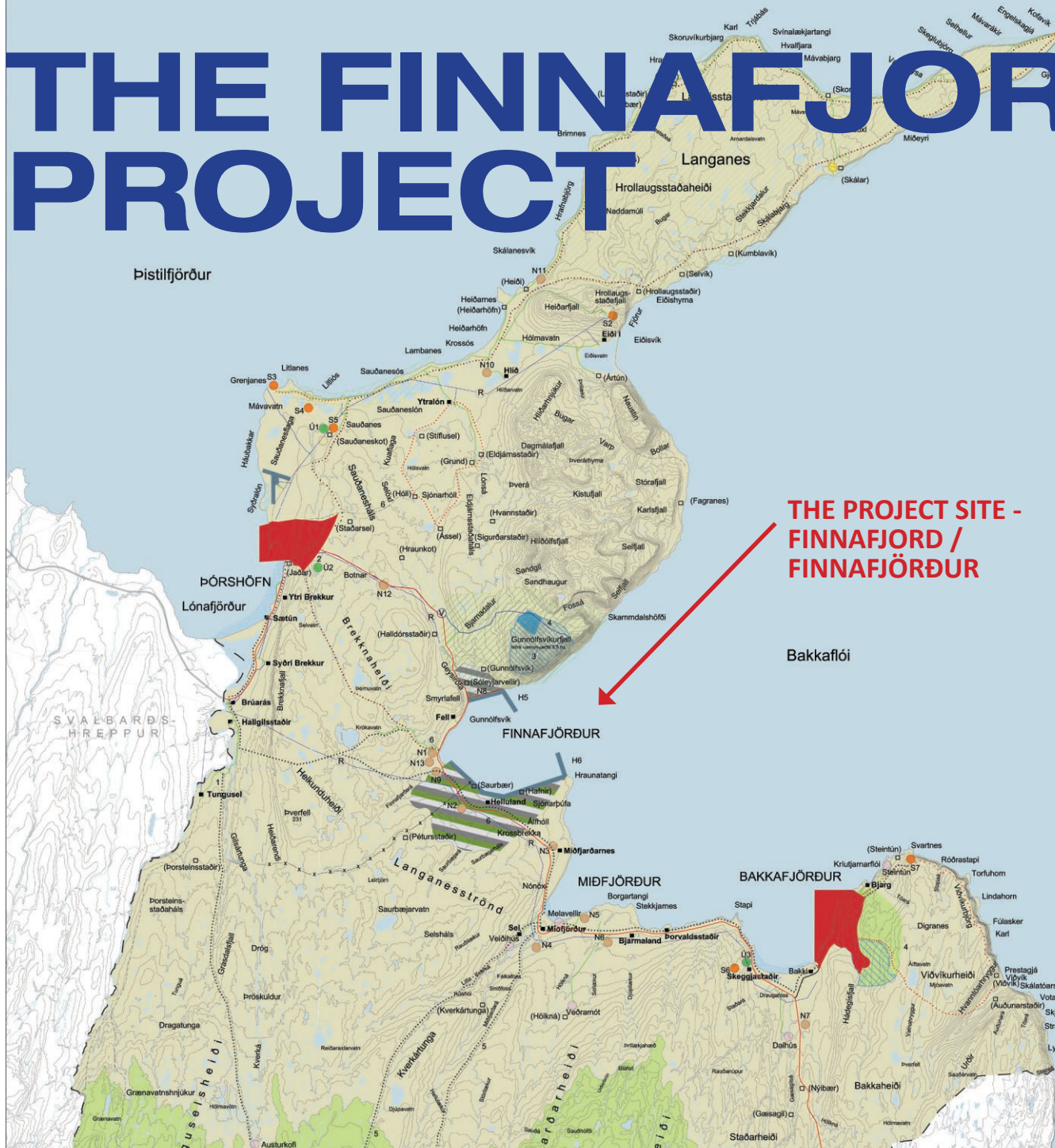




# THE FINNAFJORD HARBOUR PROJECT

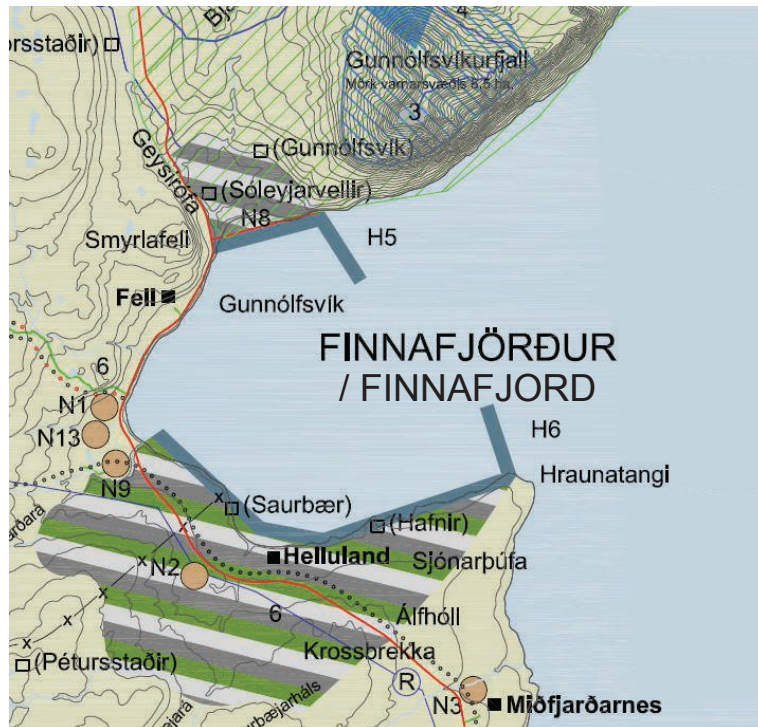


# THE FINNAFJORD PROJECT



THE PROJECT SITE -  
FINNAFJÖRDUR /  
FINNAFJÖRDUR





### THE FINNAFJORD PROJECT

The project is a new landmark deep sea port in the North Atlantic ocean for transshipment crossing the North Pole capturing the Asia-Europe route. The location is in Finnafjord (Icelandic: Finnafjörður) in North-East Iceland.

The unique offshore situation in the Finnafjord is well known by ship operators in the area since hundreds of years back. Recently this was verified by the Icelandic Maritime Administration. The unique onshore situation was first discovered a few years ago. Since year 2004 an industrial site of 167 ha has been demarcated and outlined in the masterplan for the area.

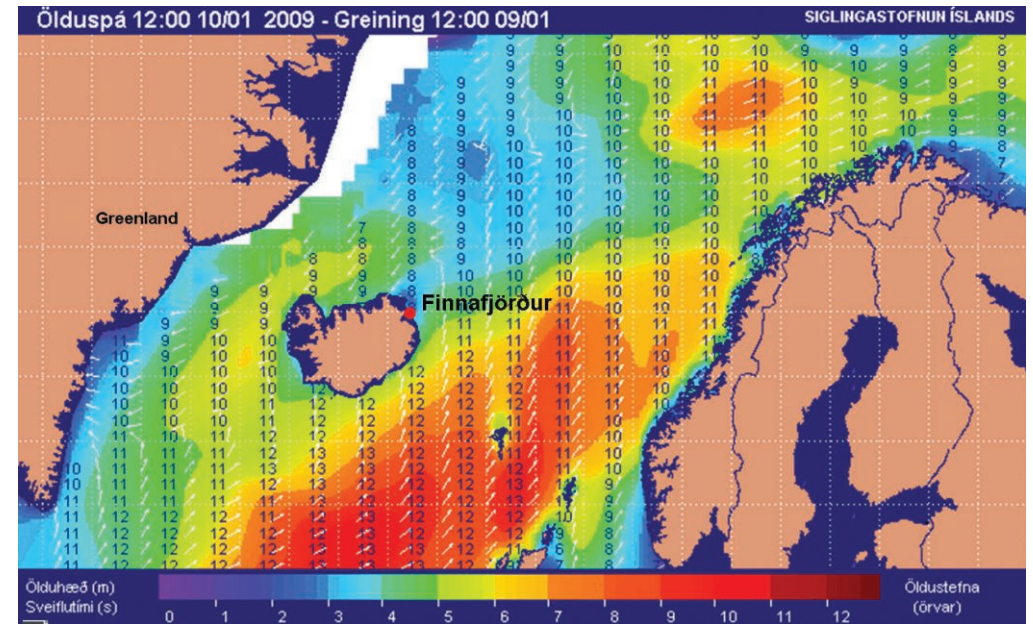
The open discussion about trans-arctic shipment during the last years has truly marked Iceland as an ideal location for a new deep sea port (transshipment Hub) in the North Atlantic ocean. The Finnafjord harbour is most likely the best location for such a harbour in Iceland.

In the new masterplan for the municipality Langanesbyggð the Finnafjord area is marked as a harbour with 6,3 km long quays, partly with depths of >50 m. The Finnafjord harbour is to be a commercial harbour. The project is planned to be a private development with full support of local authorities.

# THE ARCTIC



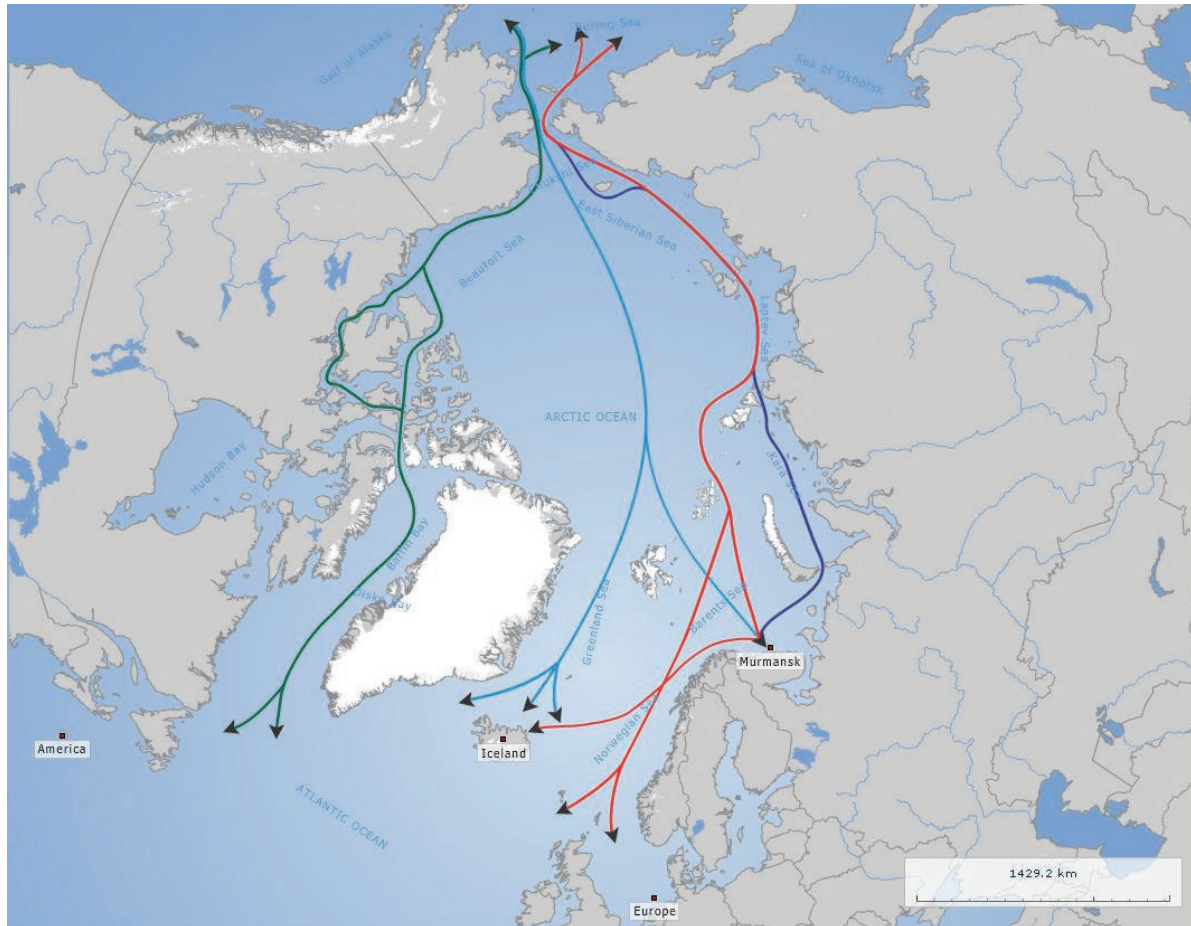
# WAVE FORECAST



## WAVE FORECAST IN METERS FOR THE NORTH ATLANTIC

The figure shows a common scenario for wave heights in the North Atlantic (Icelandic Maritime Administration). Reason for this is the weather system and the direction of the warm current from the South-West. Low pressure areas are crossing the Atlantic between Iceland and Norway. It is of interest to see the low wave height in the ocean North-East of Iceland.

# TRANS-ARCTIC SHIPPING



## SHIPPING ROUTES (WWW.ARCTICPORTAL.ORG)

The Northwest Passage (Green line) is first and foremost considered to be a continuous passage between the islands and the continental mainland of Canada rather than an actual shipping route.

The Northern Sea Route (NSR - Red Line) is an established commercial seaway that was used for domestic transportation and played an important economic role for the Soviet Union around World War II. The course of NSR was defined in a Russian regulation in 1990 and is in fact, the middle part of the North-East Passage.

A shipping route through the central Arctic Ocean (Blue Line) depends on significant reduction of ice thickness in that area. The so-called multi-year ice in the central Arctic Ocean has been changing drastically (up to 40% decrease) and disappearing completely during the last 50 years. If this development continues, ships with icebreaker abilities can navigate the central Arctic Ocean in the near future.

The image also shows why Iceland hopes to be utilized regarding Arctic Shipping, possibly with a hub-port to Europe and America.

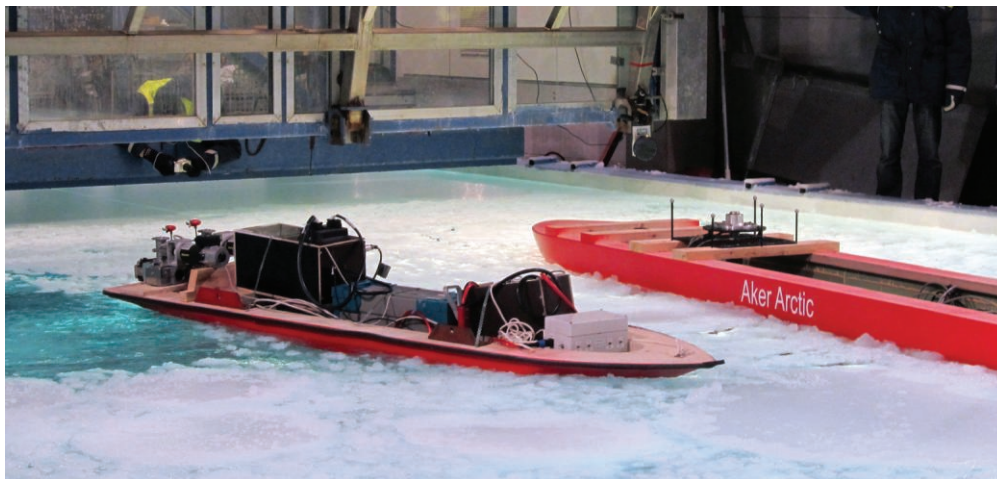
# NEW TECHNOLOGY



## NORTH POLE ICE

The ice covering the North Pole is relatively thin. A new technology i.e. from Aker in Finland makes possible the operation of cargo ships in ice without the assistance of special icebreakers.

*Pictures from Aker Arctic Technology, [www.akerarctic.fi](http://www.akerarctic.fi)*



# THE TRANS-ARCTIC SHIPPING ROUTES



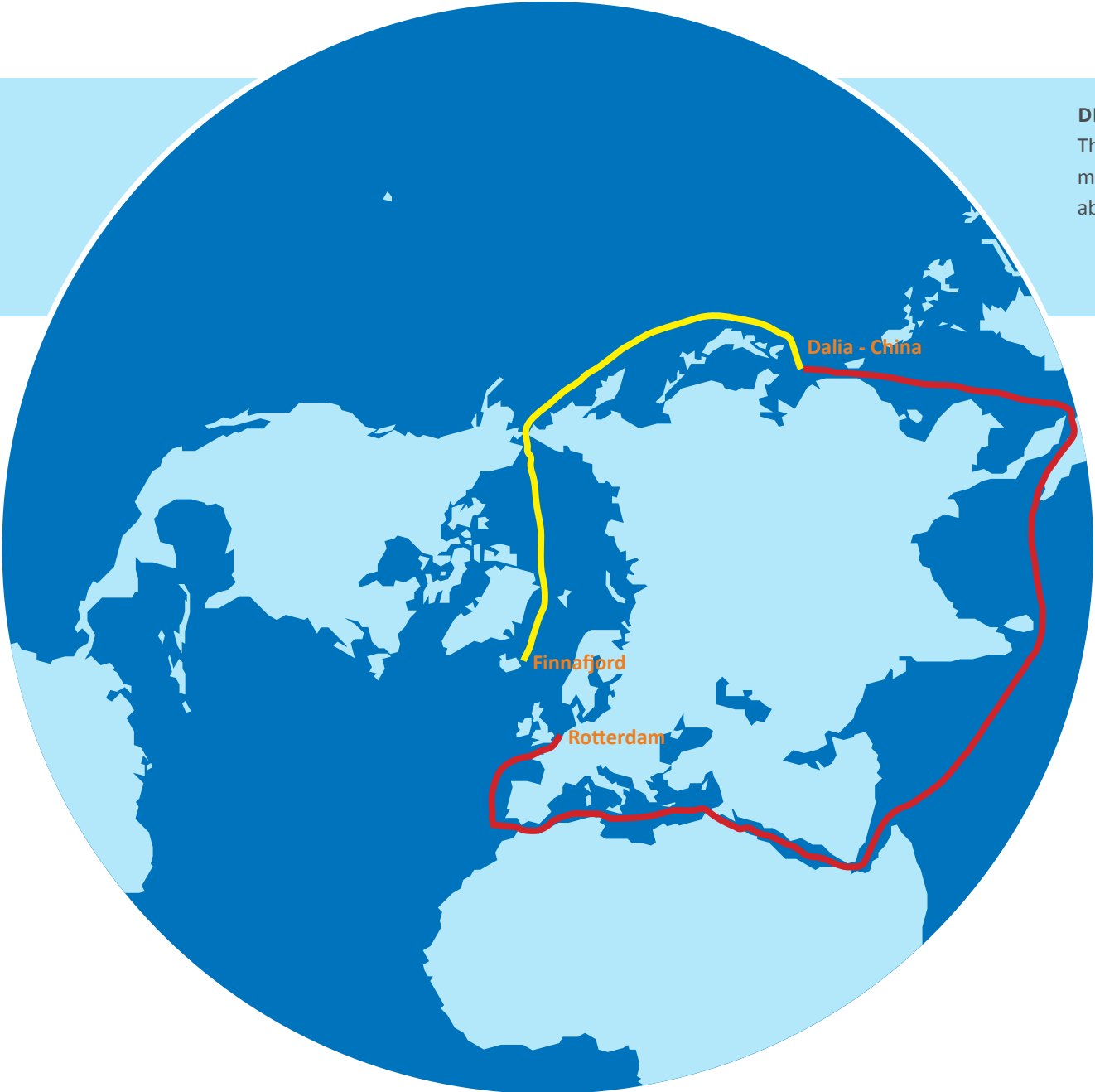
## SHIPPING ROUTES

The red line is about 11000 miles long but the yellow one only 5800 nautical miles long. This difference in the distance saves time and money but is challenging due to rough weather and cold climate in the North. This route crossing the Pole requires special made cargo ships for this operation. Therefore one of the ideas is to use those special made ships only for the route Alaska-Iceland. Normal and smaller container ships will be used for the ice free routes.

The Finnafjord harbour is a challenging project for a an absolute new way of transshipment infrastructure. Before the project will be realized, many investigations have to be conducted. Those are of technical origin as well as of political origin. Those investigations have to be carried out by teams of specialists. The time frame for those investigations is at least 10 years.

Icelandic participating body's; i.e. the land owners, the municipality Langanesbyggd and the Icelandic State are very much willing to assist a reliable and trustworthy team for this challenging task.

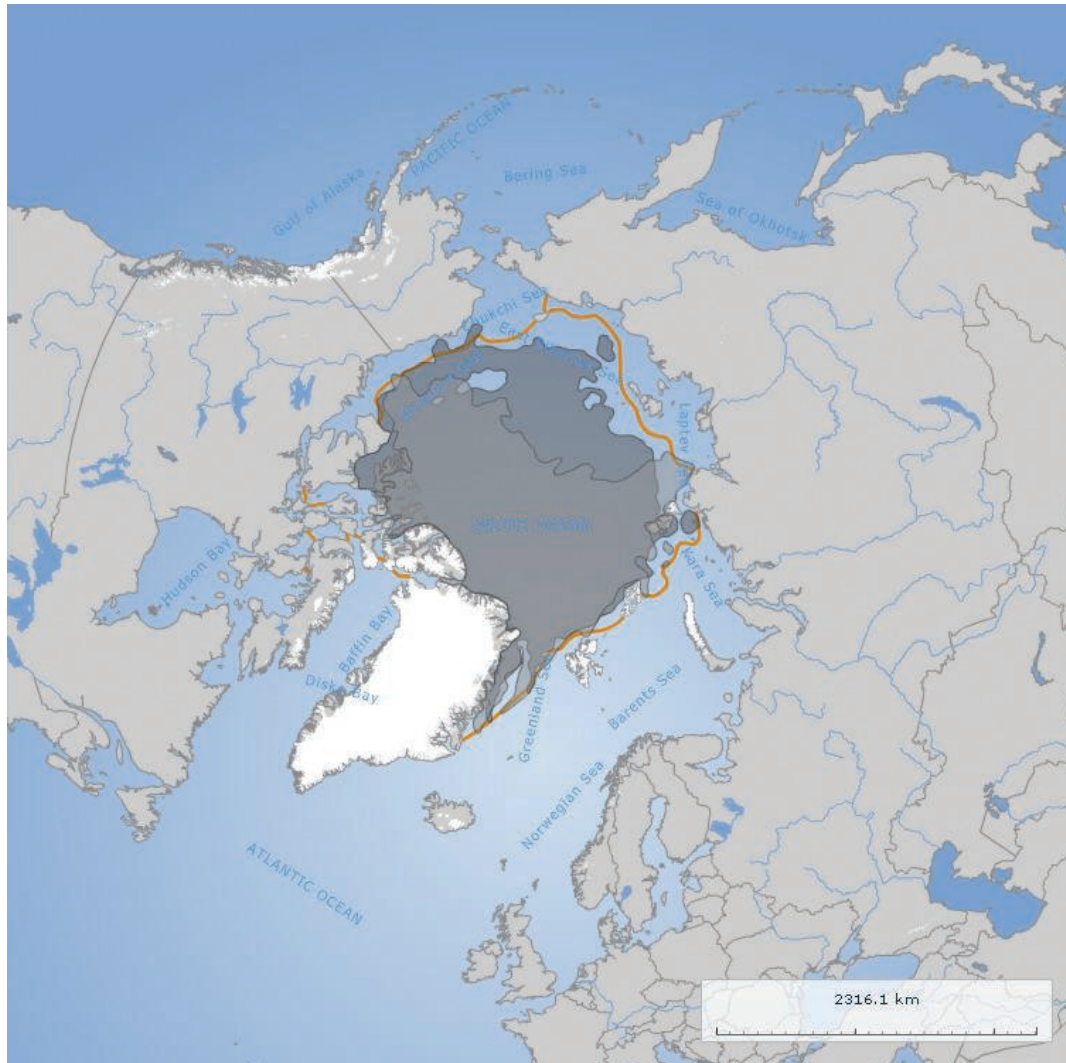




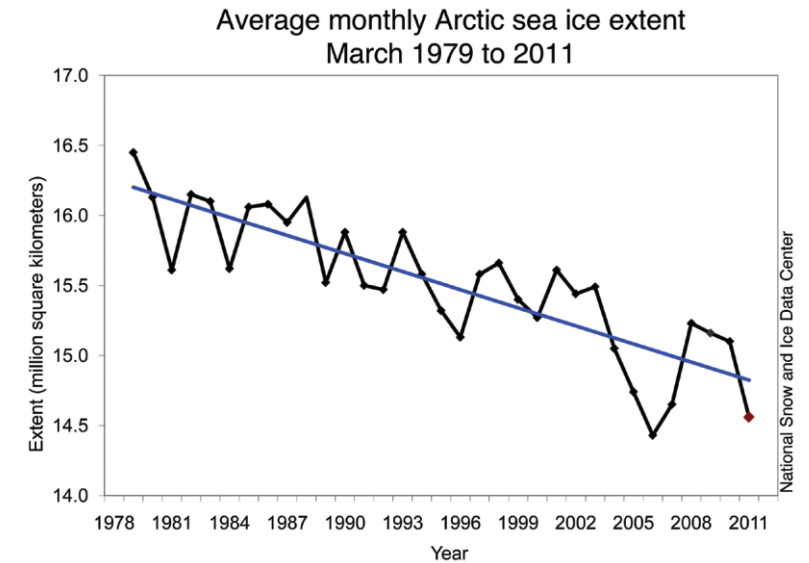
**DISTANCES**

The red line is about 11000 nautical miles long and the yellow line is about 5800 nautical miles long.

# DEVELOPMENT OF ICE



Development of Ice in the Arctic from 2006-2011.



## DEVELOPMENT OF ICE

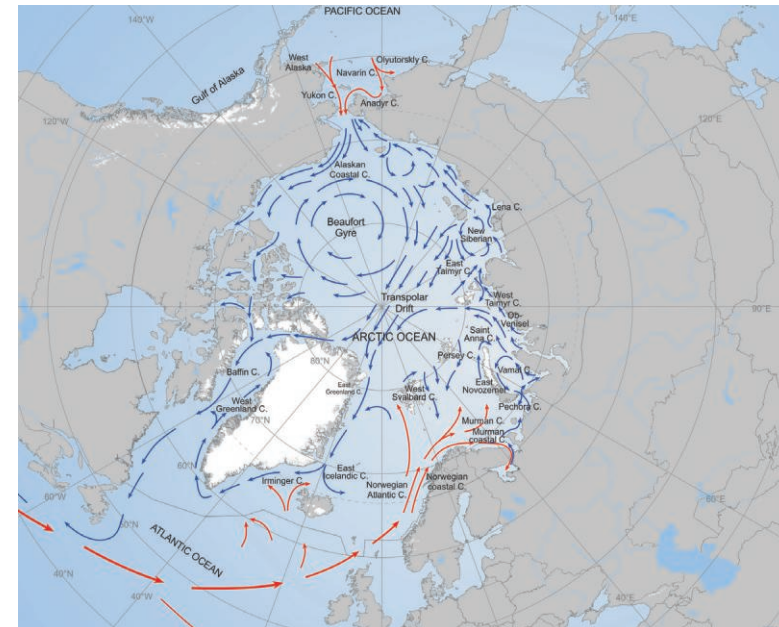
In the summer of 2011 the Arctic Sea Ice melt-down reached a new record low since the beginning of the satellite data record which ranges back to 1979 as well as according to other recorded data ranging back to the 50's. The Northern Sea route is vastly free of ice. Russians are taking advantage of that, sending numerous vessels through the route, amongst them the largest ever tanker to go through the route. Shipping in the Arctic is becoming a reality and all the Arctic nations are getting ready. The shipping and sailing will only increase with less sea ice.

# DRIFT ICE ROUTES & OCEAN CURRENTS IN THE ARCTIC



## ICEBERG TRACKS

The blue arrows show common iceberg tracks in the Arctic. During summertime the ice in the pole area, drifts towards the coast of Canada and Greenland due to strong wind from Russia.



## CURRENTS

The Gulfstream as a warm current is the main reason for the ice free ocean all around Iceland and along the coast of Norway even up to Murmansk in Russia.

# ICELAND





### ICELAND

Iceland is an island of almost 40,000 square miles, about the same size as Ohio or the former East Germany. About 11% of the country is covered by glaciers. Iceland also has more than 10,000 waterfalls and countless hot springs. Despite what its chilly-sounding name might suggest, Iceland does not freeze to a halt in winter. Average January temperatures in many parts of Iceland are actually higher than those in New York.



# ICELAND

## GEOGRAPHY, CLIMATE AND GEOLOGY

Iceland is located in the North Atlantic, about 3 hours by airplane from major cities in Europe and 5-6 hours from the East Coast of the USA. Shipping distances are 3-4 days to Europe and 7-8 days to the USA. Its mid-Atlantic location makes Iceland an ideal base for companies with business in both continents.

Geologically it is a young country, whose active volcanic forces have created huge resources of geothermal energy, which can provide economical industrial steam and electricity, while pollution-free hydropower resources have to some extent been developed in the mountainous highland terrain.

Despite its name, Iceland has relatively mild climate for its northern location at a latitude from 66°4' to 66°33'N and longitude from 3°30' to 4°3'W. The mean annual temperature in the capital, Reykjavík, is -1.5°C in January and 10.3°C in July. Temperatures from the northern town of Akureyri are -1.9°C in January and 10.9°C in July.

## RESOURCE BASE

The location and geology of Iceland determine its main natural resources, which are fish from some of the richest and cleanest waters in the world and "green" hydro and geothermal energy. Iceland is the 3rd largest fishing nation in the world, based on its catch volume in 2004. Another major resource is Iceland's unspoilt natural environment on which a large and growing tourist industry is based. High level of education, openness to innovation and specialist know-how also make Iceland's human resources an important asset for investors in many fields.

## HISTORY

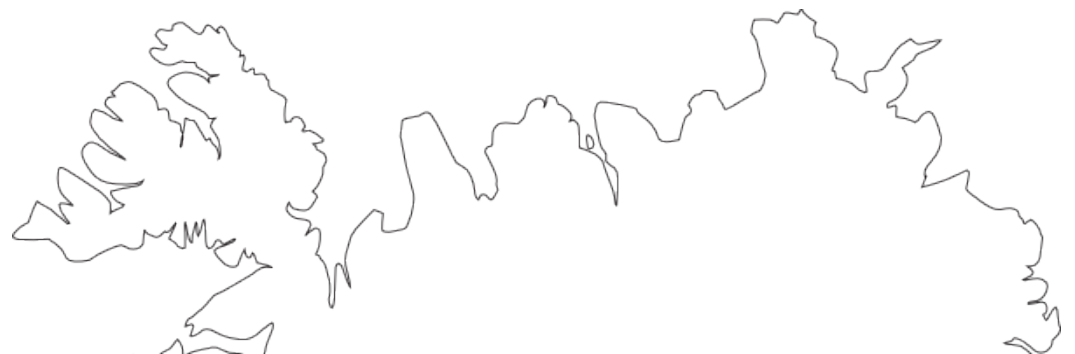
Iceland was settled in the ninth century by pioneering Vikings on the westward expansion, which took them as far as the shores of North America. They founded a unique republic in 930, and the oldest national parliament still functioning in the world today. Iceland passed under Norwegian and later Danish rule but became a fully independent republic again in 1944.

## LANGUAGE

Icelandic, the language spoken by the Icelanders, is really the ancient tongue of the Vikings and has changed remarkably little during the eleven centuries since the country was first settled. Knowledge of English is almost universal and most people speak one Scandinavian language. The majority of students past compulsory schooling age learn German, Spanish or French.

## POPULATION

Total population: 319.575 (January 1, 2012). Some 37.6% of the population live in the capital, Reykjavík, and 6.6% in the capital and neighboring communities. With 22.4% of its population aged 15 and below, and 10,7% aged 65 or above, Iceland has the youngest population in Europe. Source: Statistics Iceland, [www.statice.is](http://www.statice.is).



## INTERNATIONAL FRAMEWORK

Iceland is a founding member of the European Economic Area (EEA). This free-trade zone allows the traff-free movement of goods, services, capital and labor. A company domiciled in any of the other 30 member countries of the EEA, and in facts in any of the OECD countries, has the same rights to operate in Iceland as an Icelandic-registered company. It only needs to apply for the same permits and registration as an Icelandic-domiciled company. Companies registered in Iceland are permitted to operate in all the countries of the EEA without any special permits or legislation. The same rules apply to movements of labor. A national of foreign country who intends to stay in Iceland for a period exceeding three months must have a residence permit. However, a national of an EEA member country in search of a job is allowed to stay in Iceland for six months without a residence permit. A standard tax credit can be obtained within the tax authorities. Iceland is actively involved in the work of major international organizations. It is a member of the United Nations, Council of Europe, NATO, EFTA, OECD, GATT, GATS and WTO, and cooperates particularly closely in cultural and social fields with Scandinavian countries through the Nordic Council.

## GOVERNMENT AND POLITICAL SYSTEM

### *National Government*

Iceland is a parliamentary democratic republic. The head of state is the president, elected for a term of four years at a time, whose duties lie outside day-to-day party politics. The government is led by the Prime Minister. Parliamentary elections are held at intervals of no more than four years. There are 63 members of parliament, elected by proportional representation. Since no party has secured a parliamentary majority since the establishment of the Republic in 1944, Iceland has always been ruled by coalition governments.

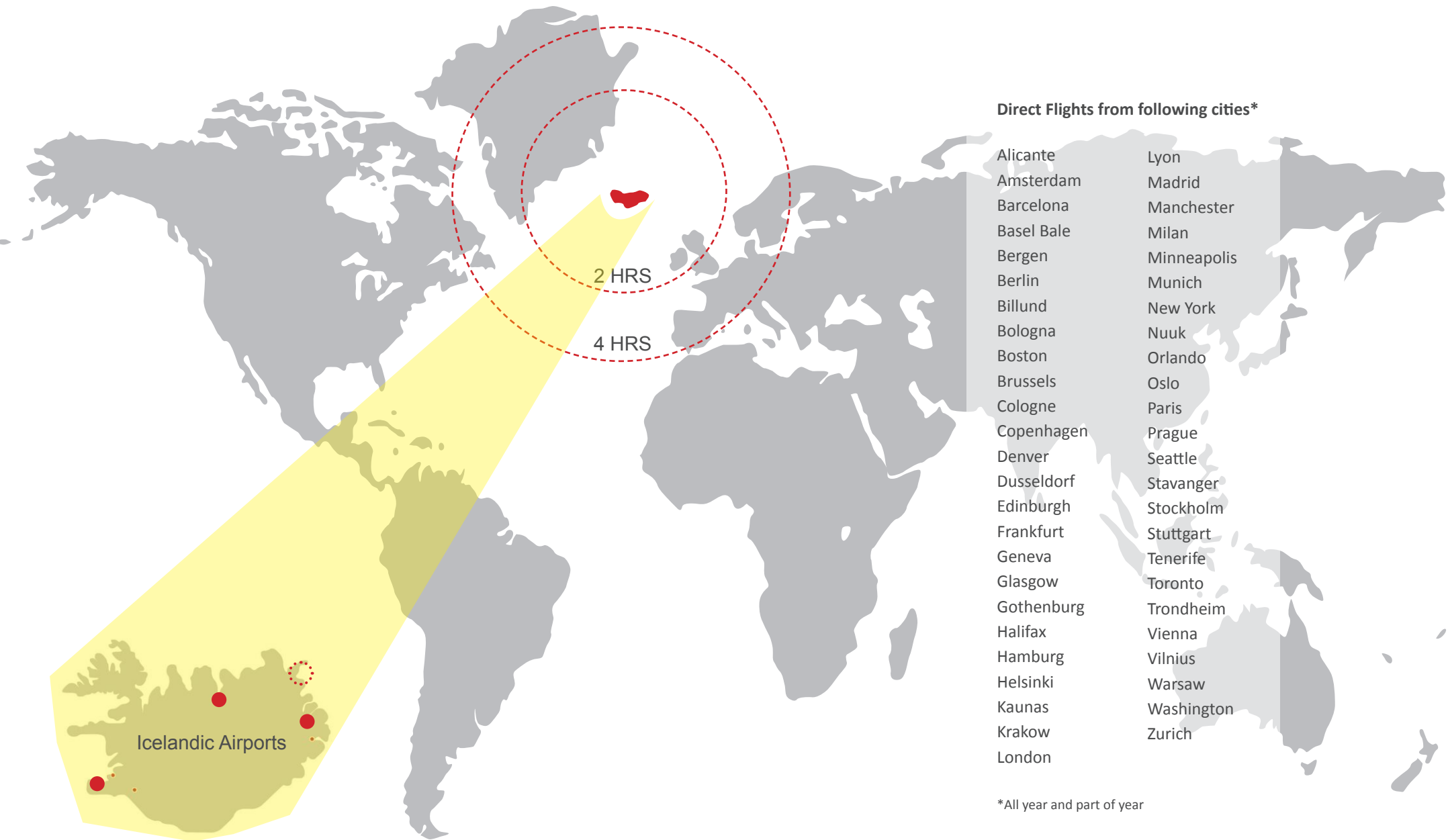
For further information see [www.utl.is](http://www.utl.is).

For more info on Iceland as an investment opportunity see:

[www.invest.is](http://www.invest.is).



# FLIGHT DISTANCES



\*All year and part of year



# SHIPPING DISTANCES



Dalian, China, crossing  
the North Pole

Finafjord	→	Rotterdam	1000 Nautical Miles
Finafjord	→	Halifax	2100 Nautical Miles
Finafjord	→	Dalian	5800 Nautical Miles

Halifax

Rotterdam

# GEOLOGY



photo from the website: [https://notendur.hi.is/oi/solheimajokull\\_photos.htm](https://notendur.hi.is/oi/solheimajokull_photos.htm)

## ICELAND'S GEOLOGY

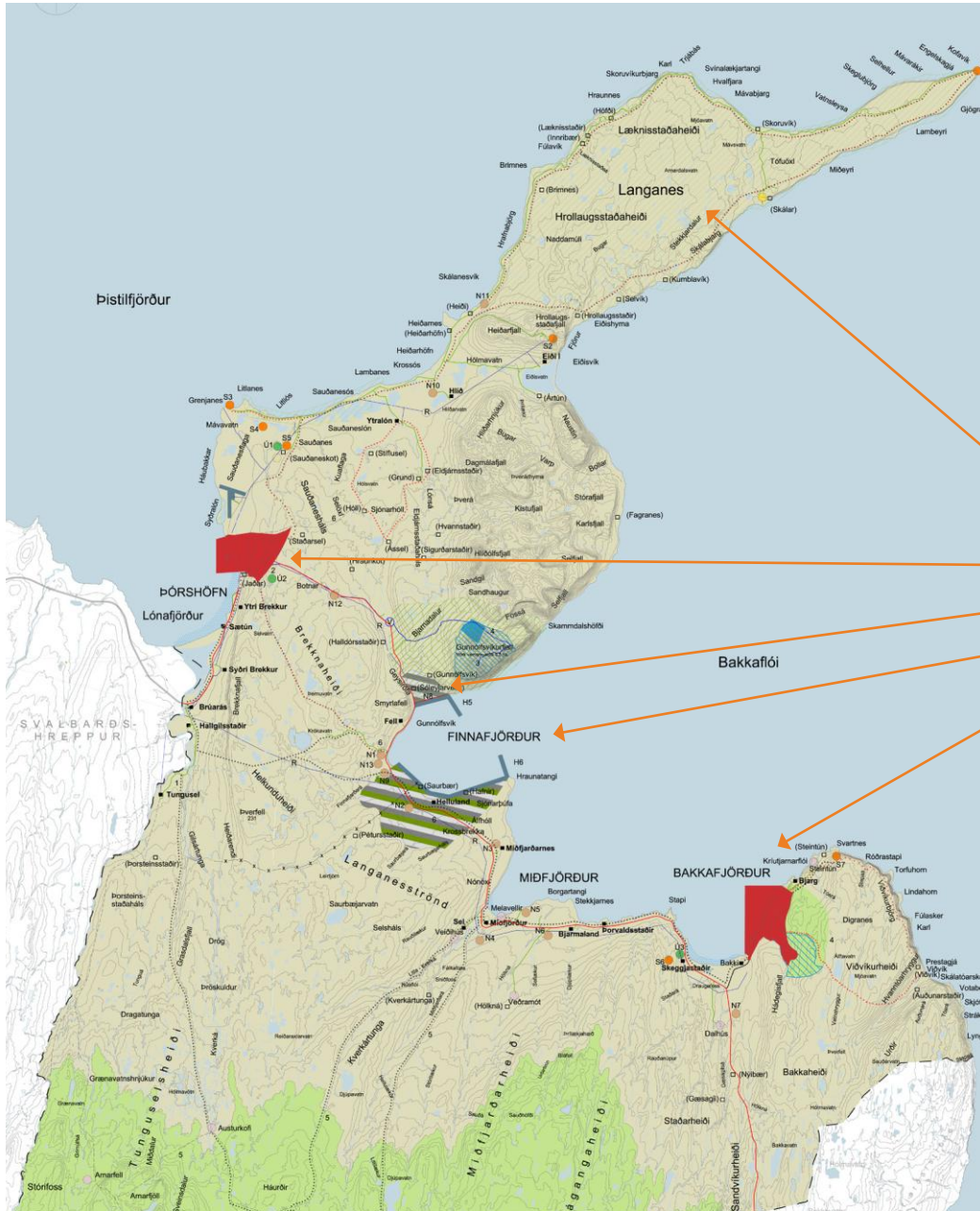
In geological terms Iceland is very young. The Ice age period of time, 10.000 years ago has formed mountains and fjords. After the ice melted, the land has risen. Due to this the coastline is dotted with more than one hundred fjords and green, fertile valleys extend from many of them. Those fjords are quite deep and the valleys are rich of gravel for construction work.





# NORTH-EAST ICELAND



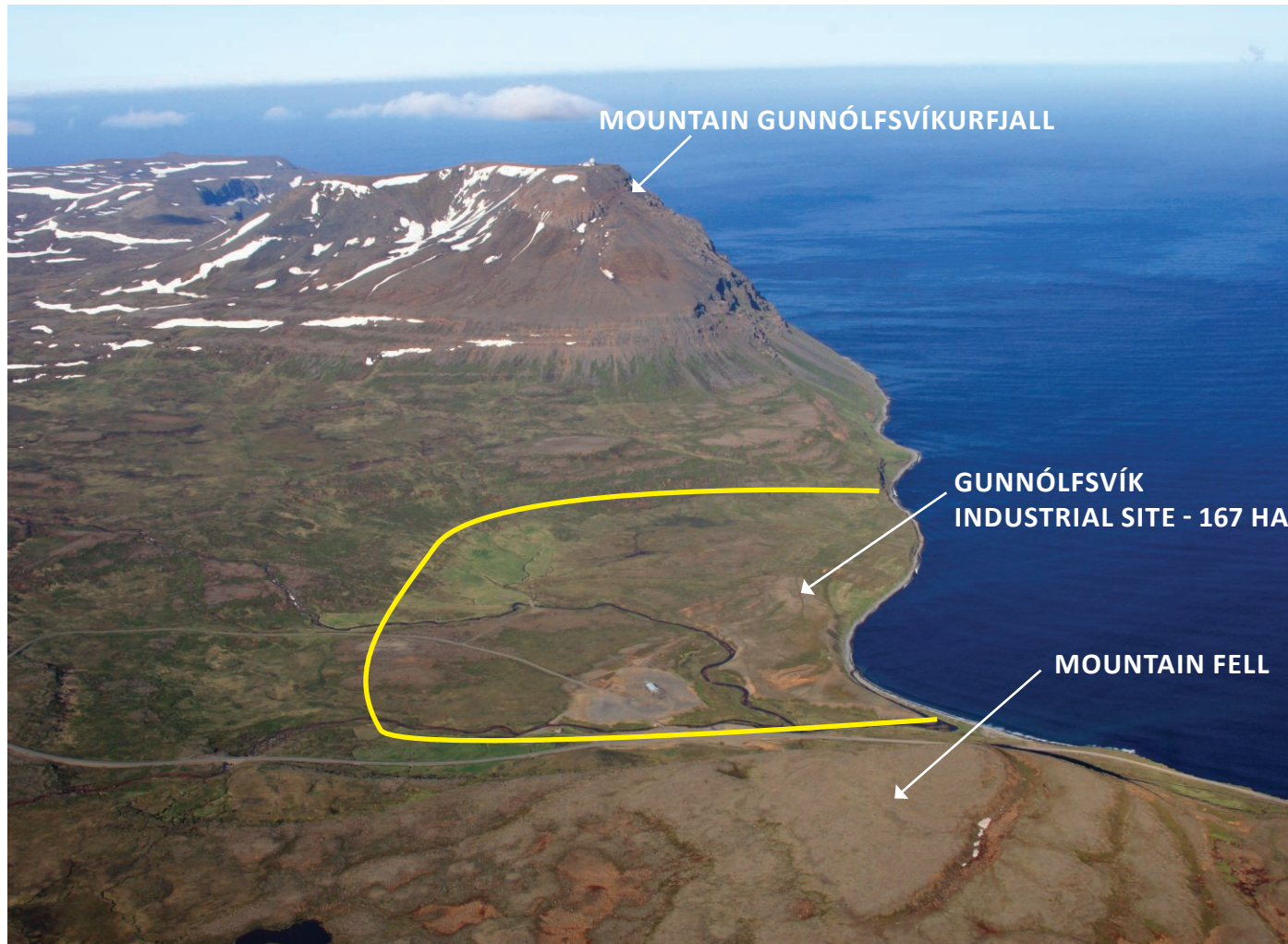


- Langanes peninsula - 40 km. long
- Thorshofn village - 500 inhabitants
- Gunnolfsvik industrial site - 167 ha
- Finnafjord - Project site
- Bakkafjordur village - 200 inhabitants

# LOCATION AND LANDMARKS



THORSHOFN



### **NORTH-EAST ICELAND**

The Finnafjord area is between two main villages in north-east Iceland. Thorshöfn in the north is in about 20 min. driving distance from Finnafjord and Vopnafjord in the south is in about 45 min. driving distance from Finnafjord. The small village Bakkafjörður is located in between.

The north-east part of Iceland is a densely populated area. About 1300 people are living in those three villages. Airports are in Vopnafjörður and in Thorshöfn used for domestic flights.

The peninsula Langanes is 40 km long. Langanes and the 700 m high Gunnólfsvíkurfjall is as a wind and wave braker for the Finnafjord. On top of the mountain Gunnólfsvíkurfjall is a NATO radar station.

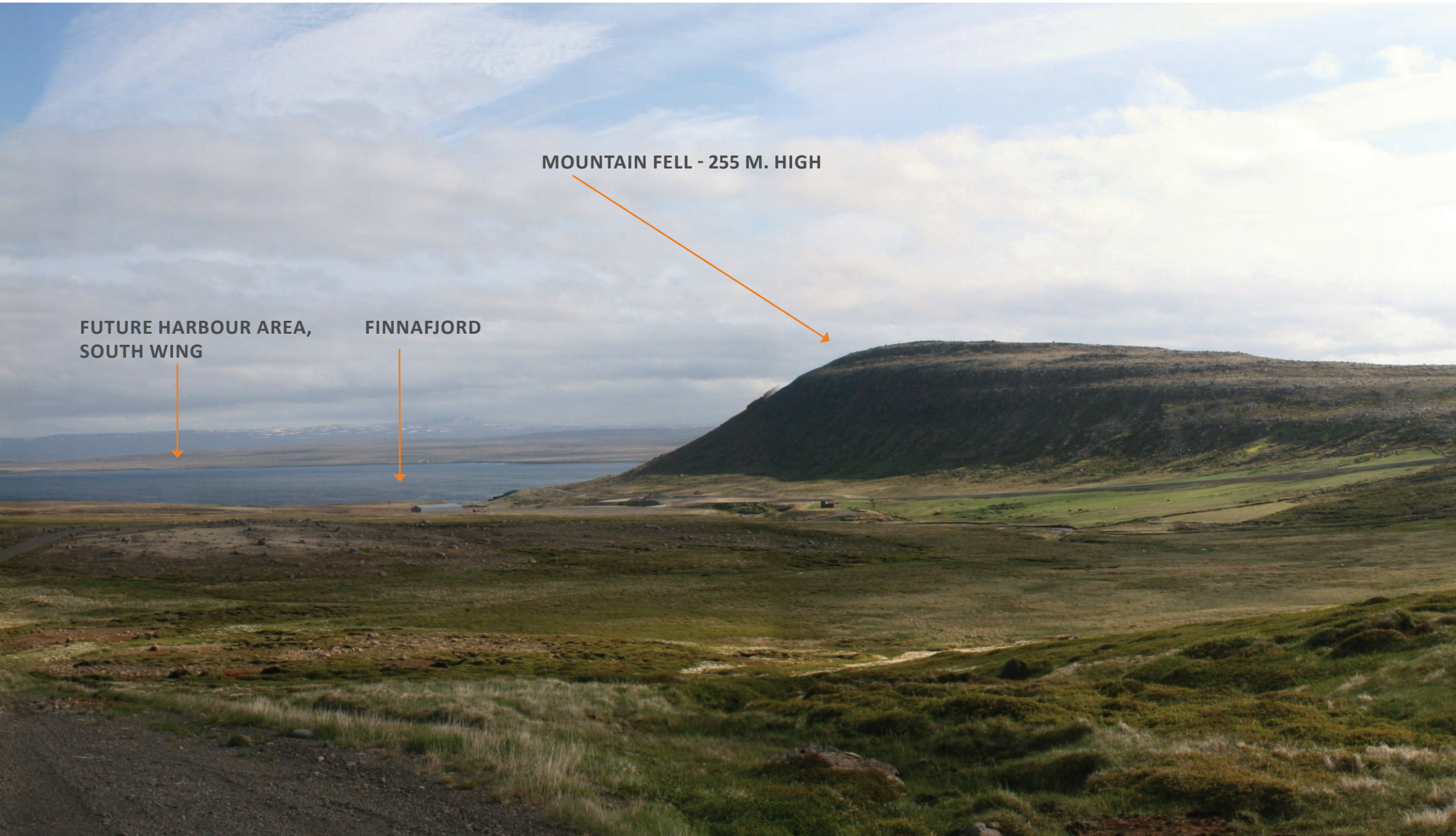
# THE FINNAFJORD SITE

MOUNTAIN GUNNÓLFSVÍKURFJALL - 700 M. HIGH

GUNNÓLFSVÍK INDUSTRIAL SITE - 167 HA







**MOUNTAIN FELL - 255 M. HIGH**

**FUTURE HARBOUR AREA,  
SOUTH WING**

**FINNAFJORD**

# THE GEOLOGY



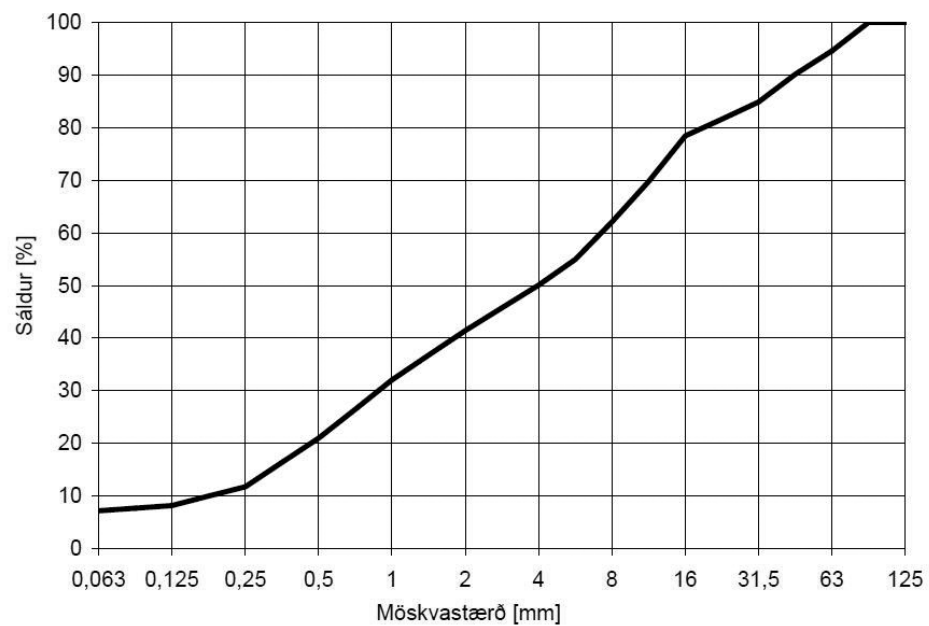
GUNNÓLFSVÍK INDUSTRIAL SITE

MOUNTAIN GUNNÓLFSVÍKURFJALL

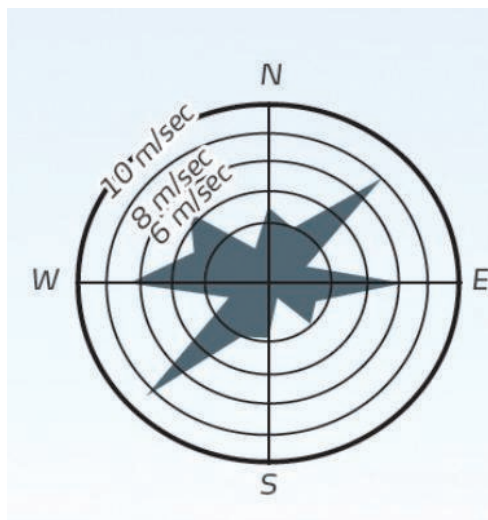


### THE GEOLOGY OF FINNAFJORD AREA

After the ice melted, the land has risen due to isostatic changes. Due to this the Finnafjord is deep and the former subsea gravel banks are now on dry land. This is the reason for the flat surface. This material is ideal for constructions and the making of concrete. The area has a very thin layer of earth and primitive vegetation due to good drain effects.



# THE WEATHER SITUATION

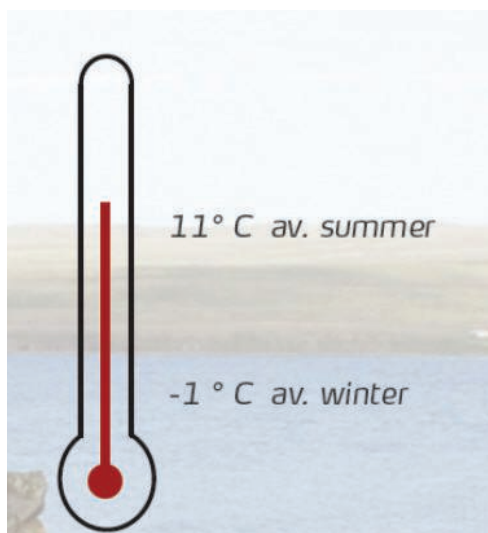


## THE WEATHER SITUATION BASED ON DATA FROM A NEARBY WEATHER STATION.

The average temperature over the year is around 4 °C. In the summer time the average temperature is around 11 °C but around -1 °C in the winter time. The average temperature over the year in Reykjavík is around 5,5 °C.

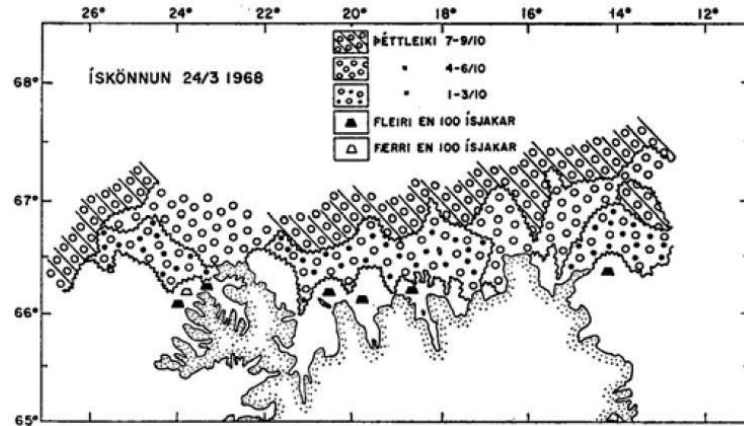
The average precipitation over the year is around 600 mm. This is low for Iceland and is so because low pressure areas are hitting Iceland from the south and south-west. The poor vegetation in the area is due to low precipitation.

The most common wind directions are from north-east or south-west. The windspeed is relative low for a costal area in Iceland. This is partly due to the wind shield effects from Langanes with relative high mountains on the north site of the Finnafjord.





# THE OFFSHORE SITUATION

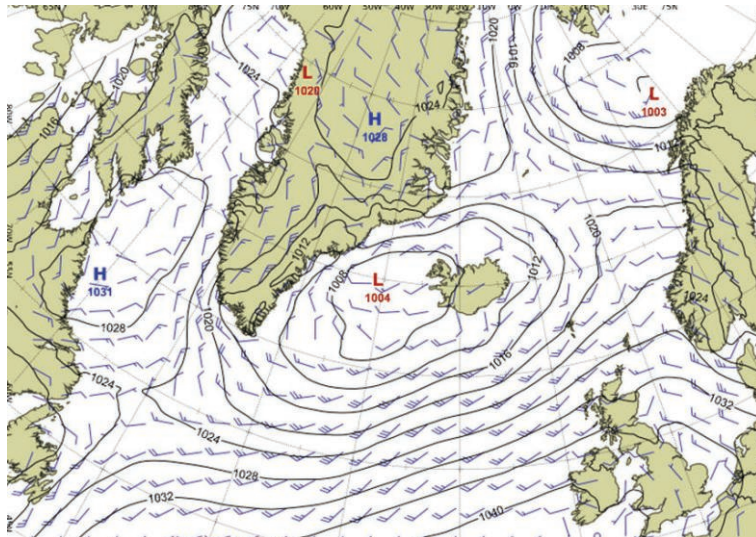


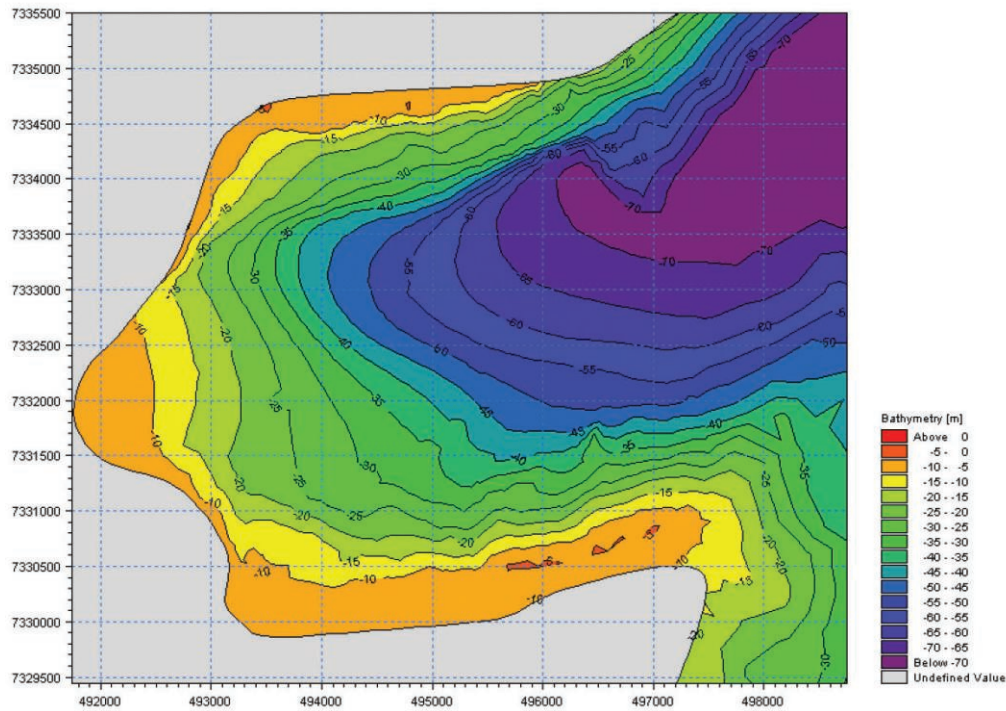
Picture from the Icelandic Coast Guard

## THE GULFSTREAM

Normally the the Gulfstream carries mild rather-warm ocean water towards the South and East coast of Iceland. Due to the movement of Low pressure areas crossing the North Atlantic Ocean the wind direction is from south and southwest. This is the main reason for the ice free ocean around Iceland the whole year around.

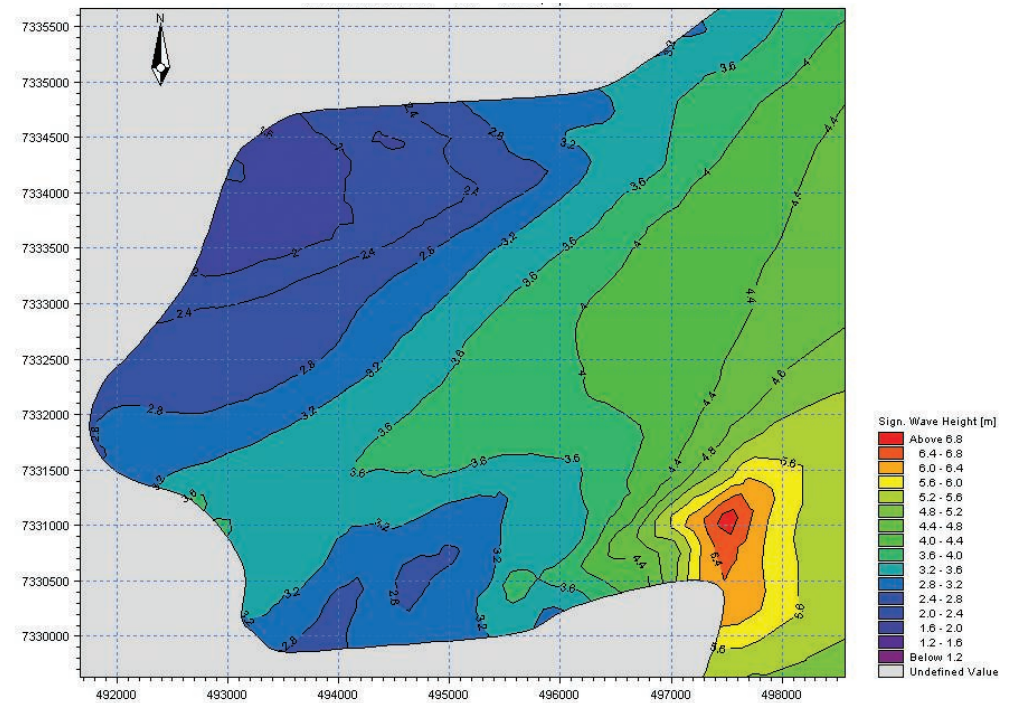
The ice is packed at the east coast of Greenland and drifting from there towards south-west with cold currents along the coast of Greenland. Rather seldom the ice drifts towards Iceland and can hit the north and west coast of Iceland. The Langes peninsula is like a long arm preventing the ice from drifting towards the south. The picture is from March 1968. This is the one of the reasons why Finnafjord is better located for a transshipping Hub than fjords at the north coast of Iceland.





## DEPTH

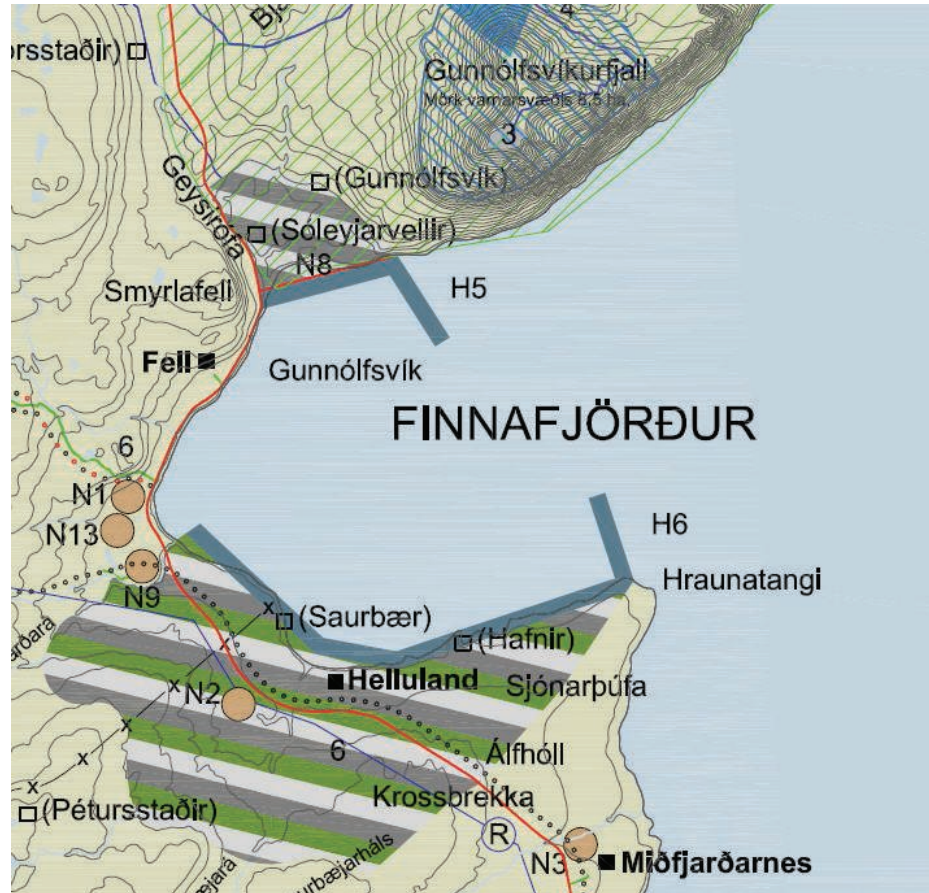
The depth in the Finnafjord was first measured with a radar in the summer of 2007 by the Icelandic Marine Research Institute. The surprising fact is that the depth close to the current coastline is between 25-70 m. Keeping in mind all the gravel material on the onshore coast it should be ideal to build up a harbour facility in the Finnafjord.



## WAVE HEIGHT

The wave height in the Finnafjord was predicted by using a calculation model using wave heights and currents in the North Atlantic Ocean and close to the coast of Iceland. This was done in the year 2008 by the Icelandic Maritime Administration. The result is in line with experience from the fishermen themselves. The worst case calculated scenario for Finnafjord shows the following surprising fact. A wave coming once in 100 years in Finnafjord is lower than a wave coming once a year near Reykjavik!

# THE HARBOUR



## THE AREA

The ownership of the land on the north side of the Finnafjord is owned by the state of Iceland. This includes the chain of mountains along the peninsula Langanes and the 167 ha industrial site in Gunnólfsvík. The ownership of the farms, Miðfjarðarnes, Saurbær, Helluland and Fell towards the west and the south of the fjord is in private hands. The farm Fell is the only one in operation. Fell is not a part of the harbour project according to the new masterplan due





to the mountain Fell and other small hills on Fells site near to the coast line.

The description about the new harbour facility in the new master plan indicates the site as ideal for cargo-and transshipment hub, oil and gas storage, oil refinery, gas liquidation as well as other industrial activity where a harbour is needed with deep water at the quay.

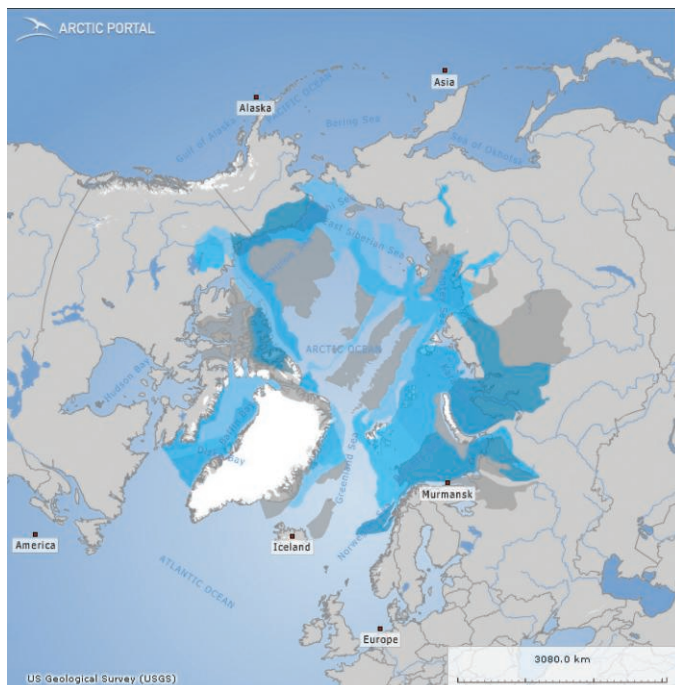
The width of the Finnafjord is about 4,5 km and the inner space of the harbour dock area is around 17 sqkm. The length of the quays in the new master plan is around 6,3 km and the industrial and harbour area close to the quays is around 650 ha. The total industrial and service area close to the harbour area is about 450 ha. There is only need for short wave breakers in front of the harbour.



# OPPORTUNITIES



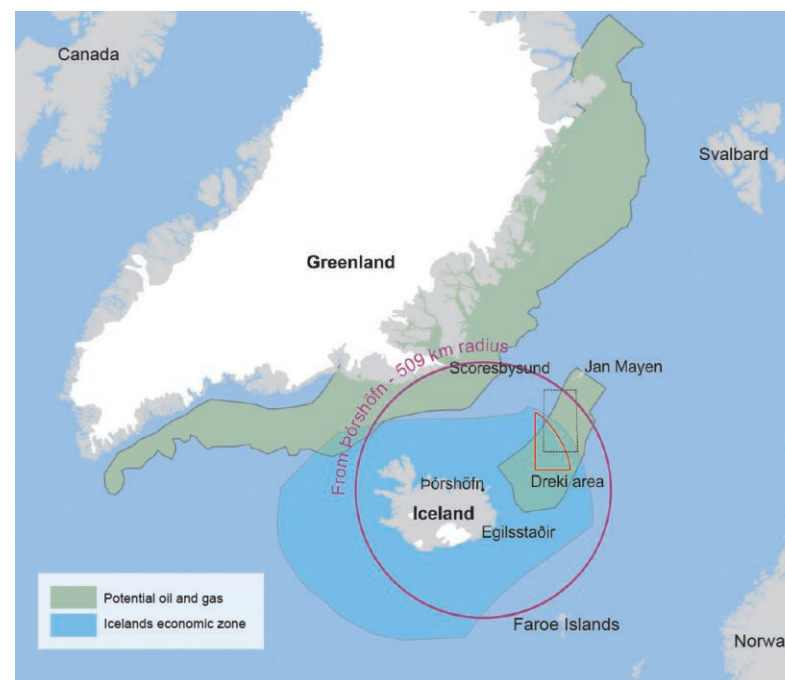
# MINERAL RESOURCES



## OPPORTUNITIES IN THE ARCTIC

The world's attention has turned to the Arctic in recent years, not least because of its vast energy resources. About 18% of the total oil resources and 30% of the gas resources on Earth are estimated to be in the Arctic ([www.arcticportal.org](http://www.arcticportal.org)).

Preliminary research indicates oil and gas in Icelandic waters at the so-called Dreki area. The shortest way from there to Iceland is to Langanes. Close to Dreki on the Jan Mayen territory is research work is ongoing. Further research work, including the first deep drilling will take place 8-10 years from now.



Preliminary research work indicates oil and gas in Greenland waters. The Greenland government plans to tender out research work for some areas soon. Furthermore the east coast of Greenland is rich in different mineral resources.

America and Europe are important markets for oil and gas from the Arctic. Iceland is in the middle of the North Atlantic ocean corridor between Greenland and Norway. The Finnafjord harbour could play an important role, servicing all the above mentioned activities and could be an important hub (plattform) for distribution of goods to those two big markets.

Picture from Aker Arctic Technology, www.akerarctic.fi



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