by conserving and enhancing environmental quality and by encouraging and promoting economic development that conserves and enhances environmental quality." (CEAA, 2003:Preamble). The main difference between the EPEA and the CEAA is that the provincial law goes into detail about what is acceptable regarding the level of the release of substances, contaminated sites, conservation and reclamation, potable water, hazardous substances and pesticides, and finally waste and recycling. Whereas the federal law limits itself to describing how environmental assessment should be done and which activities must submit to it. This shows a lot of autonomy at the provincial level in determining up to what point the environment should be preserved or conserved.

Although not all landscape-modifying activities require an environmental assessment, oil sands do require one and **the proponent of the project is charged to carry it out by producing an Environmental Impact Assessment (EIA)**. Participatory methods are part of the making of the EIA.

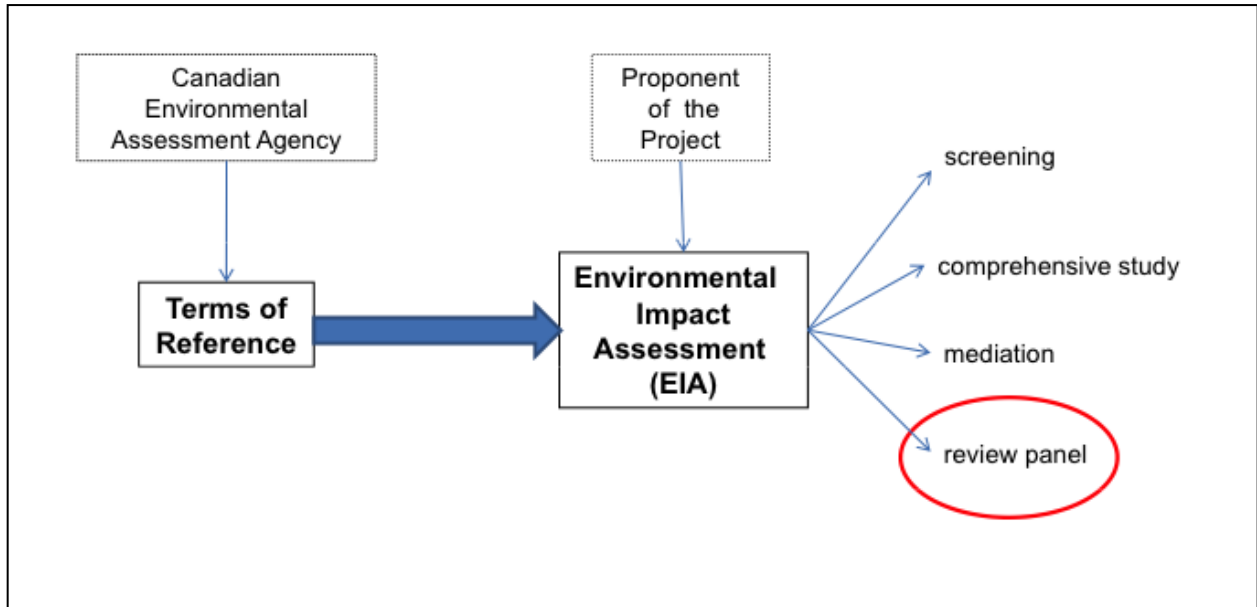


Figure 15. Representation of the environmental assessment process. The Canadian Environmental Assessment Agency sets the terms of reference, as a detailed contract explaining what the proponent should include in its environmental impact assessment (EIA). Out of this EIA, four possible processes can be followed: a screening, a comprehensive study, a mediation and a review panel. In the Kearl Oil Sands case, a review panel was chosen.

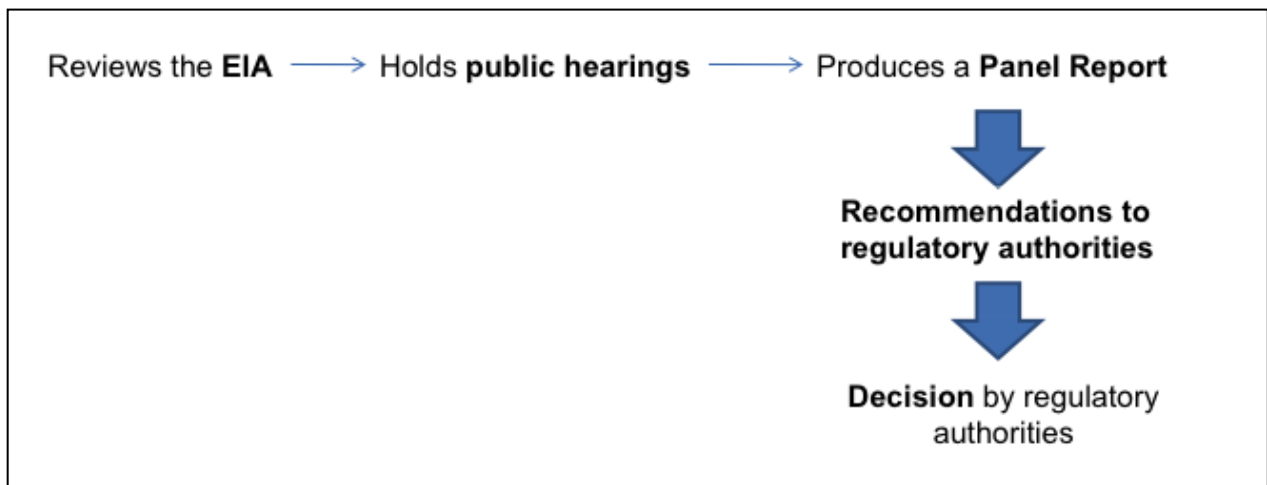


Figure 16. Roles & Process of the review panel. The review panel is composed of three independent experts and takes place after an EIA is carried out.

Once the EIA was completed by the proponent, the federal government selected a **review panel** to evaluate the EIA. Review Panels are usually chosen for larger projects entailing significant uncertainties (see Figure 15). A *Joint Panel* of **three independent experts** was formed. Their main task is to **review the EIA and hold public hearings**. During those hearings, everyone related to or affected by the project is

welcome to voice his or her opinion and rationale on different points of concerns (see Figure 16). The government also provides four grants to different groups for them to compile a report for the Panel.

After compiling all those opinions, the **Joint Panel formulates recommendations**, which are then sent to the provincial regulatory authorities. The different cabinets will then have the decisional power to approve or not on the projects. In the case of oil sands in Alberta, the former Energy Utility Board (EUB), (which split into the Energy Resources Conservation Board (ERCB) and the Alberta Utilities Commission (AUC) as of January 1, 2008) would usually be the authority handing out the permits. However, since the oil sands are located along the Athabasca River and the oil industry heavily uses its waters, the **Department of Fisheries and Oceans (DFO) often becomes the main authority for delivering permits.**

The environmental assessment regulatory process therefore clearly depends on the type of activity and the region where it is carried out. There is **no one standard environmental assessment process**. The one described above is the one that usually takes place for large oil sands mines in the Athabasca oil sands fields. It is also **highly participatory**, involving groups during the making of the EIA and during its review.

Participation after approval of the Project

In 2003, Imperial Oil, one of Canada's largest petroleum companies took over an old exploitation project, the Kearl Oil Sands (KOS) project that ExxonMobil had initiated in 1997 but not carried out. Like other mining projects, it filed for regulatory approval in 2005 and provided an Environmental Impact Assessment (EIA) to the Canadian Environmental Assessment Agency (the Agency). Due to the scope of the project, a Joint Panel was to assess and review the EIA and hold public hearings, which took place in November 2006 (see Figure 17 for the timeline of the Kearl Oil Sands controversy).

Finally, in February 2007 the Panel issued the recommendation for the regulatory authority, the Department of Fisheries and Oceans (DFO), to approve the KOS project. The environmental impacts were judged to be insignificant provided Imperial Oil implemented its mitigation measures (in *Pembina Institute for Appropriate Development v. Canada (Attorney General)* (2008 FC 302) T-535-07, [March 5, 2008]). This decision gave way to another kind of participation, one that was not built in within the process but that was supported by the Canadian legal system.

This is why, immediately after the DFO's approval based on the Joint Panel's report, the Pembina Institute for Appropriate Development, Prairie Acid Rain Coalition, Sierra Club of Canada and Toxics Watch Society of Alberta (the Coalition) filed a complaint claiming that the environmental assessment of the Kearl Project had been done unlawfully. The accusations concerned the **illegitimate approval of the Cumulative Effects Management Association (CEMA), endangered species and greenhouse gas emissions in Imperial Oil's EIA**. Justice Lamer-Tremblay settled the case on March 5, 2008. The **Canadian Environmental Assessment Act (CEAA)** was the main legal document on which the ruling was based. According to the Judge, the central tenets of this act are the **precautionary principle** and **adaptive management**. She weighed each party's arguments against these tenets and the two fundamental steps of the CEAA i.e.: environmental assessment & decision and follow-up. She concluded

that only the **lack of rationale for mitigating significant carbon dioxide emissions** in the Panel report was unlawful and asked them to **review** only this part of the report.

This marked a partial victory for the Coalition, which took an unexpected turn of event. The DFO pulled out Imperial Oil's permit following the ruling, thereby halting the KOS project's development. Imperial then sued them for taking away the license, claiming important damages as the result of delays. However, Mr. Justice de Montigny ruled against them on March 27, 2008, on the grounds that their claims for delays and damages were not precise enough to be justified. (*Imperial Oil Resources Venture Limited v. Minister of Fisheries and Oceans* (2008 FC 382) T-460-08. March 27, 2008.) Imperial appealed this decision but was turned down again on May 14, 2008 by Mr. Justice Campbell (*Imperial Oil Resources Venture Limited v. Minister of Fisheries and Oceans* (2008 FC 598) T-460-08. Date May 14, 2008).

In the end, on May 6, 2008, the Joint Panel produced an addendum to its report as required by the Judge. This addendum stated that the governments of Alberta and Canada would be the ones regulating carbon dioxide. No further actions were pursued from the Coalition and Imperial Oil was allowed to resume the Kearl Project on June 5, 2008.

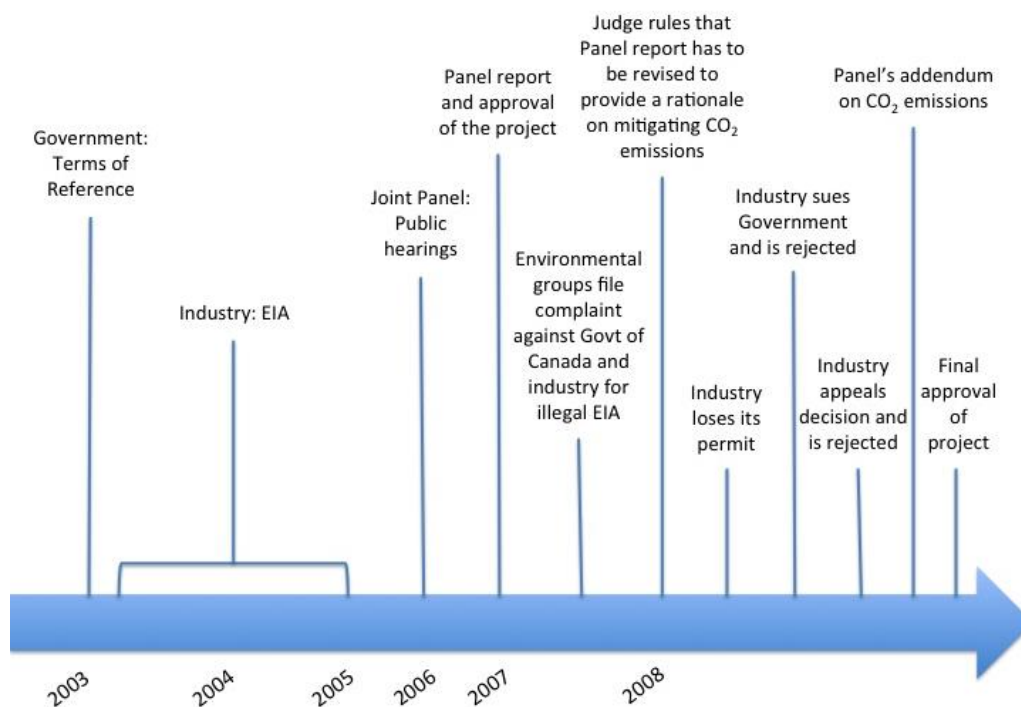


Figure 17. Timeline of the Kearl Oil Sands controversy

Figure 18 shows two peaks in media attention relating to the development of the Kearl Oil Sands Project²³: in 2008 and in 2011. Although a more detailed analysis could help to uncover the exact reasons for these peaks, a first look at the results suggest that the 2008 peak in awareness could likely

²³ Here media attention is a possible measure for awareness and is assessed by the number of articles found in a Google News archive (see Figure 18).

be linked to the Kearsy Oil Sands judicial review and the 2011 peak to the resistance in the US to the construction of the Keystone XL pipeline.²⁴

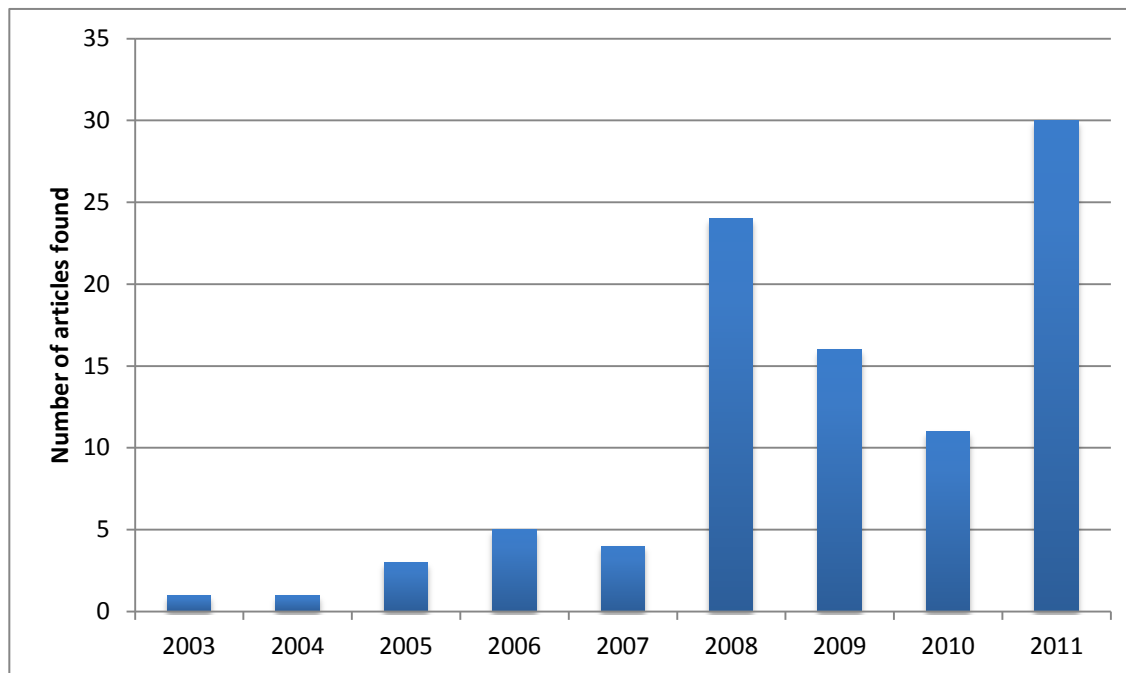


Figure 18. Increase in media attention for the Kearsy Oil Sands Project. These results were compiled by carrying out a Google News Canada archive search for “Kearsy oil sands” and “environment”

The Kearsy Oil Sands judicial review is a first in the history of the Albertan oil sands exploitation. Although it only **momentarily halted** the Kearsy Oil Sands developments, it **brought national attention** to the environmental impacts created by the oil sands industry and shook up the power relations between government, industry and environmentalist groups. The events and dynamics uncovered through the Kearsy Oil Sands trial allow studying how different groups talk about environmental risks and uncertainties.

Alcoa aluminium smelter and Kárahnjúkar hydro power project

The Kárahnjúkar-Alcoa project was probably the **most heavily protested construction project** in Iceland’s history and the issues raised by its opponents have not been settled yet²⁵. Therefore it is only to be expected that more information on that particular issue will be made available in due course. Iceland has **two government levels**, the **state** and the **municipalities**. The law making and regulatory framework lies with the state level. However, at the time of this project **municipalities** had the planning authority within their boundaries and issued **building permits**. This applied also to such large projects as power plants, transmission lines and large manufacturing units which of course tend to impact much

²⁴ See this recent report in Yale Environment 360: <http://e360.yale.edu/content/feature.msp?id=2422>

²⁵ The present minister for the environment (September 2011) declared in a speech in parliament that she will start an inquiry into the planning and decision making process of the Kárahnjúkar hydro power plant.

larger areas than the respective municipalities which are sometimes very small geographically with a low population number²⁶. If a large project happens to be located within the boundaries of such a municipality, property taxes will be paid solely to that particular municipality, as is the case with the Kárahnjúkar power plant which is located within the boundaries of the municipality Fljótsdalshreppur which had merely 80 inhabitants Jan. 1 2011. Planning for larger areas than single municipalities can, however, be carried out according to the planning act in the form of cooperation between the respective municipalities (Planning and Building Act no. 73/1997). A new Planning Act (No. 123/2010) includes important changes, notably a new planning level for the whole country “landsskipulag” or Iceland's National Spatial Plan which the Minister for the Environment shall put forward as a parliamentary resolution. This plan will consist of policies on transportation, regional development, nature conservation, energy harnessing and other fields which concern land use planning. Furthermore, this plan shall include the government's policy on sustainable development. **The planning process of the projects was, however, carried out according to the Environmental Impact Assessment Act (No. 106/2000).**

The planning process of Kárahnjúkar hydro station hydropower project

The Kárahnjúkar hydro station project involved harnessing, in a single hydropower plant, two glacial rivers which originate in Vatnajökull glacier and water from several rivers in the eastern part of the highland. This represents 7% of Iceland's total watershed. The impact area includes the highlands close to the glacier as well as land along the rivers being harnessed and the eastern coastline (Landsvirkjun, 2001). The highlands in the project area resemble, to a large extent, other arctic regions having similar vegetation with limited productivity, large rivers and a limited variety of fauna. On the other hand, Iceland is unique for its geothermal activity and young bedrock. Therefore the soil is vulnerable to erosion due to volcanic ash and wind-blown material.

Prior to the Kárahnjúkar project and its EIA process there had been plans by Landsvirkjun and the Icelandic authorities to harness the rivers in the region on a smaller scale, however. These plans had also been protested, primarily by nature conservation bodies and individuals. In year 2000 it became clear that Norsk Hydro ASA the company the Icelandic government was negotiating with wanted to build a larger aluminium plant than originally planned. Consequently the plans were changed so that Kárahnjúkar power plant was to be designed to serve the needs of a larger aluminium plant. This changed plan was discussed in the Icelandic parliament in the spring of 2000²⁷.

²⁶ Five municipalities out of 77 had less than 100 inhabitants Jan. 1 2011.

²⁷ <http://www.althingi.is/altext/125/04/l03154604.shtml>

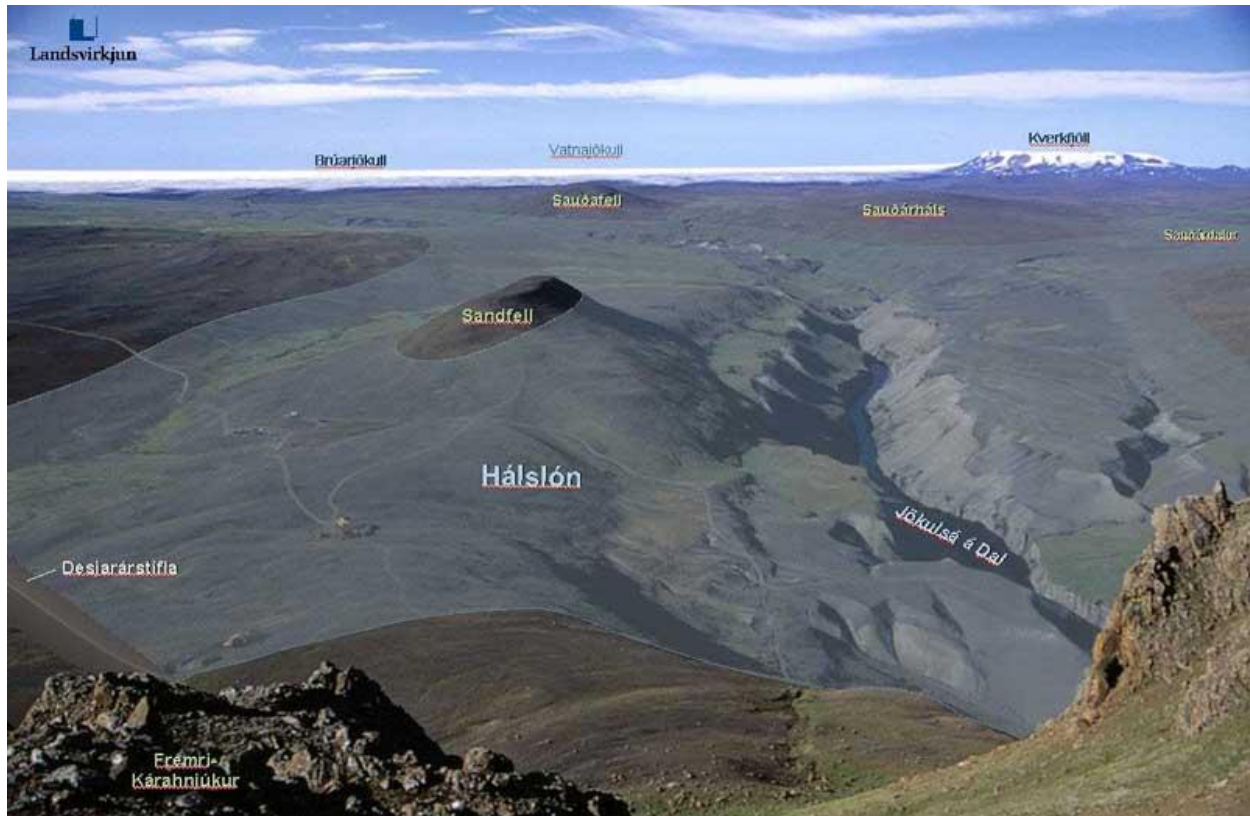


Figure 19. The shaded area shows the land covered by the Hálslón reservoir (57 km²), a birds-eye view towards the Vatnajökull glacier in SW (Source: www.karahnjukur.is)

The Kárahnjúkar hydropower project went through the process of environmental impact assessment (EIA) which was finalized 4 May 2001 and made public. The main conclusions of the EIA were as follows (text compiled and shortened by authors):

The area disrupted by the Kárahnjúkar hydro station project, particularly through dams, reservoirs and roads, is unique in many respects, and certain parts of it are considered to have high conservation value.

The Kárahnjúkar hydro station plant would impinge upon the wilderness north of Vatnajökull, and “untouched wilderness” in Iceland has been reduced due to various man-made constructions.

The Kárahnjúkar hydropower project would leave a lasting impression on its impact area. **Changes would occur in the natural terrain and land use in areas where vegetation and fauna are sensitive.**

These are the main aspects of natural environment which would change or be lost with the establishment of the hydropower station:

- Structures reduce by 925 km² undisturbed open spaces in the highlands²⁸.
- The formation of Hálslón reservoir covers an area of approximately 57 km².

²⁸ The highlands, sometimes referred to as land above 400 m above sea level is around ¼ of Icelandic surface or around 78,000 km²

- Valuable habitats of vegetation and small animals will be lost under Háslón reservoir.
- About 32 km² of vegetation is submerged by Háslón and additional 8 km² would disappear under other structures and reservoirs.
- Considerable changes in the flow of two large glacial rivers. Volume increases in the third river where water is directed to (Lagarfljót) but average flow in the river Jökulsá á Dal decreases significantly.
- The appearance of the Hafrahvammagljúfur canyon would be modified considerably, with almost no water flow below the dam.

Other **negative** changes concern **reindeer grazing** and their **migration routes**, **dust** from glacial sediments on the shores of reservoirs, **submerged geological features**, **darker colour of the river** to which water is being diverted (Lagarfljót) due to glacial sediments, **changes in groundwater levels** and **changes in coastline** (erosion) due to less sediments.

Positive impacts were in particular connected to **the sale of energy** to large-scale industry, increased **export, jobs and economic activity** in East Iceland and in Iceland in general²⁹.



Figure 20. Work beginning on the Kárahnjúkar dam (198 m high) in 2004 (Source: www.karahnjukar.is)

When the **EIA** had been made **public** 4 May 2001 it was widely **advertised** according to law and interested parties given **opportunity to make objections** to the plan. During the time the EIA was open for objections, or until 15 June 2001. **362 objections** were received by the Planning Agency³⁰. Furthermore the Planning Agency asked for appraisal from the respective municipalities, diverse

²⁹ www.karahnjukar.is

³⁰ Thereof 47 objections emanated from abroad.

institutes and specialists on various issues (Skipulagsstofnun, 2001). These objections and appraisals were **systematically analysed in the ruling of the National Planning Agency**.

Subsequently, 1 August 2001 The Icelandic National Planning Agency **ruled against** the project on the grounds of considerable environmental impact along with insufficient information on individual factors of the construction and its environmental effects (Skipulagsstofnun, 2001). The institute claimed that these negative impacts could not be justified by possible positive effects. This ruling of around 280 pages was then **appealed by the proponent**, the national power company, Landsvirkjun, to the Minister for the Environment³¹.

On 20 December 2001 the **Minister for the Environment**, however, **turned around** the ruling of the National Planning agency from August 2001 and **approved** the project with a list of **twenty conditions**, demanding a number of changes to the design of the power plant in order to reduce its environmental impact. This ruling reduced the energy producing capacity and added to the cost of the project.

The Minister for the Environment had engaged Icelandic and foreign scientists and consultants to treat the environmental impacts of Kárahnjúkar hydro-power station. This was concluded in a ruling of around 150 pages³².

The project was **heavily protested** on the grounds of nature conservation by both Icelandic and foreign associations and activists. This was for the first time in Iceland that a project received so much attention in this regard. Protestors' camps were set up in the eastern highlands during the summer while construction was taking place and attempts made to disturb the project. A number of public figures were prominent in this protest and one of them, Ómar Ragnarsson a well known media person was very active in this regard and for example organized a demonstration of some 10,000 in Reykjavík 26 September 2006 where he demanded that the project should be abolished; the land should not be flooded and the dam should be allowed to stand as a memorial of the project and the struggle against it. The same person also wrote a book on the project and arguments both for and against it³³. The present Minister for the Environment (2009) has assigned Ómar Ragnarsson's birthday, 15 September, as *The Day of Icelandic Nature*. Another person, Andri Snær Magnason, wrote a book in 2006 where the project and other similar projects were criticized "Dreamland – A Self Help Manual for a Frightened Nation"³⁴ and a film based on the book was subsequently released. A number of nature conservation organizations such as Icelandic Nature Conservation Association³⁵ and Icelandic Environment Association³⁶ were actively opposing the project. Landvernd, for example, had specialists peer review

³¹ The Planning Act was changed in 2005 so that now the Planning Agency declares its opinion on the scope of environmental impacts instead of ruling on the project in question.

³² www.karahnjukar.is

³³ http://is.wikipedia.org/wiki/%C3%93mar_Ragnarsson

³⁴ <http://www.andrimagnason.com/books/dreamland/>

³⁵ Náttúruverndarsamtök Íslands: <http://www.natturuverndarsamtok.is/> <http://www.inca.is/default.asp>

³⁶ Landvernd: <http://landvernd.is/flokkar.asp?flokkur=1003>

the EIA documents for the Kárahnjúkar project and held five open meetings in 2001 to discuss the proposed project and its environmental impacts. Subsequently the association decided to oppose the project as it was described in the EIA report³⁷. To a large degree its conclusion on the EIA was the same as that of the Icelandic National Planning Agency's when it ruled against the project in August 2001. Foreign nature conservation associations, such as the International Rivers Network also got involved with the opposition of the project as it considered the area to have a high conservation value³⁸.

News coverage for the Kárahnjúkar project changed during the period 2003 – 2007 (Figure 21 and Figure 22). In March 2003 when the contracts were signed and work was about to commence, the media attention in the newspapers seems to have peaked. Then there were fewer news items during 2004 and 2005 but increase in 2006 and 2007.

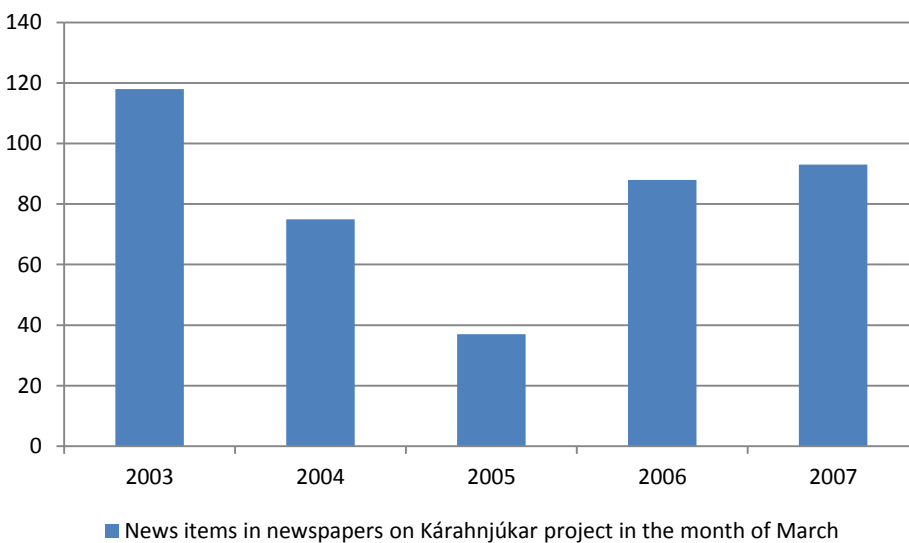


Figure 21. News items in newspapers on Kárahnjúkar project in the month of March 2003-2007 (Source: Arnarsson, 2008)

During the middle of the construction phase least positive coverage was observed and this is also the period when most opposition against the project was observed in general.

³⁷ <http://landvernd.is/page3.asp?ID=1153>

³⁸ <http://www.internationalrivers.org/files/030530.karahnjukar.pdf>

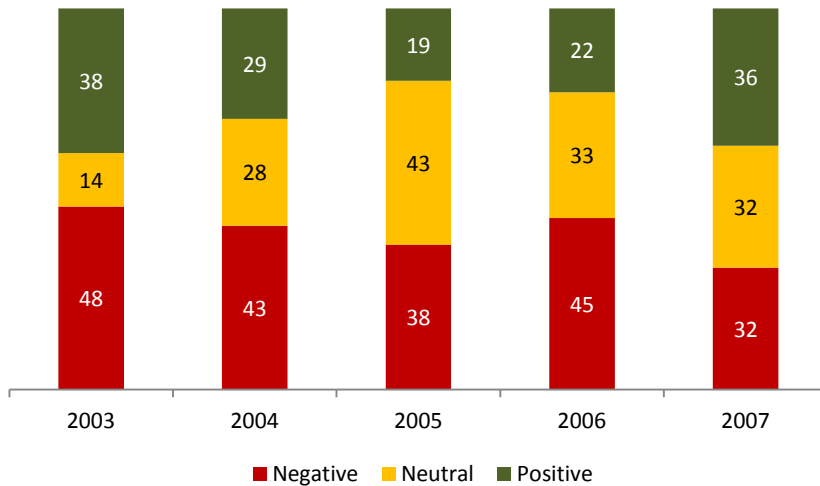


Figure 22. Analysis of attitudes towards Kárahnjúkar project in Icelandic newspapers in the month of March during the period 2003 – 2007 (Source: Arnarsson, 2008)

Many have wanted to make use of the eastern highland primarily for tourism instead of energy harnessing. During the planning process of Kárahnjúkar hydro station, there were simultaneous plans to establish a national park in the Vatnajökull glacier area (see map). The area has been regarded by many as quite unique, as in year 2000 the eastern part of the Icelandic highland was considered the most extensive wilderness area in Europe (Þóra Ellen Þórhallsdóttir, 2010). Kárahnjúkar’s impact area cut a large wedge into the area.

The plans for the national park materialized as the Vatnajökull National Park was formally established in June 2008. It was actually a merger of two existing national parks along with an enlargement of the area including the Vatnajökull glacier itself. Kárahnjúkar hydro station is located just east of the boundaries of the park. Boundaries of the park towards Kárahnjúkar hydro station are partly access roads, reservoirs etc.

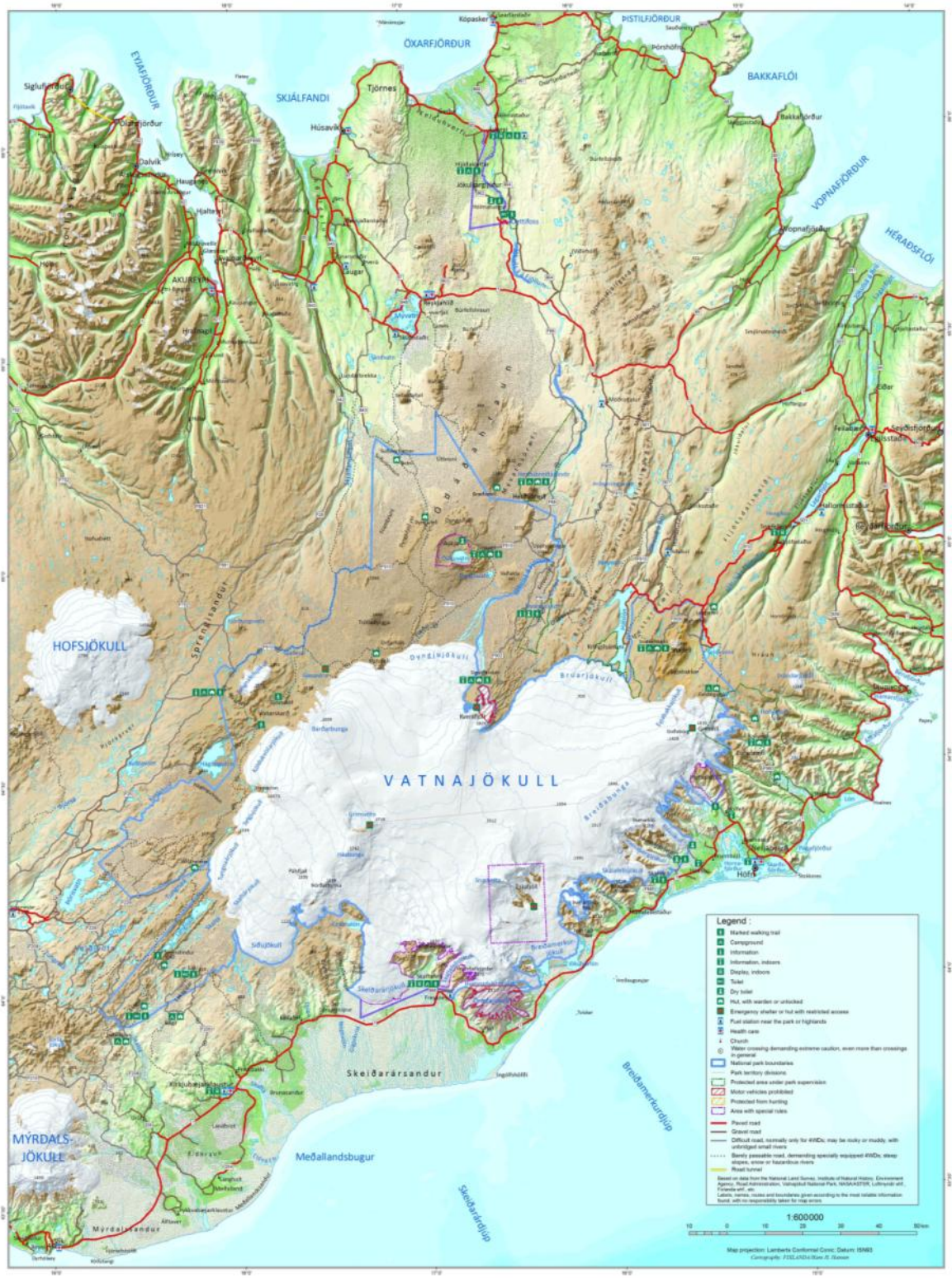


Figure 23. Vatnajökull National Park bounded by blue solid lines (Source: www.vatnajokulsthjodgardur.is)

Many people feel that Icelanders cannot harness all of Iceland's energy sources and at the same time maintain the prime attraction of the country intact and pristine in the form of untouched and active nature, i.e. "both eat the cookie and keep it". According to surveys carried out on behalf of the Icelandic Tourist Board, a majority of **foreign travellers** visit Iceland because of its **natural landscape** and related issues such as, cleanliness, quietness and the highland interior (see. e.g. Anna Dóra Sæþórsdóttir, 1998

Others, such as Landsvirkjun, state that we should not consider national parks and power stations as two opposites. These **could benefit from each other** e.g. as new roads and various infrastructures will be built by the power companies along with power stations and transmission lines and will be useful for tourism development in the respective area. A representative of Landsvirkjun said in an interview in year 2000: "I ask whether a power station north of Vatnajökull glacier might be the sole precondition for establishing the Vatnajökull National Park as a substantial project. A national park which is able to receive the tourists we wish for" (Morgunblaðið, 2000, 3 November). The thought behind this is that the power company might partly fund the establishment of the national park by sharing the construction and operation of a power station (especially infrastructure) and the establishment and operation of a national park. According to the same source it is claimed that to make progress regarding environmental issues it does not make sense only to resist. Progress would only be gained through discussion, consensus and cooperation and one issue does not necessarily rule out other issues. An article in National Geographic³⁹ in March 2008 sheds light on the power struggle between conservationists and proponents of the projects – and also emphasises the fact that the international community had a genuine interest in the project.

These questions were dealt with in the EIA process on Kárahnjúkar hydro station. In a **special report on tourism and transportation** it was pointed out that prior to the construction of Kárahnjúkar hydro station there was little tourism in the area (and little knowledge about it) but as the plans to harness the energy began to take shape tourism increased. People actually wanted to see the area that was due to be drowned by Kárahnjúkar hydro station's reservoirs. New roads built for the preparation of the power station made these trips into this part of the highland easier than they had been previously (Landmótun, 2001). According to the same special report, the area appeared at the time able to fulfil all the criteria of Icelandic laws concerning establishment of national parks despite the power plant.

Friends of Vatnajökull was established in 2009. It is a non profit fund-raising association for Vatnajökull National Park. "The role of the association is to raise funds to support research, as well as promotional and educational activities, to ensure that as many people as possible can enjoy the natural and historical phenomena the National Park has to offer"⁴⁰. Alcoa Fjarðaál is the main donor and had in June 2011 already donated over 1.7 billion USD over a three year period⁴¹.

³⁹ <http://ngm.nationalgeographic.com/2008/03/iceland/del-giudice-text>

⁴⁰ <http://www.friendsofvatnajokull.is/>

⁴¹ <http://www.vinirvatnajokuls.is/um-vini-vatnajokuls/frettir-og-atburdir/nr/99>

The aftermath of the Kárahnjúkar project is in many ways interesting and it is to be expected that interesting information will unfold in the years to come. The present Minister for the Environment announced in the parliament Alþingi 12 September 2011 that an **enquiry into the decision making process of the Kárahnjúkar project would be initiated**⁴² The minister said in parliament when this was announced that “the whole decision making process around Kárahnjúkar hydro plant is the most serious manifestation of the aggression of heavy industry policy in Iceland” (ibid). In March 2010 the minister also initiated an enquiry into how the 20 conditions set out in the EIA ruling of the Minister for the Environment (2001) had been fulfilled by Landsvirkjun since the plant began operation⁴³. In general there seems to be **more scepticism and awareness towards various projects than there was prior to the projects in East Iceland and thus more empowerment may be noticed**. This seems to concern a broad range of individuals; however, one has to keep in mind that Icelandic society has changed much during the period in question. In the autumn of 2008 the credit crisis dealt Iceland a serious blow; foreign currency doubled in value and the bank system collapsed. In the wake of these events there is more awareness and criticism towards institutions, politicians, large companies, monumental decisions and so on.

The planning process of Alcoa Fjarðaál aluminium project

A memorandum of understanding dated 19 July 2002 was signed between the Government of Iceland, Landsvirkjun and Alcoa Inc. on evaluation and potential implementation of an aluminium plant in East Iceland. An EIA had, however, already been carried out for a similar plant that Norsk Hydro had planned to build. Making use of the same EIA as the Norsk Hydro project was however protested by a former MP and a Minister for Industry and Energy⁴⁴. The high court of Iceland ruled in 2005 that a **new EIA had to be carried out for the Alcoa smelter** which used a different technology and scale of operation than the previously planned project (Morgunblaðið 2005, 10 June). The site and harbour facilities for the Plant at Mjóeyri in Reyðarfjörður were to be provided by the Government and the municipality of Fjarðabyggð. The Government and the municipality were also to assume responsibility for fulfilling other necessary infrastructure requirements⁴⁵. Building of the project commenced in 2004 and was finished in 2008. As said earlier, a new EIA process was carried out, but the project had already started when the ruling was passed by the High Court. A renewed EIA process was finished in 2006. **Similarly to Kárahnjúkar, the Alcoa plant became a target for protesters, as these two projects were generally considered to be more or less one and the same.**

To understand the projects in East Iceland and the high hopes of locals and politicians it has to be kept in mind that the projects had been long awaited. For nearly three decades there had been discussion or plans on constructing large industrial projects in East Iceland by harnessing the glacial rivers in the region. This can be considered **an effort in regional economic development and the creation of local**

⁴² <http://www.ruv.is/frett/taknmynd-yfirgangs-sagdi-radherra>

⁴³ <http://www.umhverfisraduneyti.is/frettir/nr/1619>

⁴⁴ <http://www.theage.com.au/news/world/heltersmelter-development-plans-galvanise-icelanders/2007/02/04/1170523960819.html>

⁴⁵ www.karahnjukar.is

jobs. The site of a possible manufacturing firm was during this entire period designated by the fjord Reyðarfjörður since the location has for a long time been considered to have specific advantages in the region (Staðavalsnefnd um orkufrekan iðnað, 1983).



Figure 24. A megaproject finally materializing in East Iceland. The contracts for the projects signed by (from left to right) members of the municipality, Alcoa Inc, the parliament and Landsvirkjun, 15 March 2003. (Photo: Atli Rúnar Halldórsson)

Below are the main stepping stones towards establishing a manufacturing plant in the region⁴⁶:

- 1975-1976 Norwegian company Norsk Hydro examined possibilities of building an aluminium plant. The power was to come from the Fljótsdalur hydropower plant.
- 1980-1985 Australian company Rio Tinto Zink had plans about building a silicon metal plant. The power was again to come from the Fljótsdalur hydropower plant. This project was well on its way before it was abandoned.
- 1989-1990 Atlantak, owned by Hoogovens, Alumax and Gränges, was searching for a site for an aluminium plant. The final choice was Keilisnes in the Southwest peninsula but the power was still to come from Fljótsdalur hydropower plant. The National Power Company (Landsvirkjun) had already started construction when the project was suspended in 1991.
- 1998 Discussions were taken up again with Norsk Hydro about an aluminium plant and a hydropower plant in East Iceland. A memorandum of understanding was signed in 1999, for a 120,000 tonne smelter and a power plant in Fljótsdalur with a reservoir at Eyjabakkar. This was known as the Noral Project.
- 2000 Norsk Hydro came to the conclusion that the smelter needed to be bigger in order to be profitable. In May 2000 a new memorandum of understanding was signed for an

⁴⁶ www.karahnjukur.is

- aluminium plant of 240,000 tonnes annually with a second stage of 120,000 tonnes. A company jointly owned by Norsk Hydro and Icelandic investors was to develop the plans, but Landsvirkjun would supply power by building Kárahnjúkar hydropower station.
- March '02 Norsk Hydro announced it could not meet deadlines set in the decision process but claimed an interest in the project at a later stage. The Icelandic government, however, immediately established a commission to look into interest of other companies in the project and shortly afterwards talks started with Alcoa.
- April 19 '02 A joint action plan was signed with Alcoa to explore the possibility of constructing an aluminium plant in East Iceland. Alcoa would own and operate a 320,000 tonne plant which would receive power from a 500+ MW hydropower station in East Iceland, constructed and operated by Landsvirkjun.
- July 19 '02 A memorandum of understanding was signed between the Government of Iceland, Landsvirkjun and Alcoa on cooperation on a 295,000 tonne plant in East Iceland. Landsvirkjun should begin development of a 630-megawatt hydrostation in East Iceland and Alcoa should complete environmental and engineering studies of a smelter in Reyðarfjörður. The memorandum also encompassed a harbour facility by the smelter as well as related infrastructure improvements in East Iceland.
- March 15 '03 The Government of Iceland, Landsvirkjun and Alcoa signed an agreement to commence the project.

This lengthy process had its impact in the region of East Iceland as the inhabitants had in fact been waiting for the construction of some manufacturing facility, while the population in the area went into a relatively steady decline.

The Kárahnjúkar project began delivering power to the aluminium plant in 2007 and was formally finished in November 2008. The aluminium plant reached full capacity in the spring of 2008.

Alcoa Fjarðaál and Landsvirkjun started a *Sustainability Initiative* in 2004 where they intend to monitor the projects' various impacts on nature and communities⁴⁷. The companies have involved many in the project such as locals, specialists and organizations. If this initiative continues and if it succeeds in attracting interest groups it might increase empowerment among those involved.

Main similarities and differences – participation in the planning process

The planning process has several purposes in both our cases: it allows for preparation to deal with potential environmental risks and socio-economic problems, it sets the responsibilities of different actors for dealing with these issues and it provides insurance that the investments will yield a return. The two projects under study bear many similarities in their planning and public reception. In order to compare the planning process of the two cases in, we shall use the concepts of planned participation

⁴⁷ <http://en.sjalfbaerni.is/>

and unplanned participation. The first refers to how different stakeholders interact during the official planning process, whereas the second refers to the interactions beyond the official planning process.

Planned participation

Participation is part of the normal planning process, as described in our two cases. During the planning process similar tools are used in both cases, such as public hearings, advertisements about the project in question during a certain period and opportunity is given to make objections. In Canada, the government also provides four grants to support independent research on environmental and socio-economical impacts. Both the Canadian and Icelandic cases present a **similar case of regulation** where the government sets the terms of reference for the EIA, which is carried out by the proponent of the project. This EIA is then open for public reviewing under different conditions in the two cases, but in each instance maintaining avenues for public participation from all interested actors who are invited to participate and voice their opinions. Finally, a government agency takes the final decision on whether the project is approved.

One **difference** in the planned participation process is that in Iceland, the Icelandic National Planning Agency did not grant a permit in the first place; the permit was only awarded later by the Minister of the Environment on certain conditions. In the Canadian case, the normal regulatory process did not lead to criticism relating to the Agency's (the DFO) granting of the permit until after another judicial review had taken place to examine the possibility of an unlawful EIA. Subsequently, the judge issued conditions upon whose completion, the permit would be granted anew. However, the Planning Act was changed in 2005 in such a way that the Planning Agency in Iceland now declares its opinion on the scope of environmental impacts instead of ruling on the project in question.

Unplanned participation

Origins

Unplanned participation reflects the limits of the planned participation process. Both in Iceland and in Canada, there seems to be a general delay in official scrutiny of the planning and decision-making process. It would appear as if the push for development is stronger than environmental and socio-economic concerns. A **lack of guidelines on the application of the precautionary principle** could be the reason for its misuse or lack of use. Another reason might be a general underestimation of impacts by all parties involved because of a lack of experience with this type of project. Indeed, different interpretations of the precautionary principle by different groups, especially in the Kearsley case, show that civil society interprets the principle as a means to take no action until such action is proven safe, whereas the government and industry construe it as a means to use all available new technologies to mitigate risks that might occur (Robaey, 2008). This also seems to apply to Iceland where the minister allowed the project while opponents in civil society wanted to halt it.

In both cases, concerns about the local, environmental and socio-economic issues reach the broader public stage when they involve a new government apparatus, such as a higher level of government or the judicial system. For instance, in the Kearsley project, it was the participation after approval, i.e. during

the judicial review, that attracted public attention; otherwise, before approval of the project, participation was just part of the normal EIA process. In Iceland, emerging environmental concerns (raised by MPs) are being addressed by government-appointed experts as part of a larger inquiry into the whole decision-making process. In both cases, it seems that **events unusual to the planning process** (the judicial review, the questioning of MPs) **contributed to extending concerns to a broader scale**. Moreover, environmental and socio-economic concerns seem to increase in importance and urgency when actual impacts become visible to the public – often the public has been aware of potential impacts all along, but until they became visible they were still too abstract. This also means that for the impacts to become visible, the project has to start, which is somehow an inherent contradiction in the planning process. In Iceland, awareness and concerns regarding environmental impact seem to have heightened among the public while the project was materializing but this may also relate to general changes in society resulting from the financial crisis and its aftermath. This may, furthermore, link to increased interest by the media, both domestically and internationally. In Canada, particular events like the landing of ducks in toxic tailing ponds⁴⁸ have contributed to publicizing the issue beyond the provincial level.

Public awareness & involvement - non-institutionalized participation

Both in Iceland and Canada, **public involvement increased over time**. Interest from outside the region was also very noticeable in both Canada and Iceland as, for example, environmental groups were very active in starting and continuing the public debate. Involvement of foreigners was apparent in Iceland seen e.g. by participation in opposition such as activists' camps near the project sites and protests on the project sites. Interest of international media may relate to this type of involvement. The Canadian case also welcomed international campaigns from groups such as Greenpeace and international media attention.

In both cases, as **global arguments enter the discussion**, the debate seems to become broader with global impacts and potential benefits becoming valid arguments to dismiss or support the project. For instance, the Canadian oil sands are among the sources of energy most detrimental to climate. In Iceland, one of the largest areas in Europe still almost untouched by human activity was at stake.

Activism

In Iceland, **awareness peaked when the project was more or less finished**, probably as a result of visible impacts. This included camps near the project sites, on-site protests, demonstrations in Reykjavík and more. Important public figures became involved, films were made, books were written, and international NGOs, such as International Rivers Network, became involved. In the Kearl case, the **awareness peak keeps on reaching new heights**, also because it is embedded as part of a broader socio-technical system that is made up of all oil sands projects in Alberta. While the construction of the Kearl Oil Sands Project enters its last phase and the oil field is expected to be operative by the end of 2012,⁴⁹ opposition to the Kearl Oil Sands Project and other oil sands fields in Alberta is becoming ever stronger.

⁴⁸ <http://www.cbc.ca/news/canada/edmonton/story/2010/10/27/edmonton-suncor-tailings-ducks.html>

⁴⁹ <http://uk.reuters.com/article/2011/04/28/imperialoil-idUKN2729535820110428>

While in 2008, protests against the tar sands were still marginal, they have now internationalized through several activist groups and the creation of the international Stop the Tar Sands Day.⁵⁰ This internationalization can be linked to several events in the geo-political set up of oil production and consumption. The construction of the Keystone XL pipeline, created to bring Albertan oil from oil sands to the Gulf of Mexico, has triggered an increased American awareness to the Albertan issue.⁵¹ Also, on the other side of the ocean, the EU Fuel Quality Directive would ban the import of oil from oil sands and has raised awareness and involved environmental NGOs in the EU.⁵² Last but not least, domestic awareness has starkly risen with activism intensifying on Parliament Hill in Ottawa.⁵³ Similarly to the Icelandic case, books were written and personalities such as filmmaker James Cameron, and international NGOs such as Green Peace became involved.

In **both cases**, activism arises as a social phenomenon not only against the one project but also in general against projects, whose scale makes environmental disturbance so severe. It underlines the classical conflict between environmental health and economic health. Such contradictions could, nevertheless, be avoided with a stronger planning process.

Media attention

In Iceland there was increased media interest as well as internationalization of media interest as seen e.g. by articles in National Geographic. Furthermore, filmmakers, writers and other artists took part in the campaign against the project. A prominent person in Icelandic television left his job and fought against the project. His birthday 15 September has been dedicated as the Day of Icelandic Nature.

Figure 18 suggests that **media attention reacts to events** concerning the Kearsy Oil Sands Project. However, media also possess a **framing effect** to the problem and therefore participate in building awareness by creating an environmental risk claim (cf. Hannigan, 2006). Indeed, a case study of environmental risk claims in a photo essay of the oil sands published in National Geographic in 2009 concludes that these images communicate how humans are destroying pristine nature, underlining the “tension between nature-as-resource and nature-as-sublime” (Remillard, 2011, p.141). However, Remillard also notes how these images are actually removed from “everyday life” and therefore expresses doubt on the extent of their impact. Such observations also apply to the Icelandic case. Nevertheless, while media seem to report on important events and depict environmental harm;⁵⁴ public awareness and involvement seems to increase through different channels (official participation in

⁵⁰ International Stop the Tar Sands Day: <http://www.sierraclub.ca/en/blog/derek-leahy/international-stop-tar-sands-day-2011-here-we-go-again>

⁵¹ Protests in Washington (August 2011) against the Keystone XL pipeline: <http://www.guardian.co.uk/environment/2011/aug/19/protest-white-house-tar-sands>

⁵² Tensions around the oil sands ban in the EU: <http://www.guardian.co.uk/business/2011/may/30/uk-undermining-tar-sands-ban>

⁵³ Protests in Ottawa against oil sands exploitation (September 2011): <http://www.vancouversun.com/news/Ottawa+protest+federal+support+oilsands/5454666/story.html>

⁵⁴ It is important to note that our focus is on environmental and socio-economic issues raised by the problem. There is a body of media that report on the oil sands and on the Kearsy Oil Sands Project looking into how well they are doing economically, how much the companies are earning, etc.

the EIA, judicial review, civil disobedience). **While these elements were not part of the planning process, we found it helpful to look into them in order to better understand the shortcomings of existing participation in this process.** In this way, we can expand the meaning of **participation** as the **legal landscape provided actors with the opportunity to voice their concerns also after the approval of the project.** Participation before approval also does not necessarily imply that people are heard since eventually a Panel decides what is a valid concern. The legal landscape, therefore, facilitates participation, but does not necessarily provide a platform for a common understanding. It is nonetheless a necessary element for insuring that people are heard.

Table 2. Main similarities and differences – participation in the planning process

	Kearl Oil Sands	East Iceland
Planned participation	During the EIA and during the hearings Approval of the project resulted	During meetings and periods for objections Rejection of the project resulted
Origins of unplanned participation	Different understandings of the precautionary principle Involvement of unusual government apparatus	Available data on the Icelandic case does not allow to determine the origins
Activism	Is still increasing Local groups Personalities International NGOs Use of media: books, documentaries Linked to broader geo-political events	Peaked when the project was largely finished Foreign and Icelandic groups Personalities International NGOs Use of media: books, documentaries
Media attention	Internationalized Increases with major events General increase	Internationalized

4. Lessons learned

Various findings from these two projects show how **diverse the impacts from megaprojects on the local communities can be**, how the **planning process** takes place and how **participation** of different actors evolves during the construction period. The authors hope that the experiences from these cases can serve as **lessons** for other similar cases or settings around the Circumpolar North.

Many northern locations share some features with the two cases presented in the report, such as relatively **low population number** and **remote location**. However, **megaprojects** are by definition **large scale** and this may not altogether suit these northern communities. Care has to be taken that the communities are able to accommodate such large projects without too severe impacts. Relative impacts increase as the receiving communities are smaller. These **communities need to be empowered** in order to successfully carry out the necessary planning process and be able to estimate whether and how different projects may suit these locations.

Both of these projects have materialized in these locations due to a single fact, i.e. **higher energy prices on the world market**. High fuel prices have made the oil sands processing profitable and the high price of electricity has made a relatively low cost location in Iceland attractive to an energy intensive industry like aluminium plants. We can only expect this tendency to increase as energy prices get steeper and raw materials scarcer and more expensive. Therefore it is very likely that many arctic and subarctic communities will experience **increased interest of multinational corporations** in constructing megaprojects in these locations.

The single most important finding of the **socioeconomic** study in **East Iceland** is how confined the impacts of the projects were within two municipalities closest to the projects. Individuals' responses in surveys indicate that there was much optimism in the region about the impacts and disappointment in municipalities further away from the projects. Therefore, keeping expectations at a reasonable level is recommended. These large projects usually have a long preparation phase and not all of them materialize. Therefore there is danger that communities begin to "wait" for them to materialize and if they eventually do so the hopes may become unrealistically high.

In both cases studied in this report, large workplaces tend to highly influence the **social rhythm** in small communities where they are located. Work shift schedules are among those aspects which the researchers believe need to be carefully considered when a large employer is located in a small population area.

The experience of the **house-building** programme in East Iceland demonstrates that municipal councils must ensure, not only that a suitable quantity of housing is constructed, but also that the type of houses built conforms to community practice in each location. Anticipating an increase in population, the municipalities grossly overinvested in facilities; this relates to high expectations from projects. Anticipation is also important in Canada, except that the planning under-estimated the population

growth. In Alberta, the increase was so steep that a shortage was created driving up real estate prices for the regular inhabitants of Fort McMurray.

Infrastructure needs to be up to **standard** if megaprojects enter a remote area. The new infrastructure created by the construction of an aluminium plant and power station in East Iceland has been useful to the local communities in different ways and to differing degrees. With regard to overland communications, further investments in roads, especially road tunnels, are needed to better connect workplaces and communities.

In the planning process, we observed similar trends in both countries: the use of participation in the planning process. However, in the two cases, the megaprojects were met with stark opposition after the planning stage. Our research, therefore, indicates that although participation is necessary for the planning of a megaproject, it is still insufficient as currently laid out due to remaining socio-economic and environmental impacts. That is why participation may turn into activism with consequent increase in media attention.

The lessons learned from participation in the planning process of megaprojects can be formulated in two different ways for the two main actor groups involved: the decision-makers and civil society.

For decision-makers, it is important to note that **participation schemes already do exist** and might only need **improvement**. Looking at the events that unfolded in East Iceland and Alberta, there are different lessons that decision-makers can take home. Since a lot of the debate takes place after approval, **more time** for debating and voicing opinions should be allowed before the approval. Also, for this to be optimal, the participation opportunities should be **well advertised** so that more groups have access to the debate. Public hearings are a participation tool but seem a bit stagnant, i.e. different opinions are heard, but there is **no real dialogue**. Investing in participation tools that **allow real exchanges** during the planning process will benefit reaching a consensus and making concessions **before the approval of a megaproject**. This should be easy to carry out at the community level, since these areas are often not densely populated. Such dialogues with stakeholders will assist in revealing the various values and expectations of different groups and help to plan the megaproject in a sustainable way. A suggested tool to carry out this dialogue is to make use of **future scenarios** early on in the planning process and in the carrying out of the EIA, with representatives of all stakeholder groups. Indeed, we found that as impacts were becoming visible, opposition against the project increased. Using future scenarios would help avoid this time- and uncertainty component by anticipating different possible courses of events.

For civil society, it is important to keep in mind that there are **existing structures for participation** which one should make the most of. Although these structures are not perfect in the planning process, it is important to be **aware of the general legal landscape regulating planning** which provides **opportunities for revision** of the process. Also, information about megaprojects can be overwhelming and difficult to comprehend. Civil society should not be rebutted by technicalities, but rather **seek help** to overcome them, opening up avenues for many opportunities in improving the planning process. This should also be **supported by the government**, like for instance in Canada, where grants are awarded to prepare for public hearings.

All in all, the cases studied revealed many similarities between the impacts and the planning of megaprojects. Although each project is always inherently unique, and we were able to explain the differences, all megaprojects share a set of similarities in their size and the extent of their impacts. We suggested ways to improve the general planning process for these types of projects.

5. Broadening the local view on Circumpolar Megaprojects

5.1. Objective

Besides the two cases that have been described and compared in the previous chapters, the project team wanted to follow through on the overall objective as stated in our proposal:

...broaden the horizon of on-going studies and research results on megaprojects, gain insight in the general implications of megaprojects in the North and empower local stakeholders as important actors in the planning process of a megaproject by preparing the project's findings (research based knowledge, best and worst practice) for the target groups: local civil servants and local public in the Circumpolar North.

Particularly the third point of empowering stakeholders is the focus of this part of the project. The first chapters dealt with scientific approaches to furthering knowledge on megaprojects in the Circumpolar North and their potential implications and impacts.

This chapter will describe a complementary approach to the in-depth analysis, because scientific knowledge on this matter may not necessarily be the best and only way to empower local civil servants and the local public when faced with megaproject planning. The project team believes that a broad overview of megaprojects in the Circumpolar North will stimulate awareness of other megaprojects in similar contexts and enable people to learn from them - both from the mistakes that were made, but also from the successful approaches that other local people or advocacy groups chose to become more involved in the planning process.

5.2. Method

Circumpolar Megaproject view has two components:

1. a new map view within the existing Interactive Data Map on Arcticportal⁵⁵
2. a set of Infosheets on significant cases available through the project website⁵⁶

The websites are linked so visitors have access to all the material regardless of which website they start from.

⁵⁵ <http://www.arcticportal.org>

⁵⁶ <http://megaproject.arcticportal.org>

The map view

The map view is based on a database with information on megaprojects in the Circumpolar North. The information in the database provided approximate geospatial locations, as well as basic information regarding each specific megaproject. As this map view includes 13 cases that have not been the focus of the project team's own year-long research, information on these cases is more general and to a large degree shaped by the availability of data online on each of the cases.

The Infosheets

For the Infosheets (available on the project website for the six primary cases) the same data sources were used, but a more descriptive and compelling story was created of one or more aspects of the specific case. The objective with the Infosheets is to provide a variety of narratives of some existing megaprojects in the Circumpolar North to local civil servants and the public, to inform, inspire, and raise awareness of past critical issues with megaprojects similar to enterprises that are planned near or in their community. This approach may help to empower both local civil servants and the public, and improve the process by having all actors involved from early on.

As described above, the objective is to offer a starting point for the public to become more aware, and to broaden their horizon. From the interactive map on Arcticportal, visitors are directed towards the project website and vice versa. On the project website Infosheets for each primary case can be downloaded. Some additional resources, including the comparative study on the Kearsy Oil Sands and the ALCOA - Kárahnjúkar case, can be retrieved from the project website as well.

Choice of cases

In order to give a circumpolar view on megaprojects, we decided to search for one example from each of the countries in the Circumpolar North (our 6 primary cases, see Table 3 below) that represented different critical issues and challenges regarding the planning or implementation of megaprojects. In this way we would connect to visitors' territorial realities, giving them a starting point that might be somewhat more familiar to them. At the same time, we would cover a number of different issues, perspectives and outcomes, to offer them a chance to learn more about the circumpolar megaproject as a challenge and as an opportunity.

Table 3. Primary cases illustrating various megaprojects throughout the Circumpolar North

Case title	Arctic state	Location	Feature
Kearl Oil Sands	Canada	Fort McMurray, Northeastern Alberta	The essential role of the public and advocacy groups
Thule Air Base	Greenland	Thule / Pituffik, Qaasuitsup	Indigenous people's growing awareness and use of circumpolar platforms and international institutions
ALCOA Aluminium Smelter and Kárahnjúkar Hydropower Project	Iceland	Reyðarfjörður, East Iceland	Growing awareness of environmental impacts, socio-economic impacts in remote regions
Alta Dam Project	Norway	Alta / Maze / Kautokeino, Finnmark	Recognition of indigenous rights leading to autonomous authority
Hydrocarbon in Nenets Autonomous Okrug	Russia	Nenets Autonomous Okrug, Arkhangelsk Oblast	Knowledge sharing to mitigate impacts of multiple land-uses
Trans-Alaska Pipeline System	United States	From Prudhoe Bay, Alaska to Valdez, Alaska	Native claims settlement

As a next step, nine other cases in the Circumpolar North were identified (see Table 4 below) to show that there are many more projects than what the six primary projects cover and they are spread all over the area. However, it must be emphasized that this overview is far from exhaustive -and this has been clearly mentioned on the website -, since new megaprojects will emerge at an ever-increasing pace in the coming years. Therefore, a comprehensive overview is neither possible nor meaningful and has not been part of the objective of this project.

Table 4. Secondary cases showing the public other interesting scenarios to investigate

Case title	Arctic state	Location	Activity
MacKenzie Gas Project	Canada	Northwest Territories	Gas
James Bay Hydroelectric Development Project	Canada	Quebec	Hydropower
Maniitsoq, nickel, gold, diamond mining	Greenland	Maniitsoq, West Greenland	Mining
Snøhvitt	Norway	Norwegian Sea (offshore)	Oil, Offshore
Komsomolsky gold mines	Russia	Chaunsky District, Chukotka Autonomous Okrug	Mining
Monchegorsk copper/nickel mine	Russia	Kola Peninsula	Mining
Norilsk Nickel	Russia	Krasnoyarsk Krai	Mining
North Slope Oil fields	United States	Prudhoe Bay, Alaska	Oil
Valdez Oil Tanker Port	United States	Valdez, Alaska	Oil tanker transport

5.3. Sources and material

The Kearl Oil Sands Case and ALCOA-Kárahnjúkar have been extensively studied in the previous chapters; please refer to them, the appendices to this report and the website for further information. In order to find the material and data for the other cases, that were not part of the comparative study (Chapters 2, 3, and 4 of this report), searches were conducted on the internet, using, as far as possible,

peer-reviewed articles and official sources (of involved parties) as a starting point to understand a certain relevant issue.

Thule Air Base

For the case in Greenland (Thule Air Base), several older and more recent articles offered a first picture of a case of the relocation of indigenous people and their attempts to claim their homeland via legal dispute in various courts (for example Wulff, 2005). But before reading the scientific articles and court documents on how the Inughuit had formulated their claims and how the courts had ruled, other non-scientific sources were consulted. The information provided by the advocacy group Humanity in Action⁵⁷ gives a concise description of events over time. The interesting aspect of this case is the way in which the indigenous people started to use the legal system up to the highest international level and how this legal case mobilized other Arctic indigenous groups to express their formal support.

Alta Dam Project

The Alta Dam Project has been researched extensively and a great number of scientific and popular scientific articles can be found online on the case (Briggs, 2006; Paine, 1982; and many more). Other online resources provide a broader summary of the Alta case⁵⁸, which would be directly accessible to the general public. Links to these resources can be found at the bottom of the Infosheet. The interesting part about the Alta Controversy is that it lasted very long (more than a decade) and that the indigenous Sámi, through their protests, managed to gain confidence and achieve a lasting change in their political and governance position, in spite of the dam being built in the end.

Hydrocarbon in Nenets Autonomous Okrug

In contrast to the Alta case, there is hardly any material online on oil development in the Nenets Autonomous Okrug, Russia. Two online articles that do address the complexity of oil development and indigenous livelihoods in the area are “The Tender Tundra” by Eivind Senneset⁵⁹ and “The oil adventure and indigenous people in the Nenets Autonomous Okrug” by Winfried Dallman and Vladislav Peskov⁶⁰. The text on the Infosheet for Hydrocarbon in Nenets Autonomous Okrug is to a great extent based on these two articles. The interesting thing about this case is that, in spite of the remoteness of the area and the seemingly unbridgeable power gap between the oil company and the reindeer herders, a connection between the two actors could be established and awareness of each other’s activities was increased by the use of GIS.

Trans-Alaska Pipeline System

Alaska’s north to south Pipeline System is, just like the Alta Dam Project, a case that has drawn lots of attention from both scientists and other interested parties. Scientific articles, however, are

⁵⁷ <http://www.humanityinaction.org/knowledgebase/13-the-forced-relocation-of-the-indigenous-people-of-uummannaq-or-how-to-silence-a-minority>

⁵⁸ http://www.galdu.org/govat/doc/eng_damning.pdf

⁵⁹ <http://www.siu.no/eng/layout/set/print/content/view/full/641>

⁶⁰ <http://www.grida.no/publications/et/pt/page/2577.aspx>

predominantly on technology-related issues (because of a large focus on the safety of pipeline operations), while wildlife protection and environmental impact assessments are mainly addressed in official state or federal government studies. Also the company which owns and exploits the pipeline, Alyeska, has its own online information source⁶¹. The main point of interest regarding this case is that it sparked a political process on native land claims (resulting in the ANILCA and ANCSA⁶² acts) which has had an impact far beyond the area of the actual pipeline. All indigenous peoples in Alaska were and are still affected by the decisions that were made to enable the construction of the pipeline.

In addition to the reports and scientific articles, the official websites of the megaprojects' contractors, as well as the websites of grass-roots movements bringing their socio-economic and environmental concerns to the public domain were used as complementary sources of information.

5.4. Outreach - impressions

The View

The final view of the megaprojects in the Circumpolar North on Arcticportal can be seen below (Figure 25). This view can be accessed by visiting the website of Arcticportal⁶³, going to the right hand side menu with map view options and scrolling down to 'Megaprojects'. Clicking on that option will activate the view as seen below.

⁶¹ <http://www.alyeska-pipe.com/>

⁶² <http://www.ancsa.net/law/ancsa>

⁶³ <http://www.articportal.org>

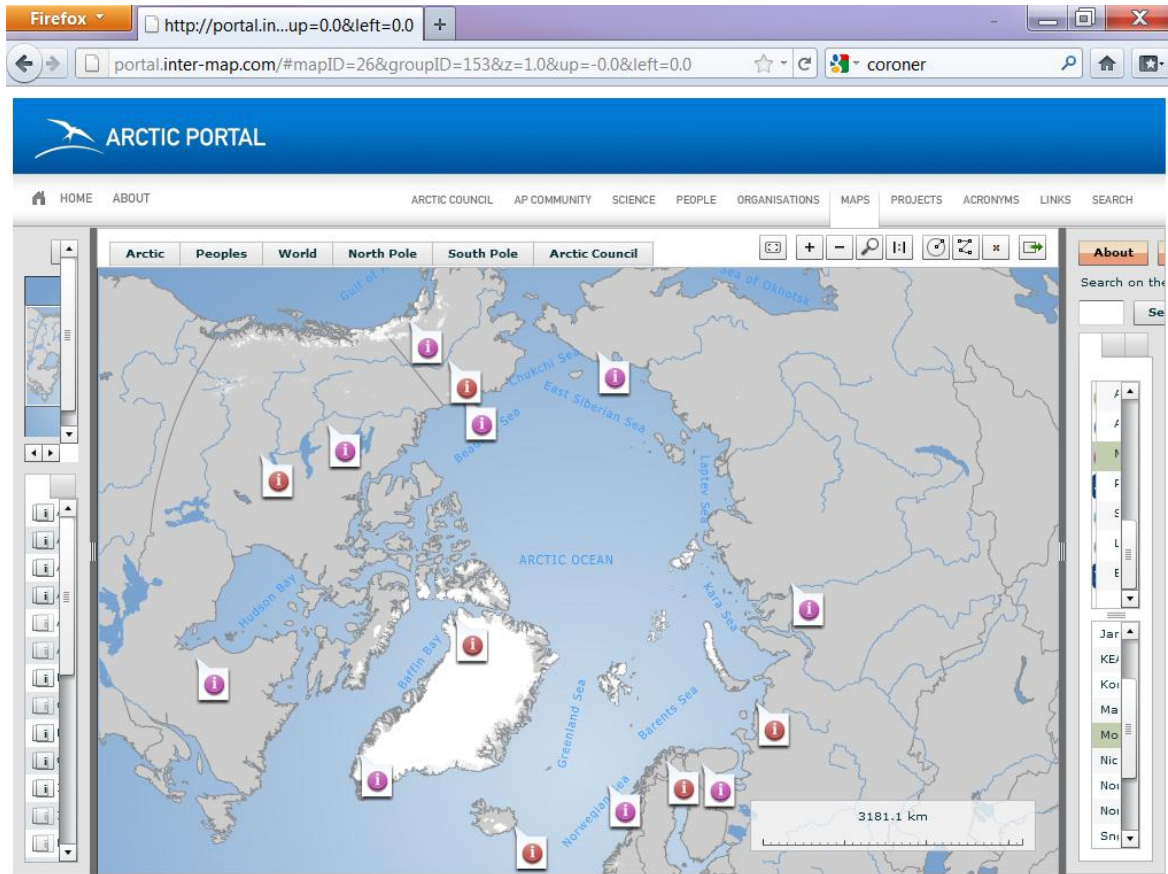


Figure 25. The website view of the Circumpolar North with the 15 identified megaprojects (this is not an exhaustive list)

The cases highlighted in this view with small 'i's do not provide a comprehensive overview, but are meant to offer a better idea of the diversity of megaprojects in the Circumpolar North, as they are dispersed all around the Arctic region.

Two views of the information (pop-up) boxes for two different cases can be seen below for both a primary case (left in Figure 26) and a secondary case (right in Figure 26). In order to close the boxes, the viewer can either click on another 'i' icon or click on the 'i' in the upper left corner of the boxes. Primary and secondary cases contain different amounts of information as was described earlier in Chapter 5.2.




Figure 26. Pop-up box as will appear in the 'Megaprojects' view in the Interactive Map on Arcticportal - information for a primary case (left) and a secondary case (right)

Infosheets

The Infosheets were produced similarly for each of the six primary cases. They consist of the same categories of information, but the actual focus of the Infosheets depended very much on the availability of information online. Each Infosheet also contains a picture of the megaproject in question and a map showing where the megaproject is situated in the region (the map view on Arcticportal provides the location of the different megaprojects on a larger scale – the entire Circumpolar North).

The Infosheets are made in full colour so that they can be printed out either in colour or in black and white, depending on the user's purpose. A disclaimer has been included in the Infosheets to make clear that this has been a small project with a limited budget, and that the topic actually merits an effort much larger than was possible in this case. Products (such as the Infosheets) should, therefore, be taken as a starting point for further exploration and for rigorous comparative research.

INFO SHEET 4 Megaprojects in the Circumpolar North – United States

TRANS-ALASKA PIPELINE SYSTEM 	
Type of megaproject	Oil, large infrastructure (pipeline)
Actors involved	Industry, federal and state government, Alaskan Native tribes, environmental groups
Feature	Native claims settlement allowed for pipeline construction, created Native corporations
In short	<p>The Trans-Alaska Pipeline System crosses lands that are traditionally used by various Alaskan indigenous peoples. The discovery of oil on the North Slope and plans to construct a pipeline therefore reinforced a number of claims of Native Alaskan tribes. These claims combined with the state and government's interest in development of the oil fields led to a relatively quick passing of the Alaska Native Claims Settlement Act (ANCSA). ANCSA settled the issue of land ownership and paved the way for the pipeline construction. It extinguished all Native rights to the land in exchange for one ninth of the state's land and nearly 1 billion \$ in compensation. Soon after, the pipeline was built and high safety precautions were observed during construction and operation. During the more than 30 years that the pipeline has been in operation no major environmental calamities have occurred on land.</p>  <p>Source: http://www.britannica.com/ftp/media-view/101402/1/0/0</p>
Location and characteristics	<p>From Prudhoe Bay, Alaska until Valdez, Alaska Built between 1975 – 1977</p> <p>The Trans-Alaska Pipeline runs through several different Arctic climates. It zigzags through various Arctic and Subarctic ecosystems: Tundra, Boreal and Temperate Forests, Mountain Ranges.</p> <p>The project was realized in an area of very high seismicity – the second largest earthquake ever recorded took place in Alaska in 1962. Next to that, the pipeline has been built on permafrost. Both of these conditions, combined with the crude oil flowing through the pipeline, and climate change make this megaproject a project of high environmental risk.</p>  <p>Source: http://www.pbs.org/wgbh/amn/x/pipeline/may/index.html</p>
Further information	<p>The following resources will provide more background information:</p> <ul style="list-style-type: none"> • Trans-Alaska Pipeline System – http://www.alaska-pipe.com/ • Alaska Native Claims Settlement Act Network – http://www.ancsa.net/law/ancsa • Googling 'Trans-Alaska Pipeline' or 'ANCSA' will generate an abundance of additional information
<p><i>This project was co-funded by the Nordic Council of Ministers' Arctic Co-operation Programme</i></p> <p><i>For questions regarding this info sheet, please contact Hjalti Jóhannesson at University of Akureyri Research Centre, Borair, 600 Akureyri, Iceland Tel: +354 460 8909 Fax: +354 460 8919</i></p> <p><i>This info sheet was downloaded from http://megaproject.articportal.org/</i></p> 	

The project team has compiled this publicly available information with care, but does not warrant that this information is free of errors. Next to that, the co-funding organizations do not necessarily agree with the statements made on the project website and in its electronic publications. The user assumes the entire risk of the use of any information contained on the project website and in its electronic publications.

Figure 27. Infosheet as they can be downloaded from the project website and can be found in Appendix III (this is an example – the Trans-Alaska Pipeline System)

Contents of the Infosheets have been structured by using a table with the different categories:

- Type of megaproject – providing a few keywords highlighting the main focus of the project.
- Actors involved – mentioning the main actors involved in the planning process and/or during construction and operation.
- Feature – describes in a very short sentence the essence of what can be learnt from this particular case

- In short – describing the essence of the case in a little more detail (the size of the Infosheet does not allow for a comprehensive description of the various cases; however, it should enable the readers to understand the relevance of a certain case to their own reality and determine whether further investigation of the case may be useful).
- Location and characteristics – provides some background information on one or more of the following: the area, the ecosystem, the climate, the socio-economic characteristics of the location of the megaproject.
- Further information – provides a few links to give the readers a starting point for expanding their knowledge on the megaproject discussed on the Infosheet (this list is by definition only two or three suggestions long, since the single page format does not allow for more information on the page. However, the links provided should give the reader enough of a starting point).

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Illustrations, maps and other web sources

Alaska Native Claims Settlement Act Network	http://www.ancsa.net/law/ancsa
Alaska Pipeline map	http://www.pbs.org/wgbh/amex/pipeline/map/index.html
Alaska Pipeline photo	http://www.britannica.com/bps/media-view/101402/1/0/0
ALCOA aluminium smelter photo	Hjalti Jóhannesson (author)
Alta Dam map	Takeuchi et al. (1998) (adapted)
Alta Dam photo	http://www.ub.uit.no/
Alþingi [Icelandic parliament]	http://www.althingi.is/altext/125/04/l03154604.shtml
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Kárahnjúkar hydro station	http://www.karahnjukar.is
Kearl Oil Sands map (map of	http://en.wikipedia.org/wiki/Kearl_Oil_Sands_Project

Alberta and extent of oil sands)	
Kearl Oil Sands photo	http://www.imperialoil.ca/Canada-English/operations_sands_glance_101.aspx
Nenets A. O. map	http://www.raipon.org/ikdm/Regions.aspx
Nenets Autonomous District (About)	http://www.arcticfrontiers.com/index.php?option=com_docman&task=doc_download&gid=14&Itemid=306&lang=en
Pembina Backgrounder – Imperial Kearl Oil Sands Mine Hearings	http://pubs.pembina.org/reports/OS-Kearl-backgrounder.pdf
Summary of the Alta case	http://www.galdu.org/govat/doc/eng_damning.pdf
Thule Air Base map	http://explorenorth.com/
Thule Air Base photo	http://www.afweather.af.mil/
Trans-Alaska Pipeline System	http://www.alyeska-pipe.com/
Workers camp photo	http://workabove.com/onthefly/2011/07/25/oilsands-camp/

Appendix II – Main Actors in the Kearl Oil Sands controversy

Main actors	Description
The Operator: Imperial Oil	<p>Imperial Oil is Canada’s largest oil company. In 1985, Imperial Oil started exploiting oil sands and using its refineries to produce crude oil from them. It did so by creating subsidiaries and investing with other oil companies. For instance, it owns the oil sands project in Cold Lake and also owns 25% of the Syncrude mine in Fort McMurray (Klassen, 1999, p147). Imperial is also part of the larger international petroleum industry since 69.6% of its stocks belong to the American ExxonMobil.</p> <p>In the Canadian system, the proponent has to justify that its project is in the public interest. Recently, environmental issues around the exploitation of oil sands have taken a high priority on questions regarding the public interest primarily for human health and First Nation livelihood reasons. For large projects like KOS, Imperial not only invests in the industrial development itself but also in these other important issues. An Environmental and Regulatory manager, a Stakeholder Relations advisor and an Aboriginal Affairs advisor are responsible only for the KOS project itself. Moreover, on its website, Imperial prides itself for environmental responsibility highlighting sound use of technologies since 1918. As Canada’s largest oil company, Imperial Oil has a lot of responsibilities towards citizens and the environment.</p>
The Regulator: different governmental bodies involved	<p>The Department of Fisheries and Oceans (DFO) was the only body to have decisional power since the project entailed significant water use from the Athabasca River.</p> <p>The DFO takes a decision after the Joint Review Panel appointed by the Agency submits a recommendation. This recommendation is the result of a public participatory process involving lay-people, specialist consultants and other governmental bodies. In the end, when the Review Panel recommends specific management plans, it refers to the regulator to help Imperial Oil keep up the conditions to its approval. In the KOS case, the regulator is Alberta Environment (AENV) and Environment Canada (EC).</p> <p>The DFO, AENV and EC all share the mission of Canada’s sustainability. They all mostly provide monitoring, surveys and expert reports. Therefore, their regulatory role lies in the monitoring and application of environmental management guidelines elaborated throughout the process of the KOS project environmental assessment.</p>
Independent actors	The Joint Panel and the federal judges are independent actors that are

<p>nominated by the government</p>	<p>appointed by the government. In the KOS case, three independent members were appointed to the Joint Panel, one from the federal government and two from the provincial government. Only biographical elements of the federally appointed member were available. Information gathered from interviews and other available documents suggested that the two other members were members of the former EUB of Alberta although their biography was never officially published. Although the Joint Panel is an independent body, its views were put before a court next to Imperial Oil in the KOS case, thereby questioning its independence. The federal judges are the ones ultimately deciding the right and wrong in the issue and do not participate in the debate with any other groups, they are in that sense truly independent.</p>
<p>The Oil Sands Environmental Coalition</p>	<p>The groups involved in the negotiations around the KOS project before the judicial review of the Panel report were called the Oil Sands Environmental Coalition (OSEC). They are an association of three Alberta-based environmentalist groups: the Fort McMurray Environmental Association (FMEA), the Toxics Watch Society of Alberta (TWSA) and the Pembina Institute for Appropriate Development. These groups essentially have the same mission as governmental bodies such as AENV and EC.</p> <p>OSEC can be considered as a consortium of grassroots environmental movements.</p> <p>However, TWSA and the Pembina Institute do not only perform advocacy activities as a reaction to environmental problems; they also provide consultancy services. They are hybrids in the environmentalist movement domain. On the one hand, they will lobby to protect the environment and citizens and, on the other hand, they will provide expert advice on how to deal with industrial effects in an environmentally friendly way.</p>

Appendix III - Infosheets as they are available via the web tool „Megaproject Universe“

ALCOA ALUMINIUM SMELTER AND KÁRAHNJÚKAR HYDROPOWER PROJECT



Type of megaproject	Hydropower, industry
Actors involved	Industry, national, regional, and local government, local population, NGOs
Features	Involvement of the public, (supra-)regional development, socio- economic fluctuations

In short

This megaproject consists of two interconnected installations, each of which is a megaproject in itself. The Kárahnjúkar hydropower station and the Alcoa-Fjarðaál aluminium plant.

Local inhabitants of the area had high hopes of prosperity and employment when the project was launched. Environmental concerns were raised, mainly by environmental groups from outside the region. An environmental impact assessment (EIA) was performed and construction was started. During the construction period, the region witnessed a significant increase in activity and investment in the projects, as well as in the housing sector and in other aspects of infrastructure. Shifts in employment have been observed, with a marked decline in fish processing jobs.



Photo: Hjalti Jóhannesson

Location and characteristics

Reyðarfjörður, Eastern Iceland

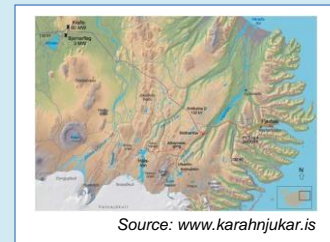
65°02'N, 14°13'W

Built between 2004 and 2008

This megaproject is located in a cool temperate oceanic, low arctic climate.

The hydropower plant is fed by two glacial rivers originating in the Vatnajökull glacier as well as by runoff from several rivers in the eastern part of the highland.

Before the project, the communities in East Iceland were experiencing a steady decline in population and local economy.



Source: www.karahnjukar.is

Further information

The following resources will provide more background information:

- Comparative study of two Megaprojects in the Circumpolar North – <http://megaproject.articportal.org/>
- The homepage of the Kárahnjúkar hydropower plant – <http://www.karahnjukar.is/EN/>

This project was co-funded by the Nordic Council of Ministers' Arctic Co-operation Programme

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Tel: +354 460 8903 Fax: +354 460 8919*

This info sheet was downloaded from <http://megaproject.articportal.org/>



norden
Nordic Council of Ministers



The project team has compiled this publicly available information with care, but does not warrant that this information is free of errors. Please note that the co-funding organizations do not necessarily agree with the statements made on the project website and in its electronic publications. The user assumes the entire risk of the use of any information contained on the project website and in its electronic publications.

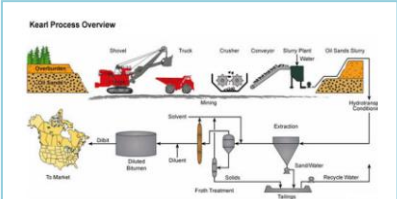
KEARL OIL SANDS



Type of megaproject	Oil sands development
Actors involved	Industry, government, grassroots environmental groups, First Nations groups
Feature	Public participation in the planning process provides a platform for public debate

In short

In 2003 one of Canada’s largest petroleum companies took over an old exploitation project, the Kearl Oil Sands, as increasing oil prices made it viable to exploit this resource. Like other mining projects, it was filed for regulatory approval in 2005 and an Environmental Impact Assessment (EIA) was submitted to the Canadian Environmental Assessment Agency. The environmental impacts were judged to be insignificant, provided mitigation measures were implemented. Immediately after approval for development was given, several grassroots environmental groups filed a complaint claiming that the EIA of the Kearl Project had been done unlawfully. The case went to court and the project was halted for several months. Even though the project was resumed eventually, it brought national attention to the environmental impacts created by the oil sands industry. It also made clear that a common understanding of terms like ‘risk’ and ‘uncertainty’ and ways to deal with them are essential in cases of this magnitude and with potentially far-reaching impacts.



Source: http://www.imperialoil.ca/Canada-English/operations_sands_glance_101.aspx

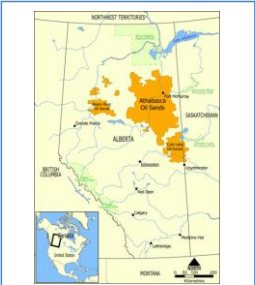
Location and characteristics

Fort McMurray, Northeastern Alberta, 56°43’N, 111°22’W

In construction since 2003 – expected beginning of production 2012

This megaproject is being developed in an area of wetlands on the Kearl Lake in northeastern Alberta. The area has a humid continental climate and is located at a slightly lower latitude than the other megaprojects in this series of info sheets. The project itself and its context, however, have many characteristics that are relevant to regions in the Circumpolar North.

The nearest city to the project is Fort McMurray, which is considered a major hub of oil production in Canada. Its economic basis is broader than hydrocarbon and includes forestry as well.



Public domain image created by Norman Einstein

Further information

The following resources will provide more background information:

- Comparative study of two Megaprojects in the Circumpolar North – <http://megaproject.articportal.org/>
- Imperial Oil on Oil Sands – http://www.imperialoil.ca/Canada-English/operations_sands_kearl.aspx
- Pembina Backgrounder on KOS Hearings – <http://pubs.pembina.org/reports/OS-Kearl-backgrounder.pdf>

This project was co-funded by the Nordic Council of Ministers’ Arctic Co-operation Programme

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This info sheet was downloaded from <http://megaproject.articportal.org/>

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ALTA DAM PROJECT



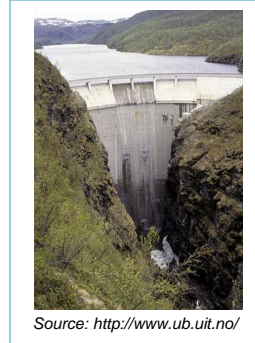
Type of megaproject Hydropower, dam, reservoir

Actors involved National government, Sámi people, Sámi representations, Sámediggi (Sámi parliament), environmental groups

Main feature How local indigenous people's protests led to recognition of their rights and representation

In short

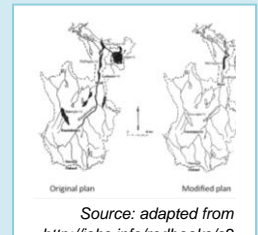
When in 1970 the Norwegian government announced its plan to build a large dam in the Alta river in northern Norway to increase energy security, the local indigenous population (the Sámi), along with some environmental groups, started a protest that lasted more than a decade. Eventually, a court ruling broke the deadlock and a modified version of the dam and reservoir was built. It had the anticipated impacts on the environment and on the local communities' livelihoods, but it had also created a political climate in which the Sámi had managed to make themselves heard. In fact, the Sámi ended up playing a central and crucial role in the planning process. Originally, the Sámi village of Maze was to be flooded by the reservoir. The protests succeeded in having the plan modified. Since then, the Sámi in northern Scandinavia have organized themselves, strengthened their cultural identity and secured their position as part of the political and decision-making processes concerning issues of relevance to the Sámi. The Sámi also gained governing power over culture, language, and education in their region.



Source: <http://www.ub.uit.no/>

Location and characteristics

Alta / Maze / Kautokeino, Finnmark, 69°26' N, 23°39' E
Planned in 1970, built between 1982 and 1987. The Alta dam project is situated in a subarctic climate in a fjord in the northernmost part of Europe. The area is part of a vast region where the indigenous Sámi people have their reindeer herds migrate over the land. Economically the region depends very much on reindeer herding and the reindeers' ability to migrate.



Source: adapted from <http://www.ub.uit.no/>

Further information

The following resources will provide more background information:

- Summary of the Alta case – http://www.galdu.org/qovat/doc/eng_damning.pdf
- Information on the dam – http://www.ub.uit.no/baser/arkinord/cateqories.php?cat_id=373
- Googling 'Alta controversy' or 'Alta dam project' will generate an abundance of additional information

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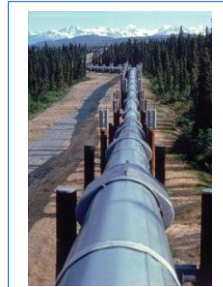
TRANS-ALASKA PIPELINE SYSTEM



Type of megaproject	Oil, large infrastructure (pipeline)
Actors involved	Industry, federal and state government, Alaskan Native tribes, environmental groups
Feature	Native claims settlement allowed pipeline construction, created Native corporations

In short

The Trans-Alaska Pipeline System crosses lands that are traditionally used by various Alaskan indigenous peoples. The discovery of oil on the North Slope and plans to construct a pipeline therefore reinforced a number of claims by Native Alaskan tribes. These claims, combined with the state and government’s interest in development of the oil fields, led to a relatively quick passing of the Alaska Native Claims Settlement Act (ANCSA). ANCSA settled the issue of land ownership and paved the way for the pipeline construction. It extinguished all Native rights to the land in exchange for one ninth of the state’s land and nearly 1 billion \$ in compensation. Soon after, the pipeline was built and high safety precautions were observed during construction and operation. During the more than 30 years that the pipeline has been in operation, no major environmental calamities have occurred on land.



Source:
<http://www.britannica.com/lps/media-view/101402/1/0/0>

Location and characteristics

From Prudhoe Bay, Alaska to Valdez, Alaska

Built between 1975 and 1977, the Trans-Alaska Pipeline runs through several different arctic climates. It zigzags through various arctic and subarctic ecosystems: tundra, boreal and temperate Forests, mountain ranges. The project was realized in an area of very high seismicity – the second largest earthquake ever recorded took place in Alaska in 1962. Furthermore, the pipeline has been built on permafrost. Both of these conditions, combined with the crude oil flowing through the pipeline, as well as climate change, make this megaproject an enterprise of high environmental risk.



Source:
<http://www.pbs.org/wgbh/mex/pipeline/map/index.htm>

Further information

The following resources will provide more background information:

- Trans-Alaska Pipeline System – <http://www.alyeska-pipe.com/>
- Alaska Native Claims Settlement Act Network – <http://www.ancsa.net/law/ancsa>
- Googling ‘Trans-Alaska Pipeline’ or ‘ANCSA’ will generate an abundance of additional information

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HYDROCARBON IN NENETS AUTONOMOUS OKRUG



Type of megaproject	Oil, gas, transportation over land
Actors involved	Industry, national, regional, and local government, indigenous people, migrant workforce
Feature	Knowledge sharing as a way to mitigate impacts of land degradation and enable a continuation of multiple land-uses

In short

For decades, the Nenets Autonomous Okrug has been the focus of attention regarding its large oil and gas reserves. Exploration and increasing development activities have had a large impact on the landscape and the extent to which development is taking place is expected to further increase. The Nenets reindeer herders are greatly affected by the land degradation. Efforts have been made to try and mitigate these impacts by bringing increased and improved knowledge to all actors about the area and the various ongoing land-uses.



Source: Global Knowledge, No. 2 2007

Location and characteristics

Nenets Autonomous Okrug, Arkhangelsk Oblast
68°50'N, 54°50'E

Under development since the 1960s.

This megaproject is situated in the Northeastern corner of the Barents Sea area, in a continental arctic climate. Its landscape consists of vast areas of tundra. The area is sparsely populated by Nenets reindeer herders who use the vast tundra as pastures. Oil prospecting and development in the area have brought supplemental job opportunities, as well as an influx of Russian laborers from outside the region.



Source:
<http://www.raipon.org/ikdm/Regions.aspx>

Further information

The following resources will provide more background information:

- About Nenets Autonomous District – http://www.arcticfrontiers.com/index.php?option=com_docman&task=doc_download&gid=14&Itemid=306&lang=en
- “The oil adventure and indigenous people in the Nenets Autonomous Okrug” (by Winfried Dallman and Vladislav Peskov) – <http://www.arida.no/publications/et/pt/page/2577.aspx>
- “The Tender Tundra”, Global Knowledge No.2 2007 – <http://www.siu.no/eng/layout/set/print/content/view/full/641>

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norden
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THULE AIR BASE



Type of megaproject Military installation

Actors involved International political partners, national and local governments, local indigenous people, Inuit Circumpolar Conference, human rights courts, scientists

Feature Indigenous people's growing awareness and use of circumpolar platforms and international institutions

In short Starting during WWII the United States has had a military presence in Thule, originally to protect Greenland on behalf of Denmark, but increasingly for strategic purposes during the Cold War. Eventually, this led to the forced relocation in 1953 of the local Inughuit population from their village Pituffik to another location, so that a partially underground air force base could be constructed where they used to live. Protests against this relocation and the use of indigenous land continue until today. Efforts to seek justice have brought the Inuit of the circumpolar north together. The Inuit Circumpolar Conference backed the Inughuit's attempts to gain rights over their traditional lands.



Source: <http://www.afweather.af.mil/>

Location and characteristics

Thule / Pituffik, Qaasuitsup, 76° 31'N, 68° 42'W

Built between 1951 and 1953, Thule Air Base is located in a polar, tundra climate, with long cold winters and short slightly warmer summers. Some of the animal species endemic to the area are muskoxen and a great diversity of marine mammals. In general, the environment around Thule Air Base, as in most of the Circumpolar North, is very sensitive to disturbance and restores only very slowly. The indigenous Inughuit, who have been living in the area for centuries, maintain a way of living that relies on subsistence hunting of mainly marine mammals. In recent decades, other economic activities have also become part of the local income.



Source: <http://explorethenorth.com/>

Further information The following resources will provide more background information:

- Thule Air Base official website – <http://www.peterson.af.mil/units/821stairbase/index.asp>
- Decision from the European Court of Human Rights – <http://www.elaw.org/node/3834>

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