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SÉRSTAÐA BYGGÐAR Á ÍSLANDI

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1. INNGANGUR

Greinargerð þessi er unnin að beiðni utanríkisráðuneytisins og er markmið með gerð hennar að taka saman upplýsingar um nokkra þætti sem varða sérstöðu byggðar á Íslandi með hliðsjón af umsókn Íslands að ESB. Er þetta hluti af stærra verkefni, þar sem Landbúnaðarháskóli Íslands og Byggðastofnun annast samantekt annarra skyldra þátta. Valtýr Sigurbjarnarson og Hjalti Jóhannesson unnu að þessari samantekt fyrir hönd RHA.

Í samningi um verkið var gert ráð fyrir að samantektin yrði að mestu í formi taflna og korta og að gögn og skýringar verði á ensku. Hér er farin sú leið að hafa kaflafyrirsagnir og inngang að hverjum kafla á íslensku en undirfyrirsagnir, þ.e. einstök efnisatriði á ensku, svo og skýringartexta og töflu- og myndafyrirsagnir. Gert var ráð fyrir að hafa textann knappan en lýsandi og áhersla lögð á gagnaöflun fremur en túlkun samkvæmt beiðni verkkaupa. Ákveðið var að setja upplýsingar um nokkra þætti í viðauka og stytta þannig meginmál. Ákveðin skörun er milli nokkurra kafla í greinargerðinni og þess vegna er að finna endurtekningar á nokkrum stöðum en leitast hefur verið við að vísa í myndir og texta eftir föngum.

2. SAMKEPPNISHÆFNI, ALÞJÓÐAVÆÐING OG FLUTNINGSKOSTNAÐUR

Þessi hluti úttektarinnar snýr að mestu um stöðu Íslands gagnvart öðrum löndum/markaðssvæðum en minna um mismunandi aðstæður eftir einstökum landsvæðum eða tegundum svæða innanlands. Gögn um þessa þættir eru ágætlega aðgengileg, einkum á vef Hagstofu Íslands.

2.1. *Main trading partners/distances from global markets*

The European Economic Area was the largest market area for Icelandic products in 2009. The share of exports to the EEA was 83.5% in 2009 and had increased from 77.3% in 2005. The share of the EEA countries in total imports was 64.8% in 2007–2009 in comparison to 69.3% in 2005. In the same period, exports to the United States and Japan and imports from the United States and Japan have decreased. The Netherlands was the largest export trading partner in 2009 while the largest share of imports to the country came from Norway.

The exports to and imports from individual countries by commodities can be seen on Statistics Iceland's website: www.statice.is/Statistics/External-trade/Exports-and-imports.

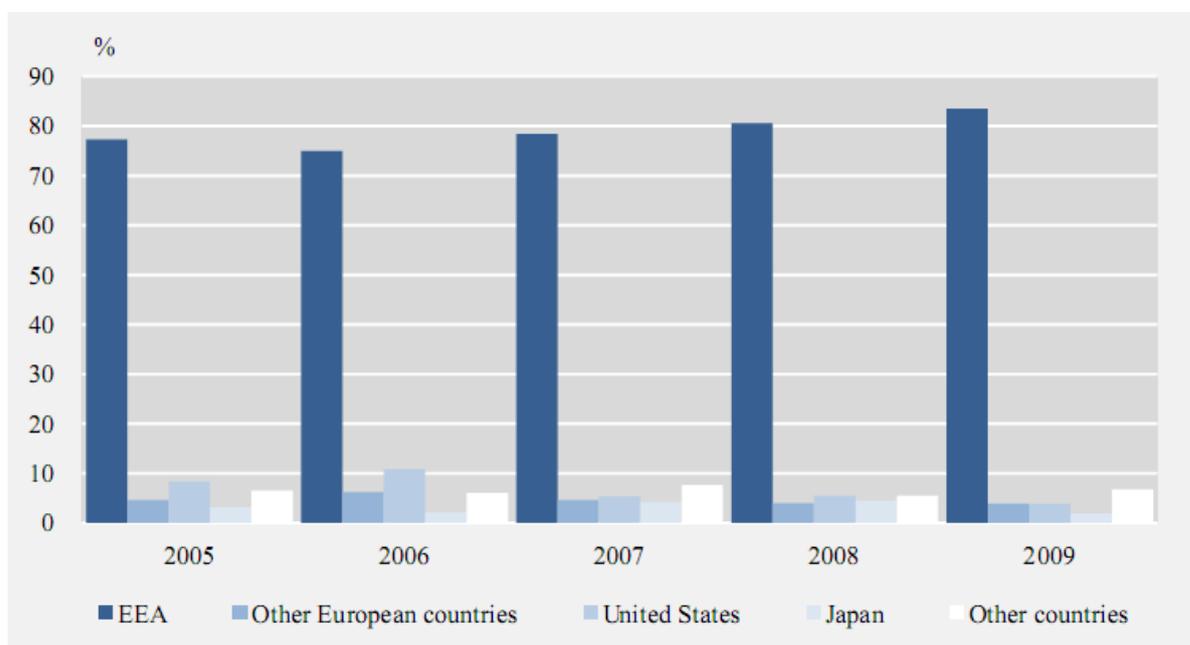


Figure 1. Exports by market areas 2005-2009

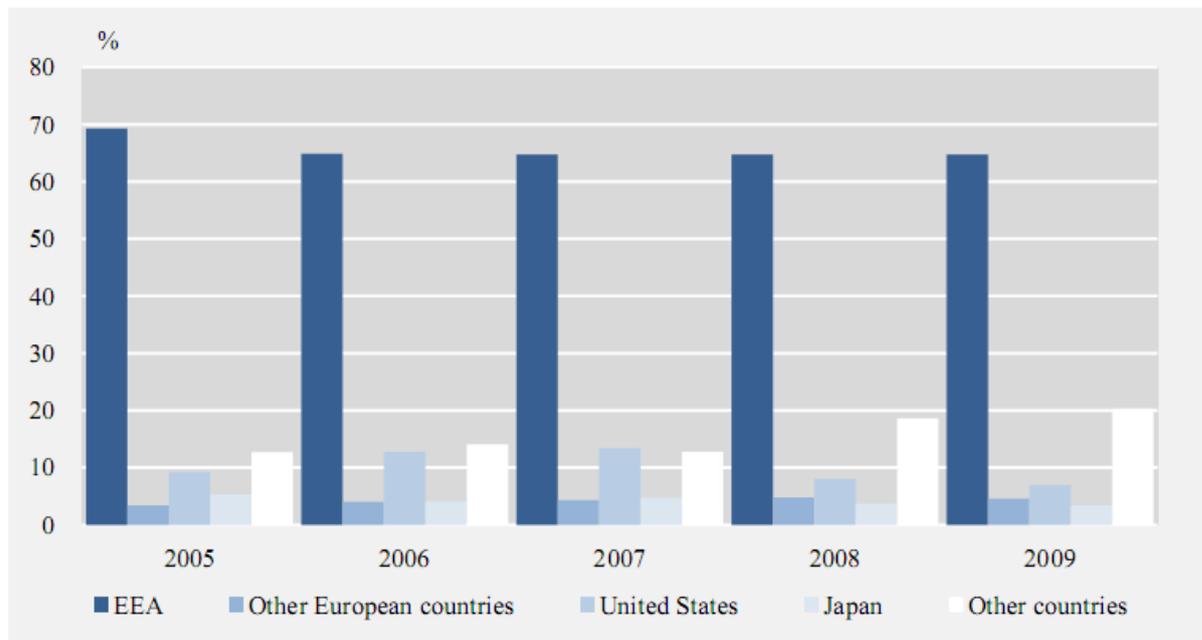


Figure 2. Imports by market areas 2005-2009

Figure 1 and Figure 2 show exports and imports by main trading countries in 2009. Figure 3 shows the balance of trade vis-à-vis main trading countries in 2009. There was a considerable surplus in the trade with the Netherlands whereas there was a deficit in the trade with Denmark, Norway and Sweden.

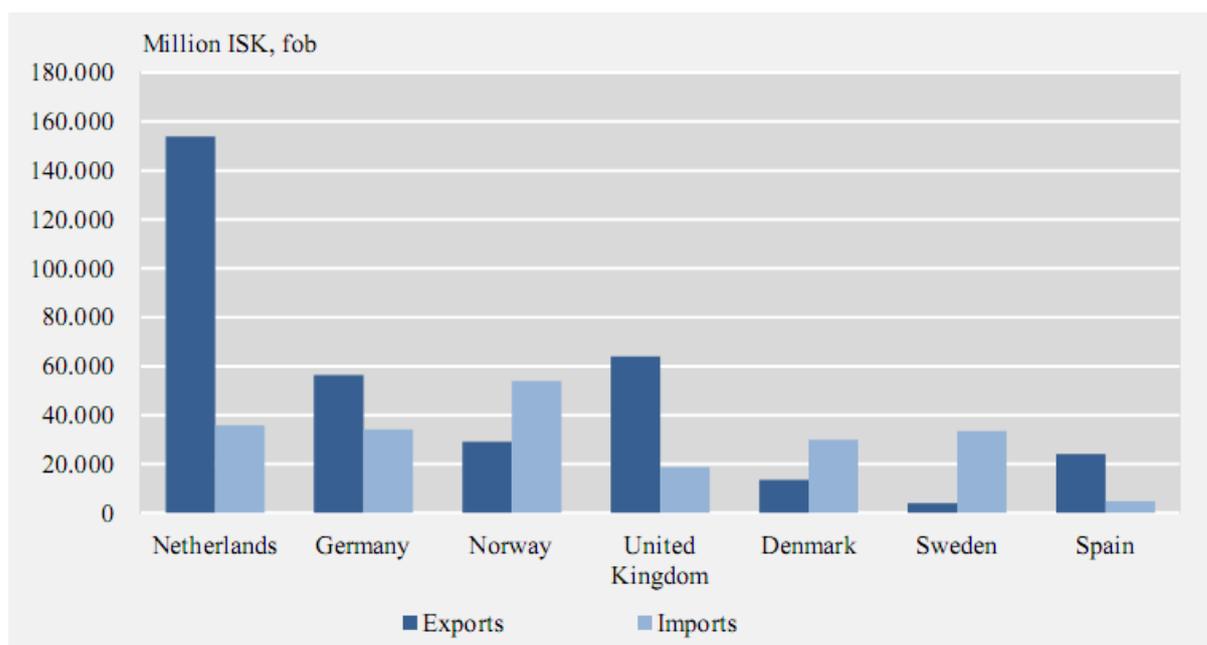


Figure 3. Exports and imports by main trading countries in 2009

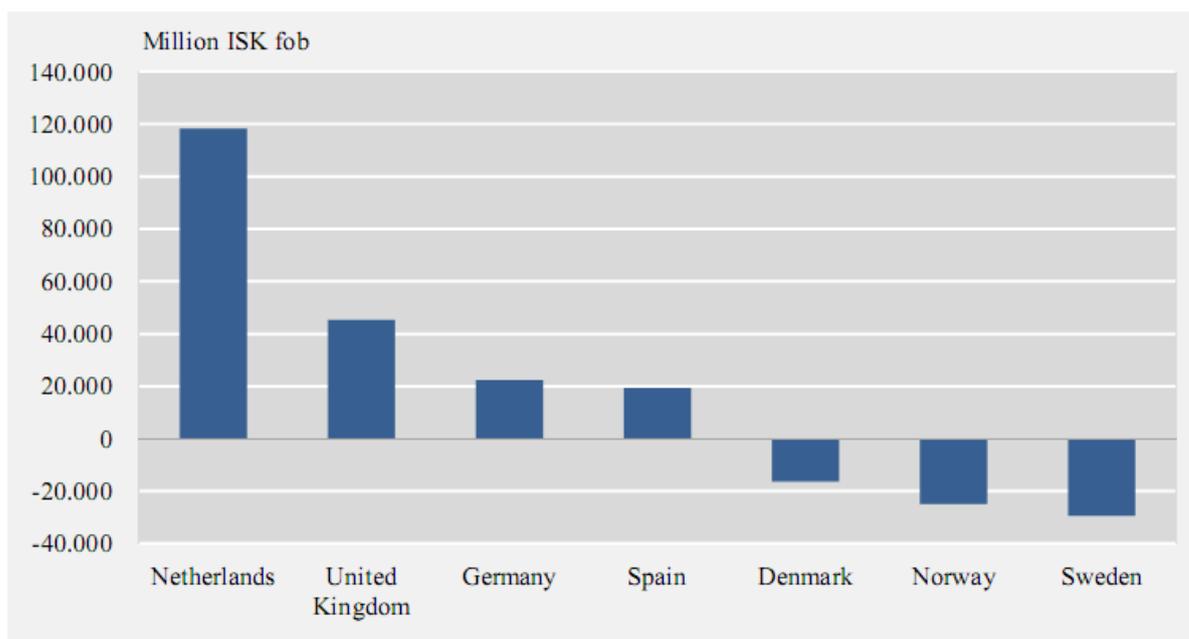


Figure 4. Balance of trade by main trading countries in 2009

Table 1. Exports by main trading countries in 2007-2009

Fob-value at current exchange	2007		2008		2009	
	Mill. ISK	Rank	Mill. ISK	Rank	Mill. ISK	Rank
Total	305,095.8	•	466,859.5	•	500,854.5	•
Netherlands	64,885.8	1	160,477.5	1	153,981.7	1
United Kingdom	40,333.8	3	54,189.0	2	63,970.4	2
Germany	40,815.0	2	52,777.4	3	56,403.2	3
Norway	11,565.0	8	20,344.8	6	29,066.7	4
Spain	14,158.8	6	17,861.0	7	24,130.5	5
United States	16,049.7	5	25,720.1	4	19,402.9	6
France	7,827.3	10	14,287.3	9	17,575.1	7
Ireland	23,077.4	4	1,350.3	25	15,228.4	8
Denmark	10,080.3	9	14,642.5	8	13,512.3	9
China	2,375.9	19	10,276.9	10	11,728.3	10
Nigeria	3,720.8	17	5,442.9	15	10,187.5	11
Japan	12,775.6	7	20,453.0	5	9,304.5	12
Belgium	4,997.7	13	7,214.1	12	9,208.6	13
Portugal	7,560.0	11	8,791.7	11	8,804.7	14
Switzerland	3,856.6	16	4,271.0	16	6,609.3	15
Russia	4,185.6	15	6,201.2	13	6,093.0	16
Lithuania	2,763.9	18	5,956.7	14	5,733.1	17
Poland	1,909.4	23	3,545.2	19	5,321.2	18
Italy	1,991.2	22	3,647.5	18	5,106.1	19
Sweden	2,214.4	20	3,912.7	17	4,000.8	20

The increase in export to the Netherlands in 2008 is quite noteworthy. That year the largest aluminium plant in Iceland opened¹. The plant is owned by

¹ http://www.alcoa.com/iceland/en/info_page/home.asp

Alcoa and its production is transported to the European market. Similarly in next table an increase can be seen in imports from Norway in 2008. Important inputs to the aluminium production of the Alcoa plant (anodes) are imported from Norway² and this probably contributes significantly to the deficit of trade with Norway. Fluctuations in exports to some countries is very much linked with fluctuations in fisheries, e.g. export of capelin to Japan.

Table 2. Imports by main trading countries in 2007-2009

Cif-value at current exchange rates	2007		2008		2009	
	Mill. ISK	Rank	Mill. ISK	Rank	Mill. ISK	Rank
Total	429,468.9	•	514,739.3	•	446,128.2	•
Norway	19,682.3	9	57,644.4	1	57,865.6	1
Netherlands	24,012.8	5	31,234.4	7	38,506.2	2
Germany	51,582.5	2	52,819.2	2	36,847.1	3
Sweden	42,848.3	3	46,277.0	3	35,937.7	4
Denmark	31,660.9	4	37,695.7	5	32,453.6	5
United States	57,558.6	1	41,353.8	4	30,972.2	6
China	21,601.8	7	34,110.3	6	22,161.8	7
United Kingdom	22,875.1	6	22,467.5	9	20,298.4	8
Brazil	526.4	44	1,635.6	35	18,298.0	9
Japan	20,161.6	8	19,130.9	10	15,317.3	10
Italy	14,550.0	10	14,411.7	12	12,299.8	11
Switzerland	8,555.2	12	16,314.3	11	12,241.0	12
France	12,201.0	11	12,157.3	13	8,635.7	13
Canada	7,583.1	13	5,313.8	20	8,584.8	14
Australia	3,200.3	24	22,774.2	8	7,212.4	15
Belgium	6,725.4	16	6,809.5	15	6,871.9	16
Ireland	7,193.0	15	5,547.9	19	6,821.1	17
Suriname	1,362.3	35	5,268.3	21	6,341.9	18
Jamaica	1,587.1	31	5,054.6	22	5,992.7	19
Spain	5,694.2	18	6,020.8	17	5,455.9	20

2.2. Exports, imports and balance of trade

Goods and services exported from Iceland accounted for a total of 869 billion ISK in 2010. Thereof goods (fob) accounted for around 65% and services 35%. The balance of trade was positive by around 163 billion ISK, thereof goods (fob) 73% and services 27%.

According to data from Statistics Iceland, goods were exported from Iceland in 2009, for 500,900 million ISK fob and imported into Iceland for 410,600 million ISK fob, 446,100 million ISK cif³. Thus there was a trade surplus for the

² http://www.alcoa.com/norway/en/info_page/home.asp

³ Fob: Free on board. Cif: Cost, Insurance and Freight

first time since 2002 of 90,300 million ISK, calculated on fob value, compared with 6,700 million ISK trade deficit in 2008. Exports values increased by 7.3% at current prices while imports decreased by 13.3%.

Marine products constituted 41.7% of all exports, the second time in a row with less share than manufacturing products, increasing in value by 21.8% from the year before, at current prices. Manufacturing products were 48.6% of the total exports, increasing in value by 0.2%, at current prices.

The largest import categories were industrial supplies accounting for 31.4% of total imports, capital goods (except for transport) with 21.1% of total imports and consumer goods, other than food and beverages, with 15.5% share. Measured in ISK, the decrease in imports was greatest in industrial supplies, transport equipments and capital goods. The share of EEA countries was 83.5% in exports and 64.8% in imports.

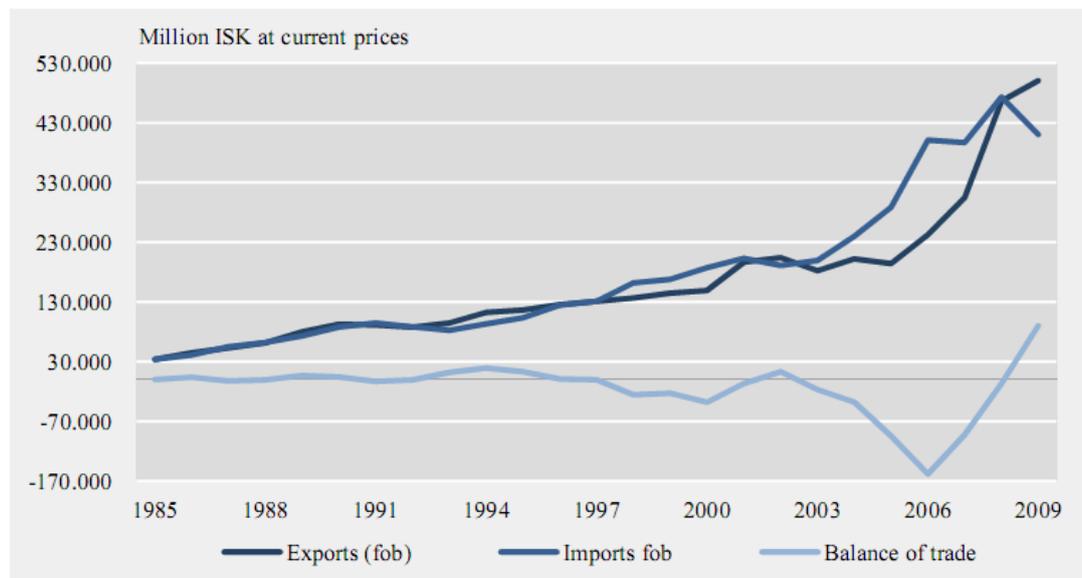
Table 3. Value of external trade at current value and changes at constant value in 2008 and 2009

	2008	2009	Change on previous year at constant exchange rates, ¹ %
Exports fob, total	466,859.5	500,854.5	-20.0
Marine products	171,348.7	208,623.6	-9.2
Agricultural products	6,426.6	7,682.7	-10.8
Manufacturing products	243,147.2	243,641.0	-25.3
Other products	45,937.0	40,907.2	-33.6
Imports fob, total	473,524.7	410,574.8	-35.3
Food and beverages	37,383.4	41,774.1	-16.6
Industrial supplies n.e.s.	148,577.5	124,929.5	-37.3
Fuels and lubricants	58,254.6	51,105.3	-34.6
Capital goods (except for transport)	102,477.8	88,365.2	-35.7
Transport equipment	60,395.9	39,758.6	-50.9
Consumer goods n.e.s.	66,071.9	64,111.2	-27.6
Goods n.e.s.	363.6	530.9	8.9
Balance of trade	-6,665.2	90,279.7	•

¹ At trade weighted average rates of exchange; change on previous year 34.1%.

Source: Statistics Iceland

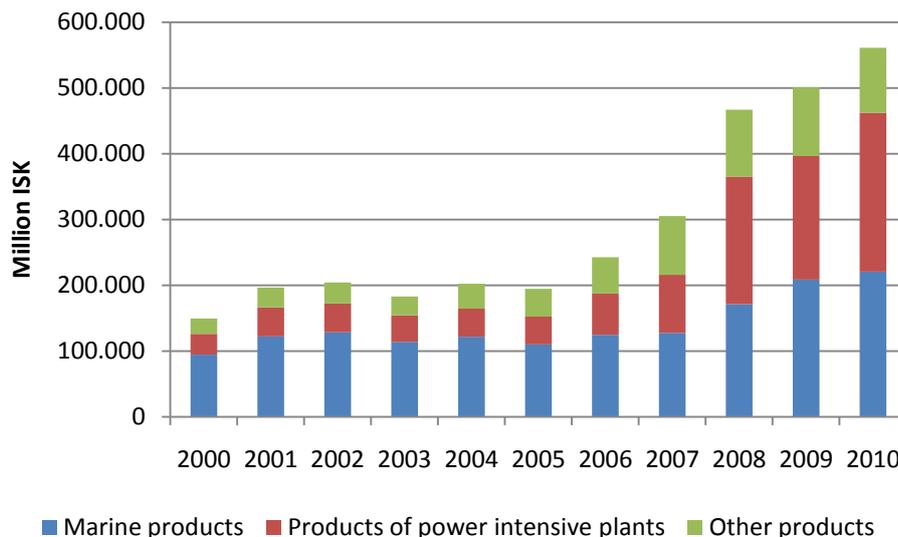
Figure 5 shows the development of exports fob, imports fob and balance of trade fob. 1985-2009. Interesting is the trade deficit increasing prior to the credit crunch in 2008 and the devaluation of the ISK.



Source: Statistics Iceland

Figure 5. External trade 1985-2009

In recent years there has been a change in the main export products from Iceland which also impacts trading routes. Traditionally, Iceland has been dependent on fish exports but aluminium production has increased much. The number of workers in aluminium plants in Iceland is around 1,800 and if the multiplier effects are around 1.4 then some 4,300 persons earn their income from aluminium production or around 2.5% of the total Icelandic labour market (www.statice.is). It is estimated that these companies buy goods and services from 700 Icelandic businesses.



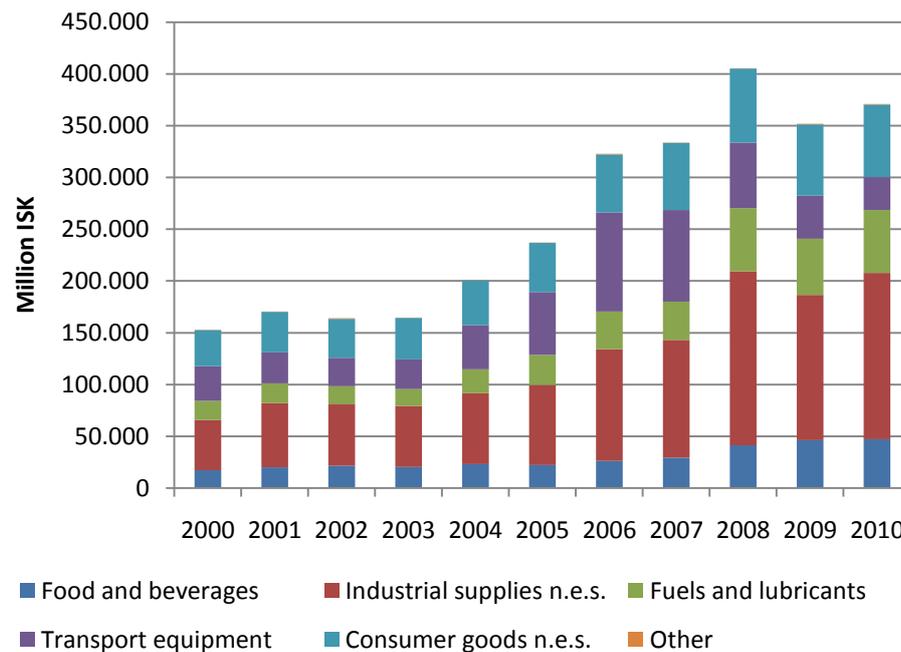
Source: Statistics Iceland

Figure 6. Development of export value 2000-2010, two largest sectors

Figure 6 shows the two main pillars of Icelandic export production; marine products and products of energy intensive industry⁴. In 2007 aluminium surpassed marine products as the main export product, note that the value of the ISK fell in 2008 and contributed to increased export value in ISK. In 2010, fish products and aluminium were almost equally important products with 39.3% and 39.6% respectively of the total export value (www.statice.is). The aluminium products are mainly shipped to the European market and thus large transshipment harbours such as Rotterdam have become the destinations for the production and the Netherlands the main trading partner.

Due to e.g. small domestic market, Iceland relies to a large degree on imports of diverse consumer and investment goods. Figure 7 depicts the main import categories by value.

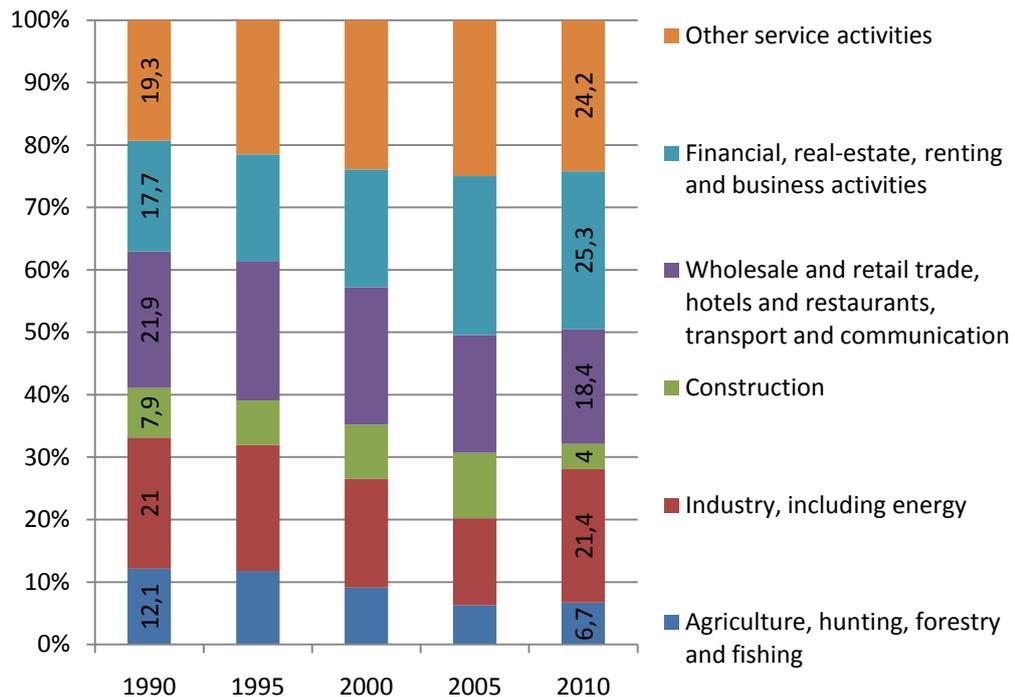
⁴ Mainly aluminium, but also ferro silicon products.



Source: Statistics Iceland

Figure 7 Development of import value by main categories 2000-2010

There has been considerable change in the main import categories in the past few years especially before and after 2008. Prior to the credit crunch and the devaluation of the ISK in 2008, import of transport equipment was noteworthy but also steady increase in industrial supplies. After 2008 there is noticeable increase in industrial supplies as a result of increased industrial production but also increase in foods and fuels reflecting higher value of these products both on the world market and in ISK due to its devaluation.



Source: Statistics Iceland

Figure 8 Share of different economic sectors in gross domestic production 1990-2010

The figure above shows the share of different economic sectors 1990-2010 in the GDP. Among many changes changes in the period is the decreasing importance of the primary sector accounting for over 12% in 1990 but only 6.7% in 2010. Furthermore services have increased much and account for 68% of all GDP. Manufacturing declined relatively after 1990 but increased again in the last decade as a result of increased energy intensive industry. After the credit crunch in 2008 construction decreased much but it had reached a peak of 11.5% in 2007. Another sector that experienced changes during that period was the financial sector peaking at 27% in 2007.

Table 4. Employed persons by economic activity in 2010 (%)

Employed persons by economic activity (percentage distribution)	Capital region	Other regions
<i>Agriculture and fishing total</i>	1.2	14.2
Agriculture	0.4	7.3
Fishing	0.8	6.9
<i>Industry total</i>	15.2	24.7
Fish processing	0.6	5.0
Manuf. except fish processing	8.2	10.9
Electricity and water supply	1.0	0.8
Construction	5.4	8.0
<i>Services total</i>	83.7	61.1
Wholesale, retail trade, repairs	13.7	9.8
Hotels, restaurants	5.2	3.9
Transport, communication	7.2	5.1
Financial intermediation	6.1	2.3
Retail estate and business activities	13.2	5.5
Public administration	5.2	5.1
Education	12.2	12.2
Health services, social work	17.9	15.1
Other services and n.s.	3.0	2.1

Source: Statistics Iceland

Table 4 shows the different economic structure of the capital region and other regions measured by share of employed persons in different economic activities. Note however that this division of the country in two regions has to be used with great caution as the functional region of the capital region is larger than the statistical region used by Statistics Iceland. Within some 45 minutes driving distance⁵ from the capital there are many who do commuting and thus contribute to similar economic structure of the capital and its immediate hinterland. In rural and more remote regions the monotony of the economy is more pronounced. Data on employed persons by economic activities in the eight regions seen in Appendix 1 has however not been issued by Statistics Iceland since 2005.

⁵ The 45 minute driving distance has been used in ESPON project such as: Dubois, Alexandre, Gløersen, Erik, Stead, Dominic og Zonneveld, Wil, (2006). Polycentric Urban Development and Rural-Urban Partnership-Thematic Study of INTERREG and ESPON activities. Lúxemborg: ESPON, European Spatial Planning Network.

2.3. Transportation costs for people/goods/services between countries compared to EU 27

Due to its small domestic market Iceland has to rely heavily on import and export of many types of goods cf. chapter 2.2 above. This is especially important for businesses located far from import/export harbours and the international airport in Keflavik (see chapter 3 on the infrastructure network). Individuals and businesses in large areas of rural Iceland, especially in the northwest and the north, have to rely on transportation by trucks to and from harbour/markets as coastal shipping discontinued in 2004 (see Figure 24 and Figure 19).

According to a study carried out by the regional economic development agency of the Westfjords around 80% of the transport cost to and from the regions is paid for by the fisheries sector in the region. This transportation cost has according to their estimate increased drastically in recent years⁶. A company in the same region; 3X technology which specializes in solutions for the fisheries processing reports high transportation costs. For production aimed at export to Europe, approximately 50% of the cost for the product to reach the harbour in Europe is domestic transport in Iceland⁷. Too little information is available on different transportation costs in the provinces.

2.4. Main transportation routes: Scheduled air transport and sea transport between countries

Among the characteristic of the transportation network is the fact that there have been few relatively large companies (by Icelandic standards) which have shaped the characteristics of the networks.

Sea transportation routes

Sea transportation is primarily provided by the companies Eimskip, Samskip (freight) and Smyril line (freight and passengers). Few harbours in Iceland are designated for transportation between countries. The number of

⁶ <http://www.bb.is/Pages/26?NewsID=159865>

⁷ <http://bb.is/?PageID=26&NewsID=159144>

export/import harbours has been declining in recent years as these harbours are primarily located in the capital region or where heavy industry is located (see Figure 24). Thus goods for import and export from many regions, especially the Westfjords and North Iceland have to be transported by road a long way to and from harbour which is very costly.

Appendix 2 contains maps of the shipping routes of Eimskip, Samskip and Smyril line.

Smyril line has a special status in the Icelandic transportation network. Its ship, *Norrøna* provides the only ferry services between Iceland and mainland Europe (Denmark). Furthermore, *Norrøna* provides an important entry point into East Iceland (*Seyðisfjörður*; see Figure 24) and an alternative to the otherwise dominant entry point which is the Keflavik international airport (see Figure 19). Thus the importance of this ferry connection concerns both the geographical location in rural Iceland and the different mode of transportation. Among the challenges related to this service is the fact that to reach the harbour in *Seyðisfjörður* the traffic has to cross the second highest mountain pass, for the connection of a town, (*Fjarðarheiði*) 620 m above sea level which can prove difficult to trucks and the diverse tourist vehicles. According to information from the Icelandic roads administration traffic in *Fjarðarheiði* mountain pass was interrupted in 39 days in 2008⁸.

⁸ <http://www.althingi.is/altext/136/s/0799.html>



Figure 9. From Fjarðarheiði mountain road towards Seyðisfjörður

Air transportation network

Icelandair, Iceland Express and SAS provide year-round direct air transportation from Keflavik airport (49 km from downtown Reykjavik) to many European and North American destinations. Keflavik airport serves as a hub in the network of Icelandair and Iceland Express and thus opportunities of connections are quite diverse on both sides of the Atlantic. During the summer (June 18 – August 20 2011) Iceland Express offers direct flights from Akureyri in central north Iceland (388 km from Reykjavik).

Table 5 Approximate distances from Reykjavik (Keflavik) to a few cities in Europe compared to distances from the Azores and the Canary Islands.

From/To	Brussel	London	Paris	Glasgow	Madrid	Lisbon
Reykjavik	2.140	1.900	2.240	1.350		
Las Palmas, Canary Islands	3.020	2.900	2.760		1.740	1.310
Ponta Delgada, Azores	2.770	2.520	2.570			1.450

The table above shows the approximate distance (by air)⁹ to three major cities in Europe and three “next” cities from the islands. According to this

⁹ <http://www.travelmath.com>

distances from Iceland are generally shorter, both to “next” city in the EU and these three major cities.

3. STAÐA INNVIÐA/GRUNNGERÐ (INFRASTRUCTURE)

Í kaflanum verður leitast við að draga fram sérstöðu Íslands hvað varðar aðgengi að þeim helstu innviðum sem rekstur nútímasamfélags krefst. Höfuðborgarsvæðið býr við góðar aðstæður að þessu leyti og líklega sambærilegar við hliðstæð svæði víða í Evrópu. Sérstaða landsbyggðar Íslands er hins vegar að líkindum talsverð og tengist miklu og vaxandi strjálbýli og landfræðilegum aðstæðum s.s. miklu fjalllendi og vegalengdum sem gera uppbyggingu innviða kostnaðarsama og í sumum tilvikum tæknilega krefjandi. Þá er rétt að hafa í huga að skipulagsmál eru á hendi margra og smárra sveitarfélaga sem hefur áhrif á áherslur í uppbyggingu innviða. Í þessari vinnu var upphaflega lagt til að skoða ástand nettenginga og aðgangs að farsímakerfum en ákveðið að fella þann kafla að mestu niður. Samt er rétt að benda á að í strjálbýli er mikið kvartað undan slæmu aðgengi að háhraða nettengingum.

3.1. Roads, general information and comparison

Iceland is a large country compared to population size, the landscape is difficult and often long distances between inhabited places. This causes many challenges in providing and maintaining good infrastructure network for modern society. Not least is this apparent in the road network. The director of the Road Administration said at a speech May 19, 2011¹⁰ that it was estimated that 200-300 billion ISK were needed to upgrade the Icelandic road network so that its quality would be comparable with the road network in countries which Iceland compares with generally. However only around 6 billion ISK will be used for new road projects in 2011 and therefore Icelanders will have a long way to go to accomplish this task.

According to the Road Act (from 2007), Iceland's road system is categorised into national roads, municipal roads, public paths and private roads. National

¹⁰ Hreinn Haraldsson, vegamálastjóri á Samgöngupingi, Hótel Sögu, 19. Maí 2011, Sjá upptöku á vef hér: <http://www.innanrikisraduneyti.is/verkefni/malaflokkar/samgonguaetlun/>

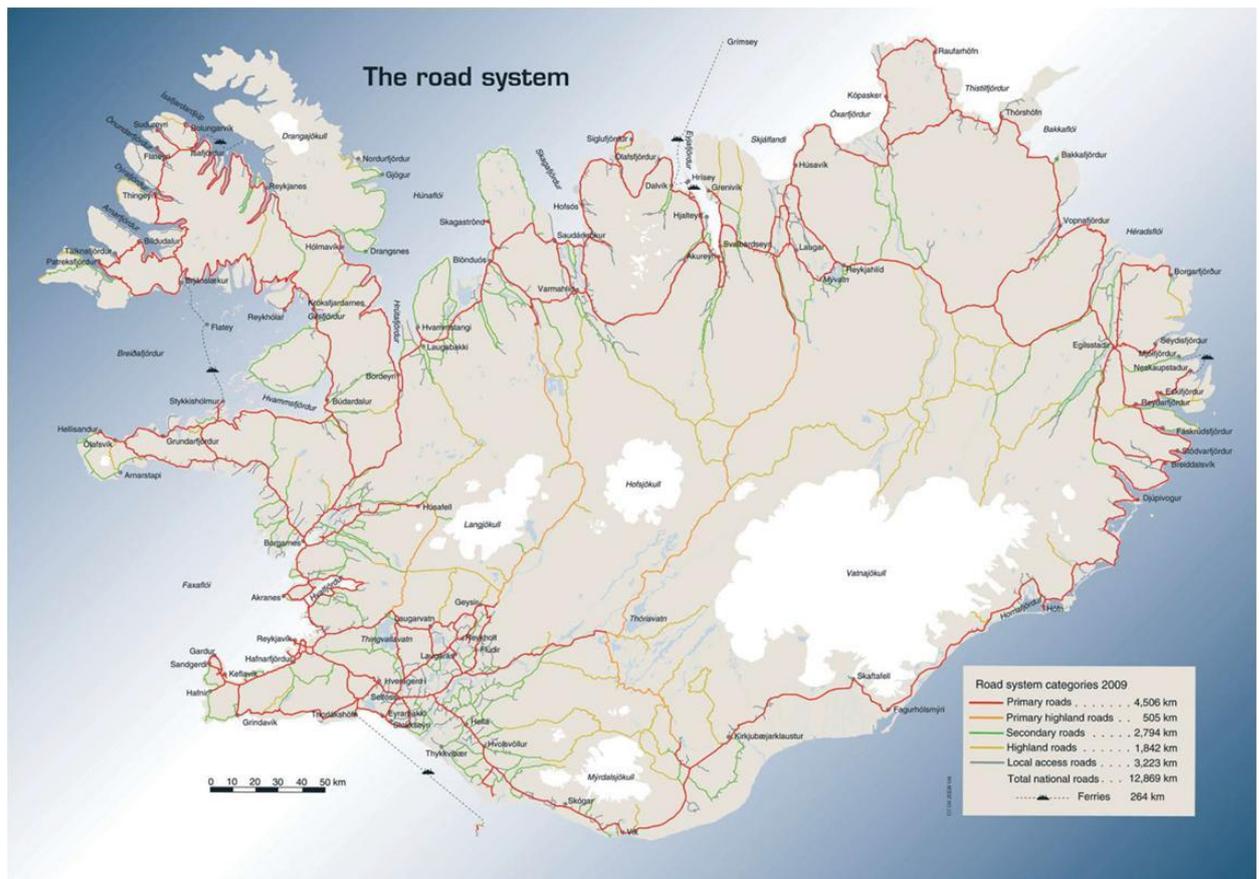
and municipal roads make up a coherent and continuous road system that connects the country's urban and rural areas.

National roads are for the free travel of the general public. They are categorised into primary roads, primary highland roads (generally closed during winter), secondary roads, local access roads, highland roads (tracks) and ferries.

The primary roads (red in Figure 10) constitute the backbone of the road system. The ring-road, or road no. 1, is the primary road that circles the country and its importance has increased in recent years as nearly all domestic transportation has to use this road after coastal shipping was discontinued in 2004¹¹. The minister of internal affairs has started work in looking into the possibilities of starting coastal shipping again.

¹¹ Coastal shipping was temporarily offered in the Westfjords again in 2007:

<http://www.bb.is/Pages/26?NewsID=101774>



Source: The Icelandic Road Administration

Figure 10. The road network in Iceland 2009

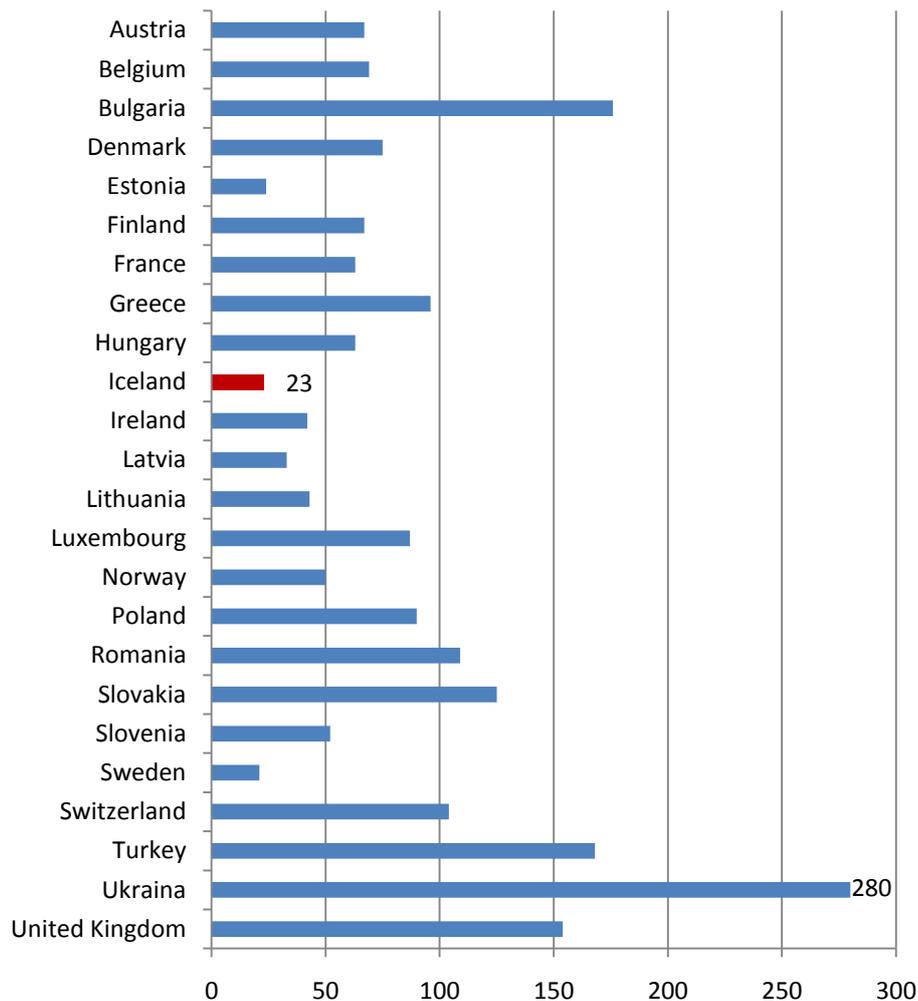
An important feature of the Icelandic road network is that there exist no year-round connections across the country (yellow on the map). These connections across the highland interior are only open during the short Arctic summer and are primarily used for tourism and recreational purposes. Most of these roads are only suited for off-road vehicles.

According to a speech held by the director of the Road Administration 19 May 2011, he stated that the secondary roads was the part of the road network that needed most upgrading (green on the map). Around 26% of these roads have paved surface.

Due to increasing transportation costs of individuals and businesses in the Westfjords, North- and East Iceland, resulting from rising energy prices and the fact that domestic shipping was discontinued in 2004, there is increasing pressure to shorten distances to and from these provinces. Solutions are

being looked into such as making town by-passes or by creating a year-round connection north-south across the highland interior.

Below there are three figures which shed a light on the main differences and similarities between Iceland and a number of other countries when the road network is compared with the size of the country, the population size and the number of vehicles in each country.

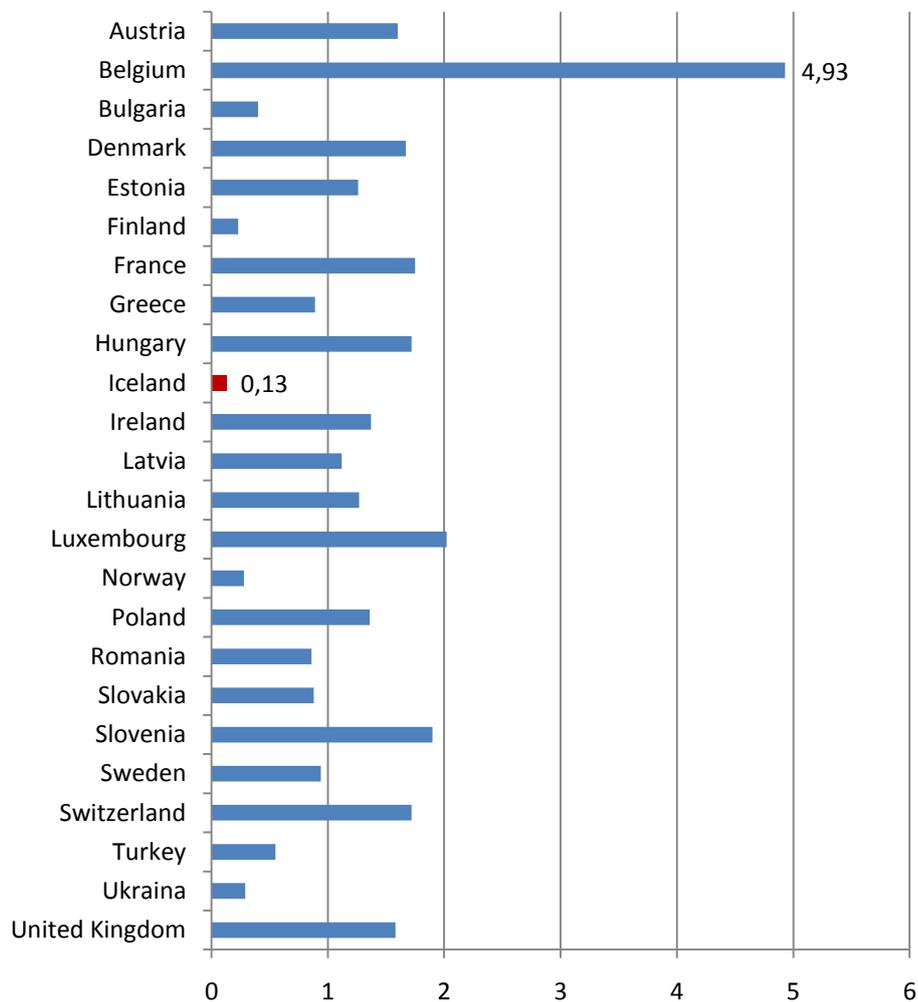


Source: The Icelandic ministry of communications (2007)

Figure 11 Number of inhabitants per km of road network in 2004

In this comparison one can see how the low population density of Iceland is reflected in the road network and basically the “difficulties” and cost associated with creating a road network for the needs of society. The average number of individuals per km of roads in the comparison above is 87.

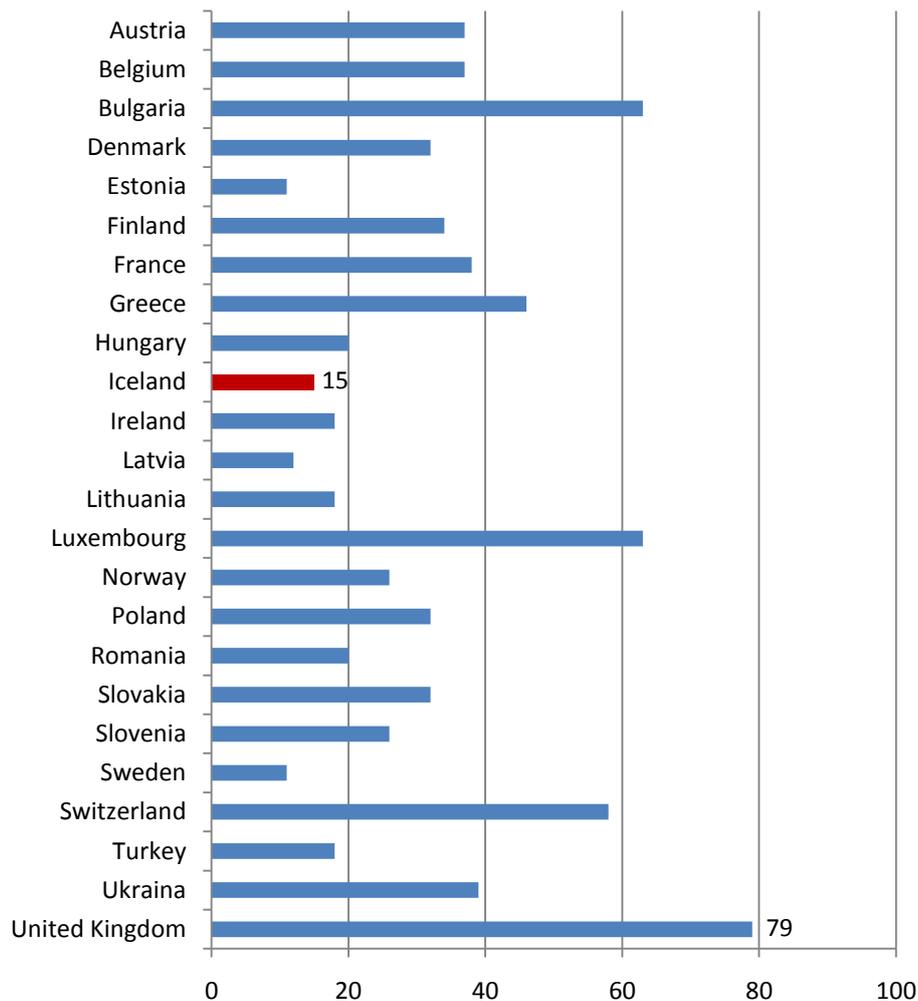
Countries with similar conditions as Iceland using this type of measurement are Sweden and Estonia.



Source: The Icelandic ministry of communications (2007)

Figure 12 Length of road network (km) per sq. km in 2004

Similar as regarding length of road network compared with population number, the length of road network is very small compared with the size of Iceland. Here we can e.g. see the effects of the uninhabited highland interior which has very limited and seasonally accessible road network. In this comparison, Iceland has by far the fewest km per sq. km of land area. The average among this group of countries was 1.3 in 2004 and this has probably not changed dramatically during this period.



Source: The Icelandic ministry of communications (2007)

Figure 13 Vehicles per km of roads in 2004

The final comparison of this kind is the number of vehicles per km of roads. Again, Iceland indicates a low number or 15 vehicles per km which is among the lowest, however high rate of car ownership influences this indicator positively. The indicator is lower or 11 on both Estonia and Sweden. The average number for this indicator is however 33 cars per km of roads in the countries making up the profile.

Road tunnels, mountain roads and bridges

Due to mountainous terrain in some regions in Iceland, especially in the Westfjords, central north and the east, road tunnels have been considered necessary to secure a year-round road connection. The map below shows areas which lie 600 m above sea level and this may give an indication of

regions where tunnels are needed. Other factors of course have an impact on the need for this solution, such as steepness of mountain roads and local conditions such as weather and snow accumulation.

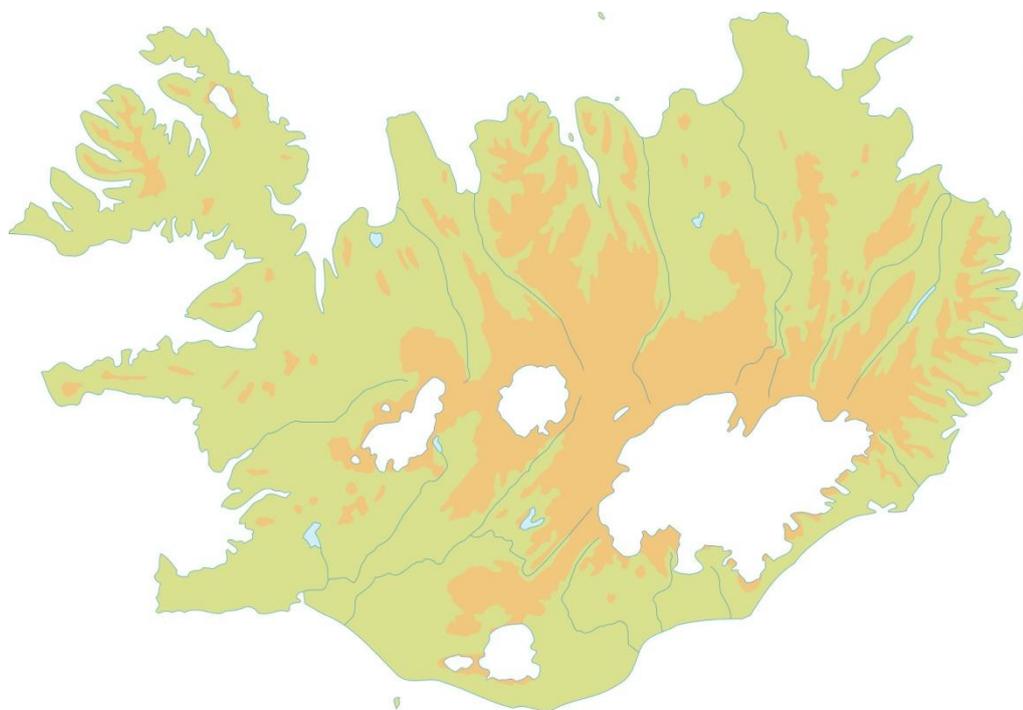
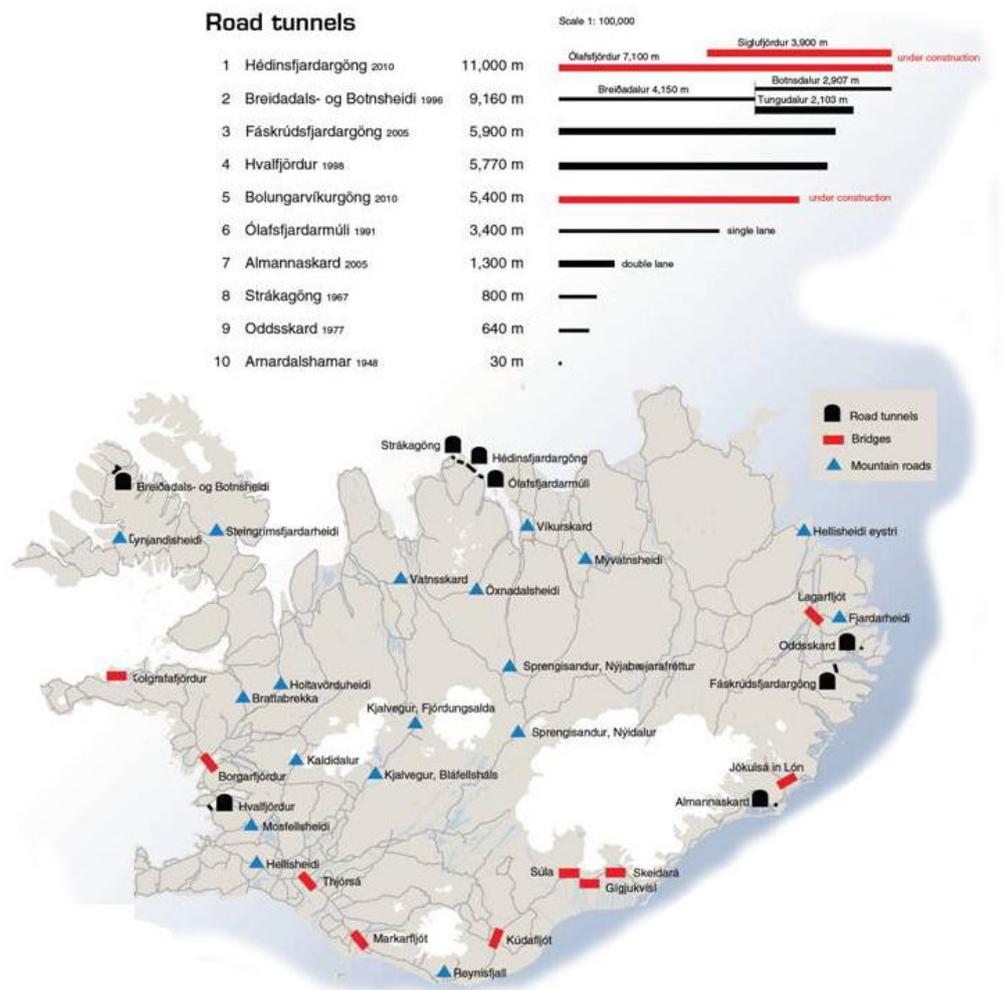


Figure 14. Mountainous areas, elevation above 600 m indicated in orange colour

The map on next page shows the road tunnels and that all of them are located where the landscape is most elevated, i.e. in the Westfjords, central north and the east. In these regions there still exist several difficult mountain roads. One of the road tunnels is an exception, Hvalfjörður tunnel in the west, a sub-sea tunnel which is operated as a toll-road¹² and shortens the distance from the capital to the west and the north by some 40 km.

¹² The only toll road existing in Iceland today, however another tunnel project through a mountain juse east of Akureyri in central north Iceland will be a toll road and is open up for bids (May 2011).



Source: The Icelandic Road Administration

Figure 15. Road tunnels in 2009 and mountain roads

In spite of several road tunnels having replaced some of the most difficult mountain roads in the past decades, a number of mountain roads become closed occasionally during winter and some mountain roads even remain closed during the most severe winter months. Among the highest mountain roads, necessary for the year-round connection of inhabited places is Fjarðarheiði 620 m above sea level, providing a road connection for a town in east Iceland, (Seyðisfjörður, 670 inhabitants). This mountain road is also connecting the harbour for Norrøna, the only ferry that connects Iceland to Europe to the main road network of Iceland. Higher mountain roads are usually either found in the highland interior (mainly for tourism) or serve as a second connection to inhabited places. See Figure 16 for visual comparison of

the highest mountain roads; see Figure 15 for location of these mountain roads.

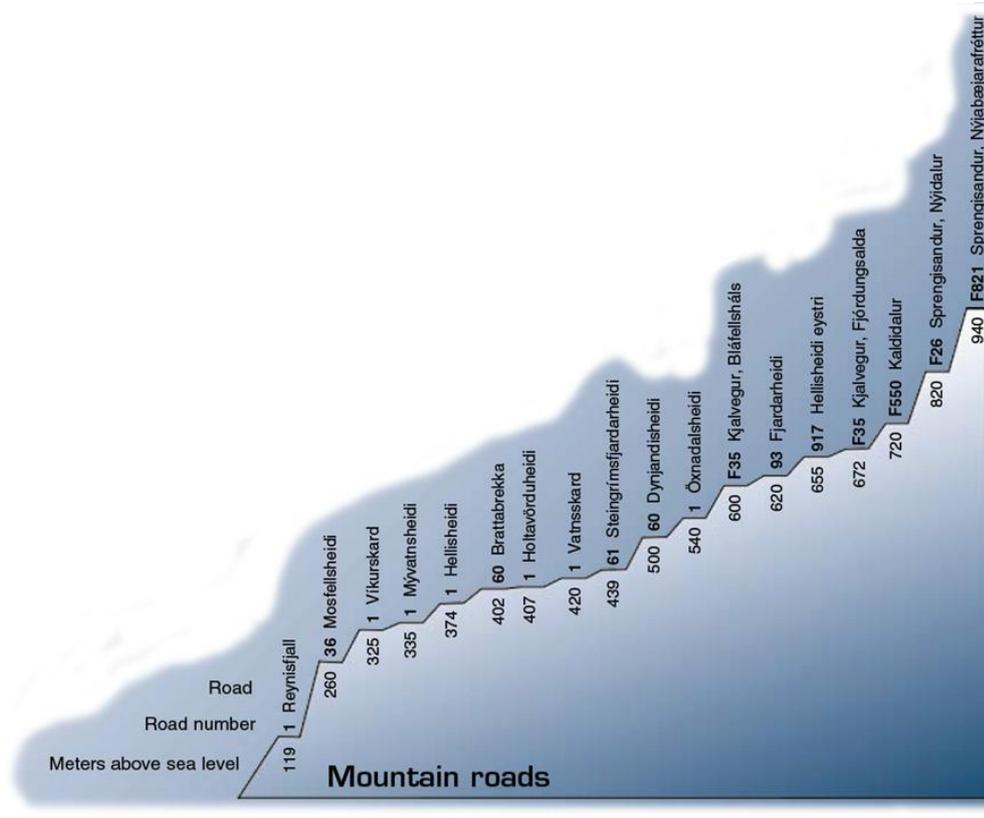


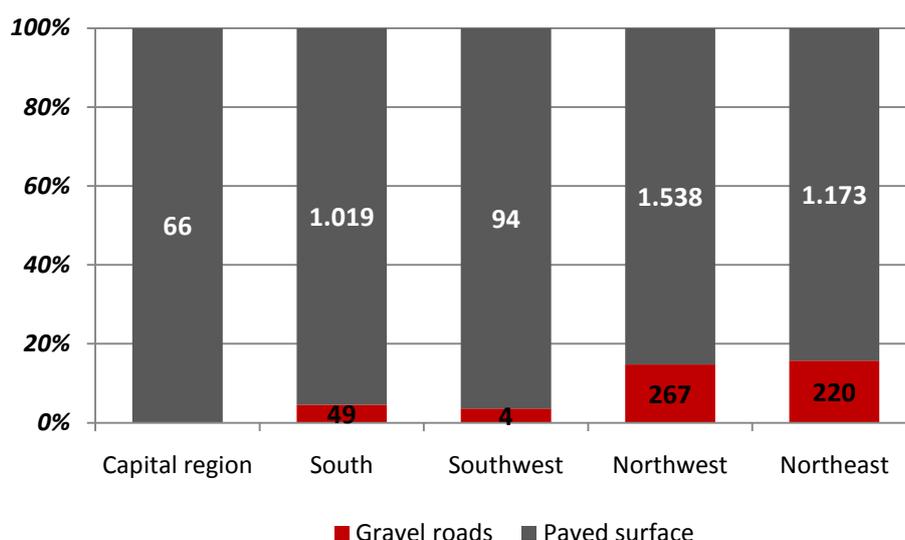
Figure 16. Highest mountain roads in Iceland 2009

Yet another challenge associated with creating a road network in Iceland are the many rivers which have been a major hindrance. The ring road was finalized only in 1974 when the large glacial rivers south of the Vatnajökull glacier were bridged. A special challenge in maintaining these bridges/road connections are floods in the glacial rivers caused e.g. by sub-glacial volcanic activity which can ruin these bridges. In an appendix there is an overview of largest bridges on state roads and some mountain roads. Their size is represented with symbols which are to scale. Bridges are listed according to length and the surface area. Iceland's longest bridge, across Skeidará, a glacial river south of Vatnajökull glacier, is mostly single-lane¹³, whereas the bridge across Borgarfjörður in the west is double-lane and therefore larger in terms of surface area.

¹³ Finalized in 1974

3.2. Paved roads and gravel roads

The total length of primary roads is around 4,500 km. Thereof some 88% have paved surface. There exists however much difference between regions as the road network is of the highest standard in the capital region and the south while gravel roads in the system are more common in the northwest and the northeast. The figure below indicates this difference between regions¹⁴.

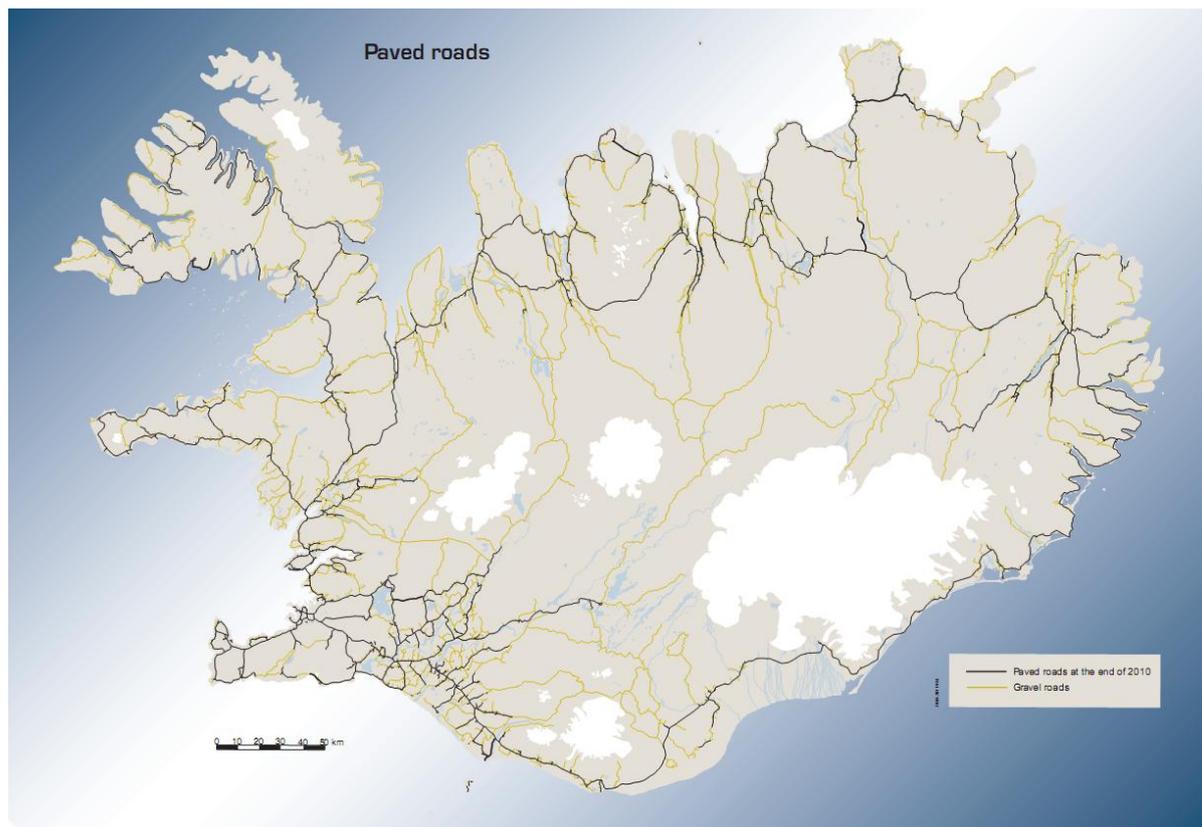


Source: Based on data from The Icelandic Road Administration

Figure 17. Gravel roads and paved surface on the primary roads (km and share)

Figure 18 shows the whole road network and its division into paved and gravel roads. It is easy to see that the densest network of paved roads is found in the SW-corner of the country. In eastern Iceland there are still parts of the ring road which have not yet been paved.

¹⁴ Note that the geographical division in the figure is the same as the latest version of constituencies used since 1999.

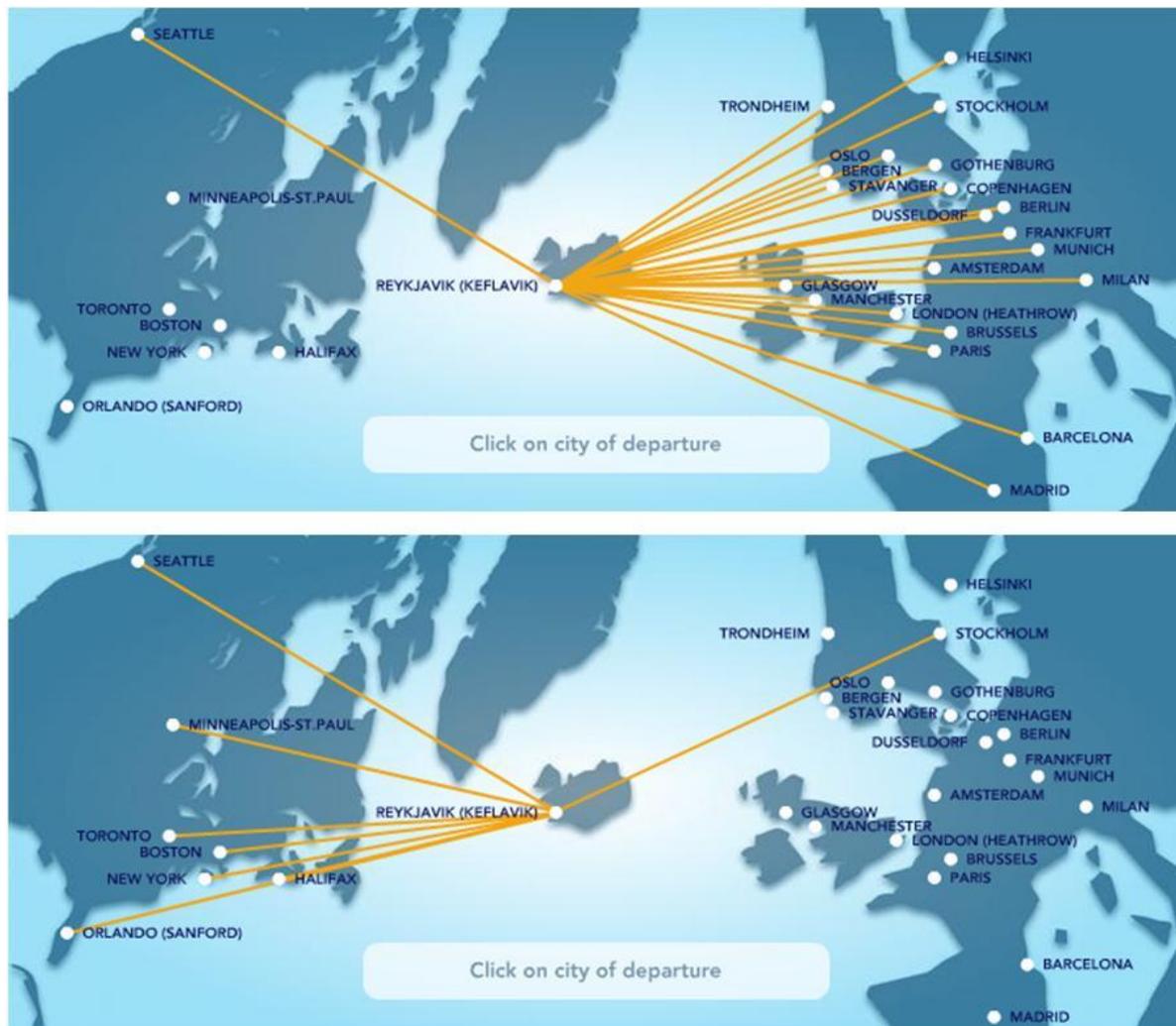


Source: The Icelandic Road Administration

Figure 18. Paved roads at the end of 2010.

3.3. Access of regions to scheduled international and domestic flight and access to bus services

Nearly all scheduled international flight (as described in chapter 2) is operated from Keflavik airport 49 km from downtown Reykjavik. The road connecting the airport to the capital region is four lanes and of the highest standard found in the country. In Akureyri there is scheduled international flight to Copenhagen during the summer (June 18 - August 20, 2011). From Reykjavik there are also flight connections to Greenland and the Faeroes. In Egilsstaðir in the east the airport has served charter flights occasionally and is also a reserve airport for Keflavik airport and shares that duty with Akureyri airport. When the eruption was in Eyjafjallajökull in 2010 this role of Akureyri airport became very important.



Source: www.icelandair.is

Figure 19. The hub and spoke network of Icelandair and its destinations in Europe and North America

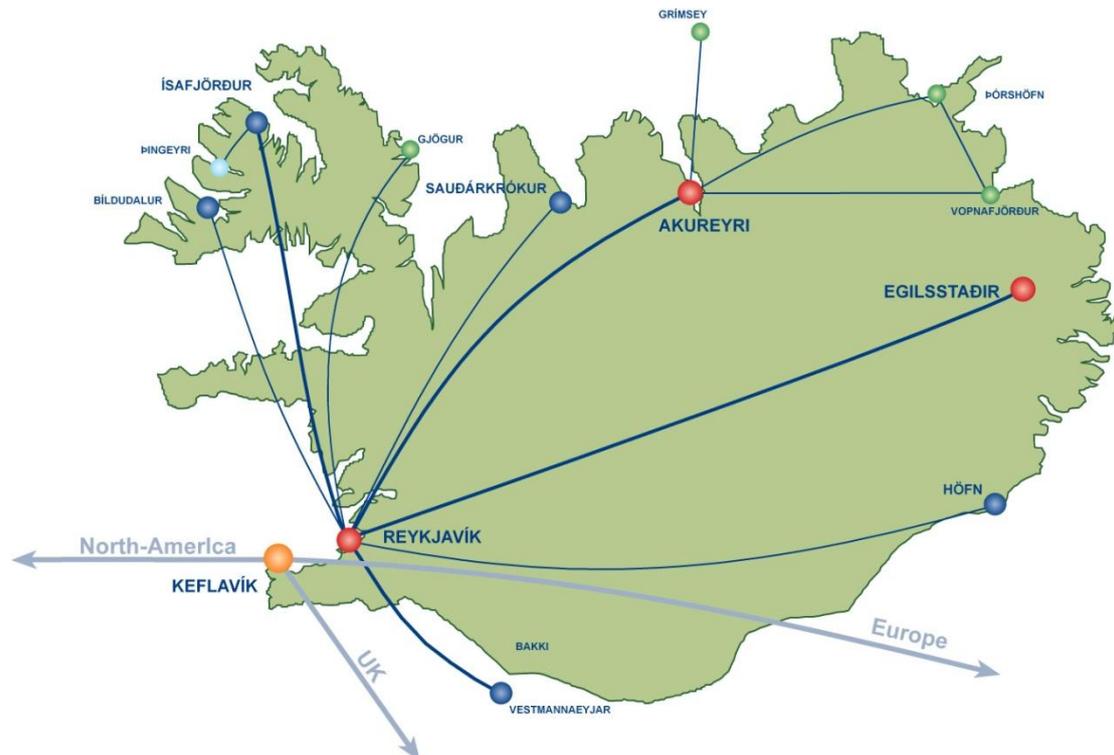
The airport in Keflavik offers quite diverse connections to the outside world especially due to the advanced hub and spoke system that Icelandair has developed during the past decades (Figure 19).

In 2009 around 1,650,000 international passengers travelled to and from Keflavik or 97.7% of all international air passengers in Iceland. Only 1.9% travelled to and from Reykjavik airport (primarily Greenland and the Faeroes) and 0.4% to and from Akureyri.

Scheduled domestic flight is operated from a number of airports in regions where the travel distance to Reykjavik is greater than some three hours. The air transportation system is centred on Reykjavik which has gradually become

a stronger hub in the system. Akureyri has maintained a position as a small hub for three settlements in the north- and northeast.

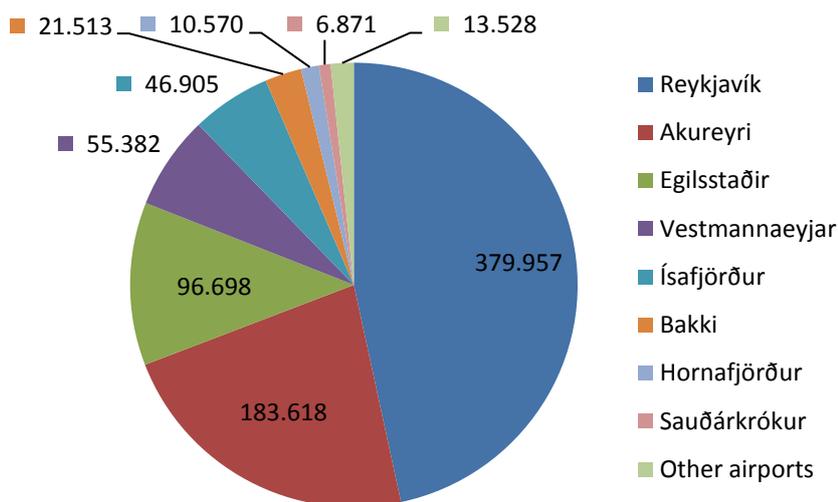
ISAVIA is a state-owned limited company which operates and develops all airport facilities and air navigation services in Iceland and conduct other aviation related operations.



Source: ISAVIA

Figure 20. Airports with scheduled flight and flight connections

The figure above shows all domestic scheduled flight connections in 2011 and the respective airports. The map shows well the role of Reykjavik which has increasingly become the centre of the system. To fly between e.g. the towns Akureyri and Ísafjörður one has to stop over in Reykjavik. This central function of Reykjavik has been increasing in recent years. Previously it was possible to fly direct between several hubs like, Akureyri, Egilsstaðir and Ísfjörður; furthermore the number of flight destinations has been decreasing. This also reflects the fact that road connections have gradually become better. As a rule of thumb no scheduled flight thrives within 3-3.5 hours driving distance from Reykjavik.



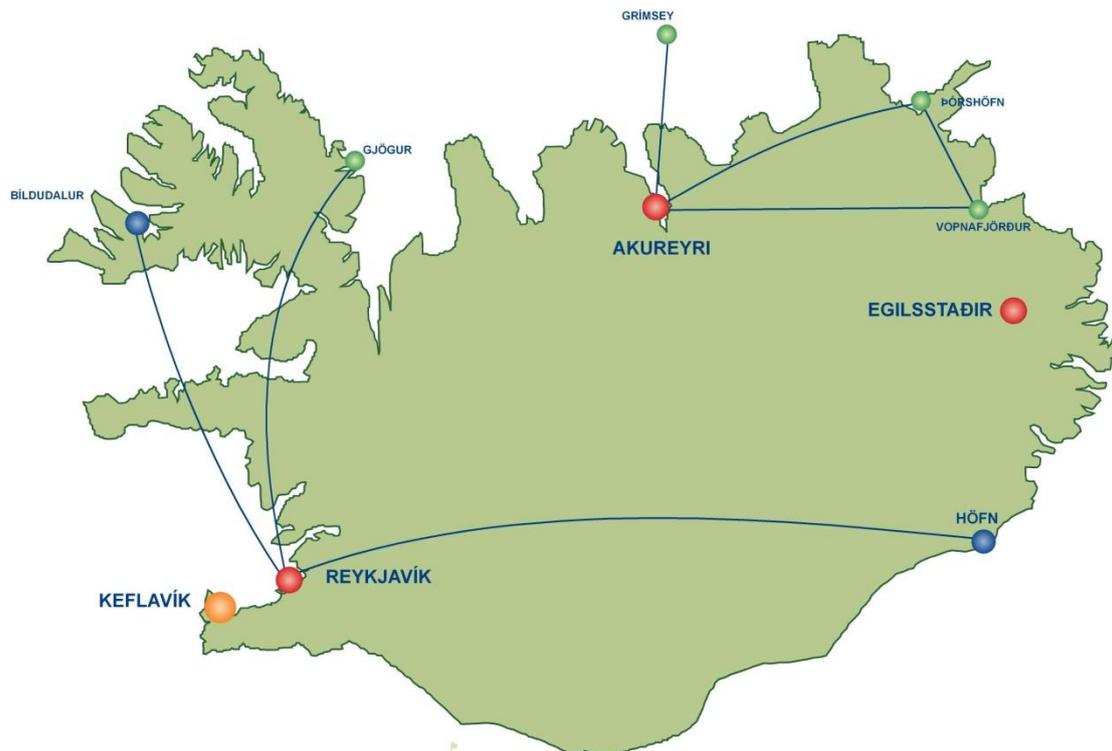
Source: Based on data from ISAVIA

Figure 21. Number and share of passengers by airports in the domestic network, 2009

The pie chart shows the importance of Reykjavik airport in the domestic air traffic with 47% of passengers in 2009. Akureyri which is the largest town outside the capital area has 23% of the traffic and Egilsstaðir 12%. Traffic between Vestmannaeyjar and the airport Bakki on the south shore will probably discontinue altogether due to a new ferry harbour (Landeyjahöfn) on the south shore.

Figure 22 shows air connections which need a government support. These places are remote and have limited access by other means of transport. According to the transportation plan of the parliament for the period 2009-2012¹⁵ on average 300 million ISK will be put into this service each year.

¹⁵ Icel. Samgönguáætlun 2009-2012



Source: ISAVIA

Figure 22. Domestic flight connections which are supported financially by the government

A bus service system is operated by private bus companies. The network is densest in the SW corner of the country and it appears that the needs of tourism have much influence in shaping the system. The price for trips is based on a rate per km which is issued by the Icelandic Roads Authority¹⁶. The centre of the system is at the Bus terminal in Reykjavik¹⁷.

¹⁶ <http://www.sterna.is/is/aaetlun>

¹⁷ http://bsi.is/index_en.html

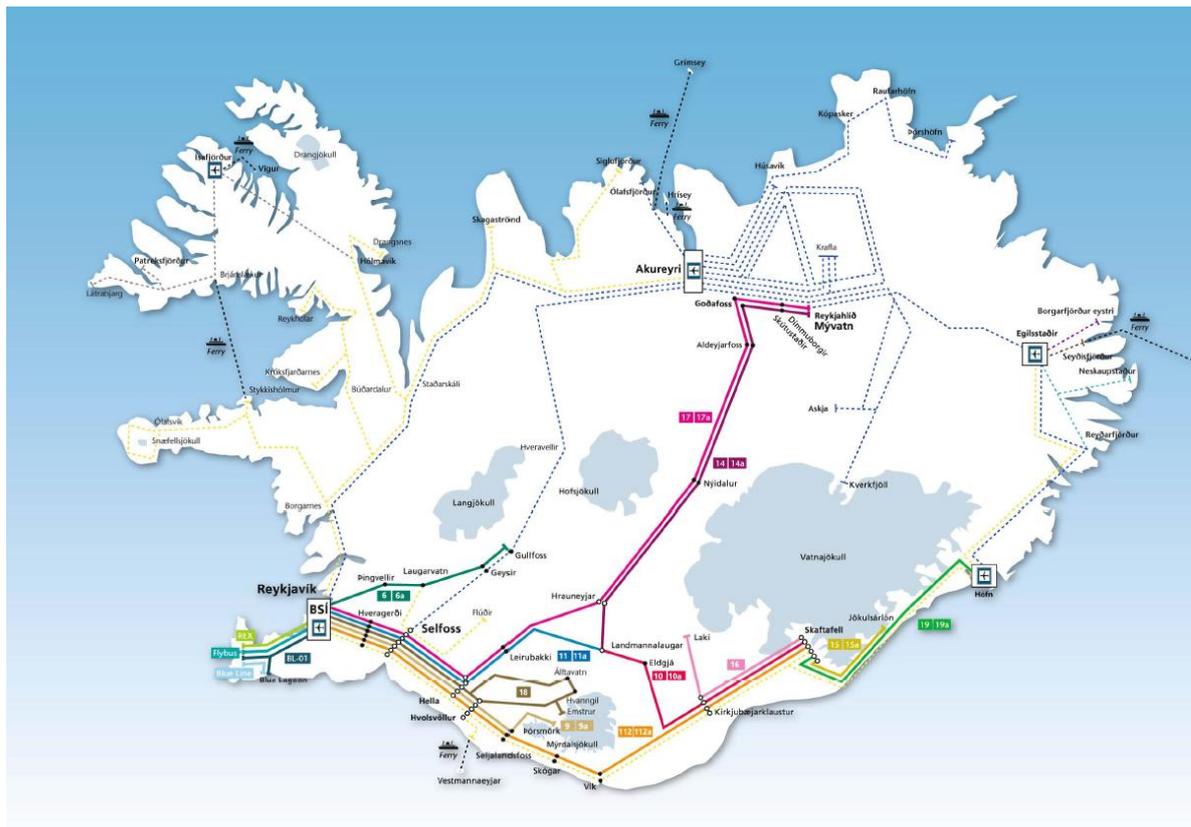


Figure 23. The bus schedule of Kynnisferðir/Reykjavik Excursions, one of Iceland's largest bus companies

Figure 23 shows that major destination of this large bus company; Kynnisferðir/Reykjavik Excursions outside Reykjavik are not major towns but rather diverse tourist hotspots. When looking at the system of bus transportation it appears that the system is not very efficient as a public transportation system for someone is travelling between towns and not very user friendly.

3.4. Access of regions to scheduled domestic and international sea transportation

There exists little domestic sea transportation since 2004 when the two large Icelandic shipping companies decided to discontinue these services and transport all domestic freight by trucks. However there is a ship owned by a small company transporting goods from Akureyri and Ísafjörður abroad¹⁸. There are also ferries which are operated by the Icelandic Road

¹⁸ <http://www.dregg.is/>

Administration and are classified as a part of the road network (see Figure 10).

Harbours for scheduled international sea transportation have gradually become fewer in recent years. These harbours are shown on the map below:

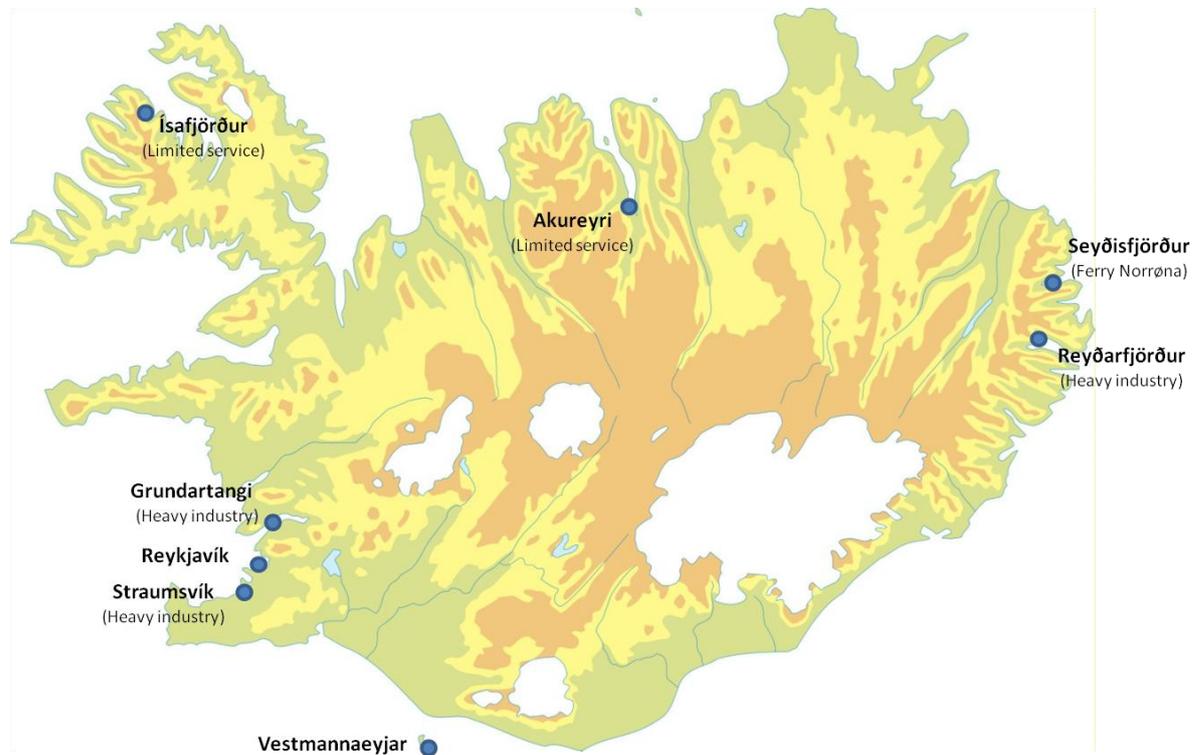


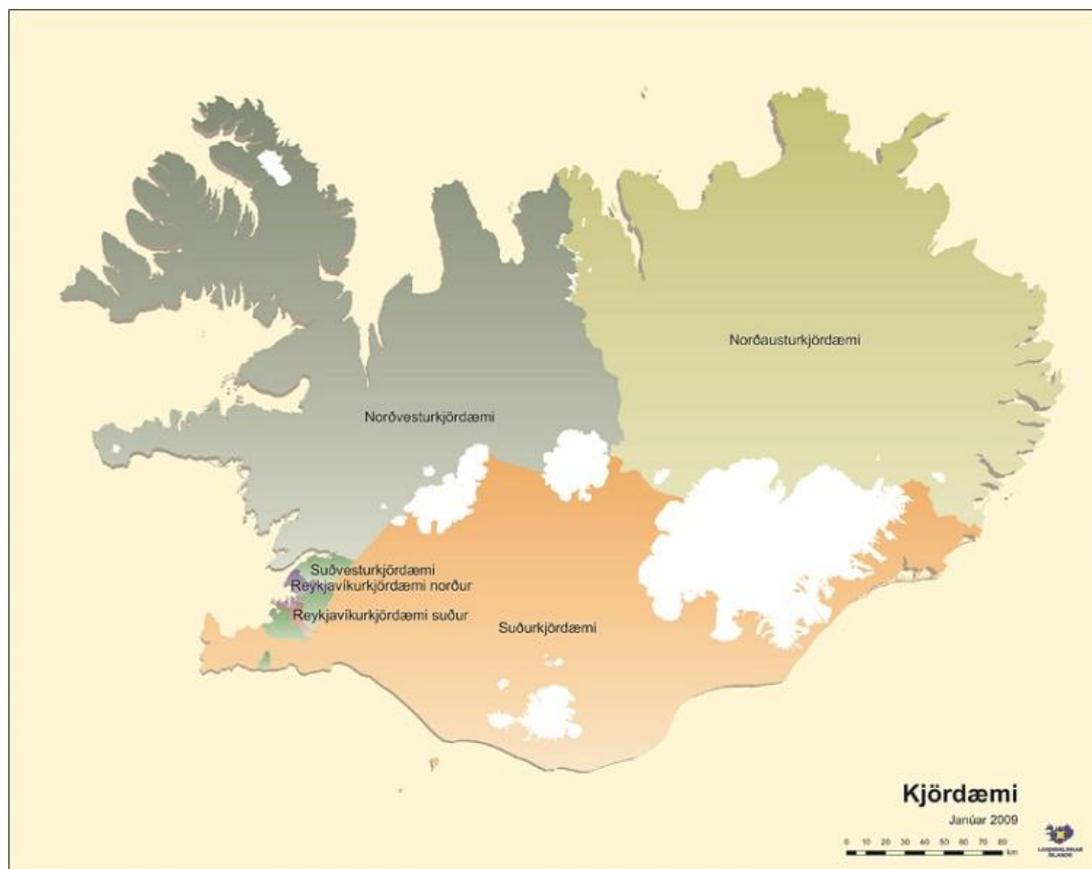
Figure 24. Harbours for scheduled international transport

The map above shows the geographical clustering of these harbours and the fact that heavy industry (aluminium- and ferro silicon plants) determines the location of several harbours for international transport. The absence of regular import/export harbours in the northern part of the country is striking. There is very limited service of this kind in Akureyri and Isafjörður.

4. APPENDIX 1, REGIONAL DIVISIONS USED IN THE REPORT



Regional division used by Statistics Iceland (8 regions)



Division into six constituencies after 1999

5. APPENDIX 2, TRANSPORTATION ROUTES OF SHIPPING COMPANIES



Eimskip's Southern Route, sailing is every week

Source for Eimskip maps: <http://eimskip.is/EN/about/schedule/default.html>



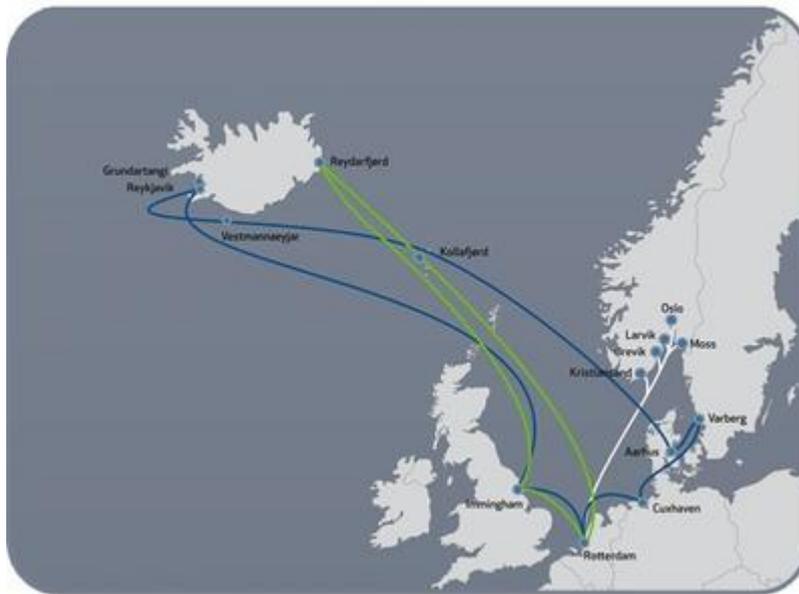
Eimskip's Northern Route, sailing is every week



Eimskip's Eastern Route, sailing is every week

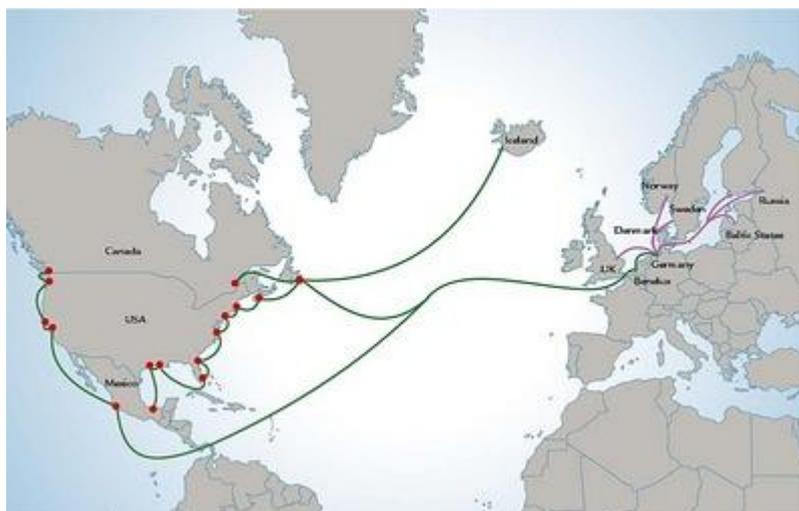


Eimskip's American Route takes almost one month and the sailing is operated the whole year



Samskip's European routes (blue = weekly, green = 9 days schedule)

Source for Samskip maps: <http://www.samskip.com/services/>



Samskip's American routes

Norrøna's sailing schedule

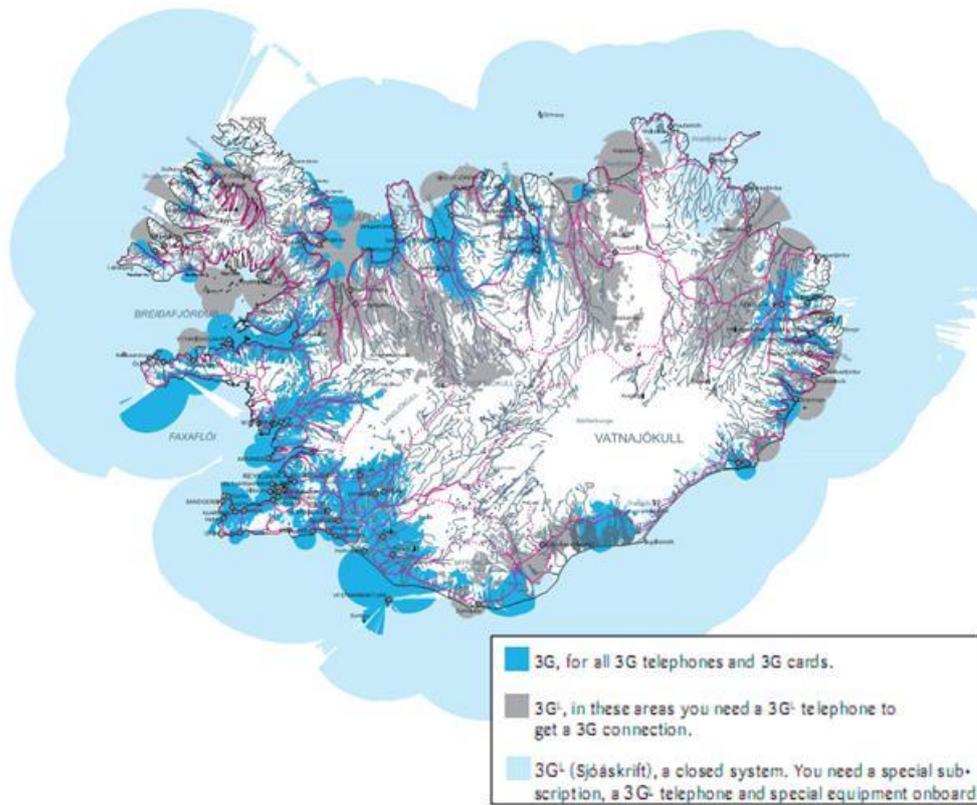
Route: Denmark - Iceland	 Outbound:	 Homebound:
Period	Dep. Denmark Arr. Iceland	Dep. Iceland Arr. Denmark
09.04 - 10.06	Sat. 15:00 - Tue. 09:00	Wed. 20:00 - Sat. 09:00
11.06 - 26.08	Tue. 09:00 - Thu. 07:30	Thu. 10:00 - Sat. 12:30
27.08 - 28.10	Sat. 15:00 - Tue. 09:00	Wed. 20:00 - Sat. 09:00

Stop-over in the Faroe Islands: in mid- and low season (09.04-10.06 and 27.08-28.10): Monday 05:00-14:00.

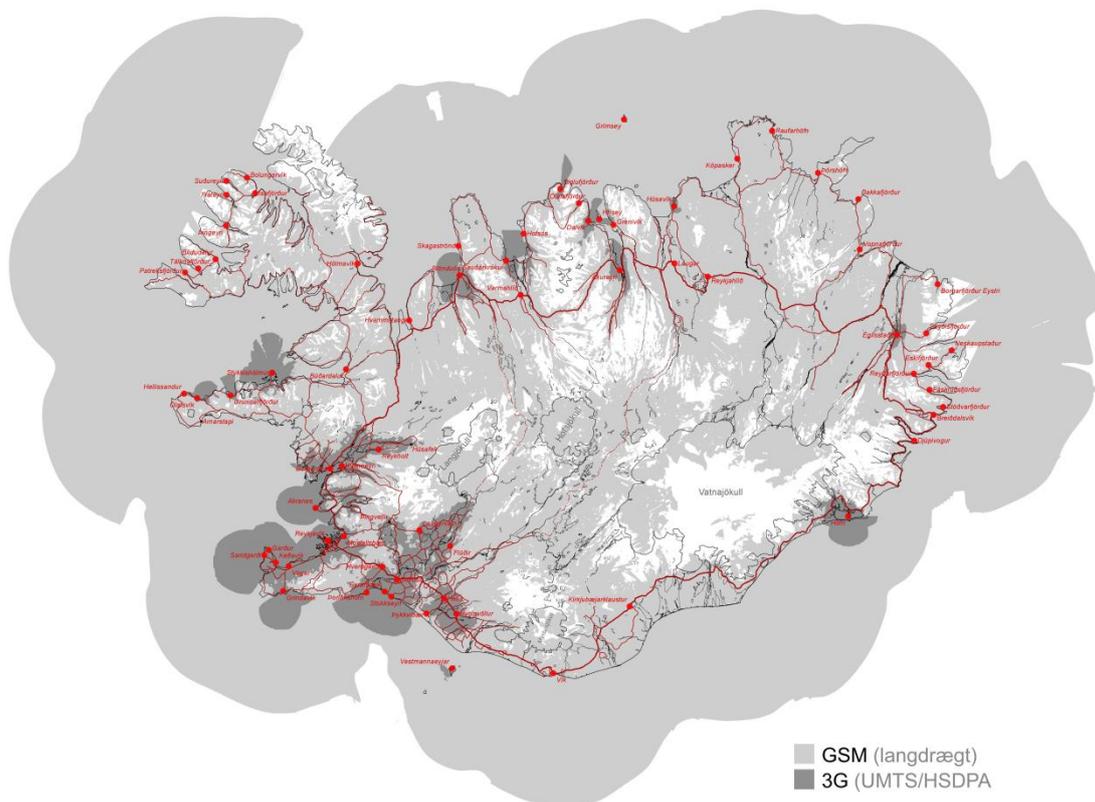
Route: Denmark - Faroe Isl.	 Outbound:	 Homebound:
Period	Dep. Denmark Arr. Faroe Islands	Dep. Faroe Islands Arr. Denmark
09.04 - 10.06	Sat. 15:00 - Mon. 05:00	Thu. 21:00 - Sat. 09:00
11.06 - 26.08 (Twice a week)	Sat. 15:30 - Sun. 21:30 Tue. 09:00 - Wed. 15:00	Sun. 23:30 - Tue. 07:00 Fri. 04:30 - Sat. 12:30
27.08 - 28.10	Sat. 15:00 - Mon. 05:00	Thu. 21:00 - Sat. 09:00
29.10 - 31.12	Sat. 15:00 - Mon. 05:00	Thu. 21:00 - Sat. 09:00

Source: http://www.smyrilline.com/Sailing_Schedule.aspx

6. APPENDIX 3, ACCESS TO CELLULAR NETWORK

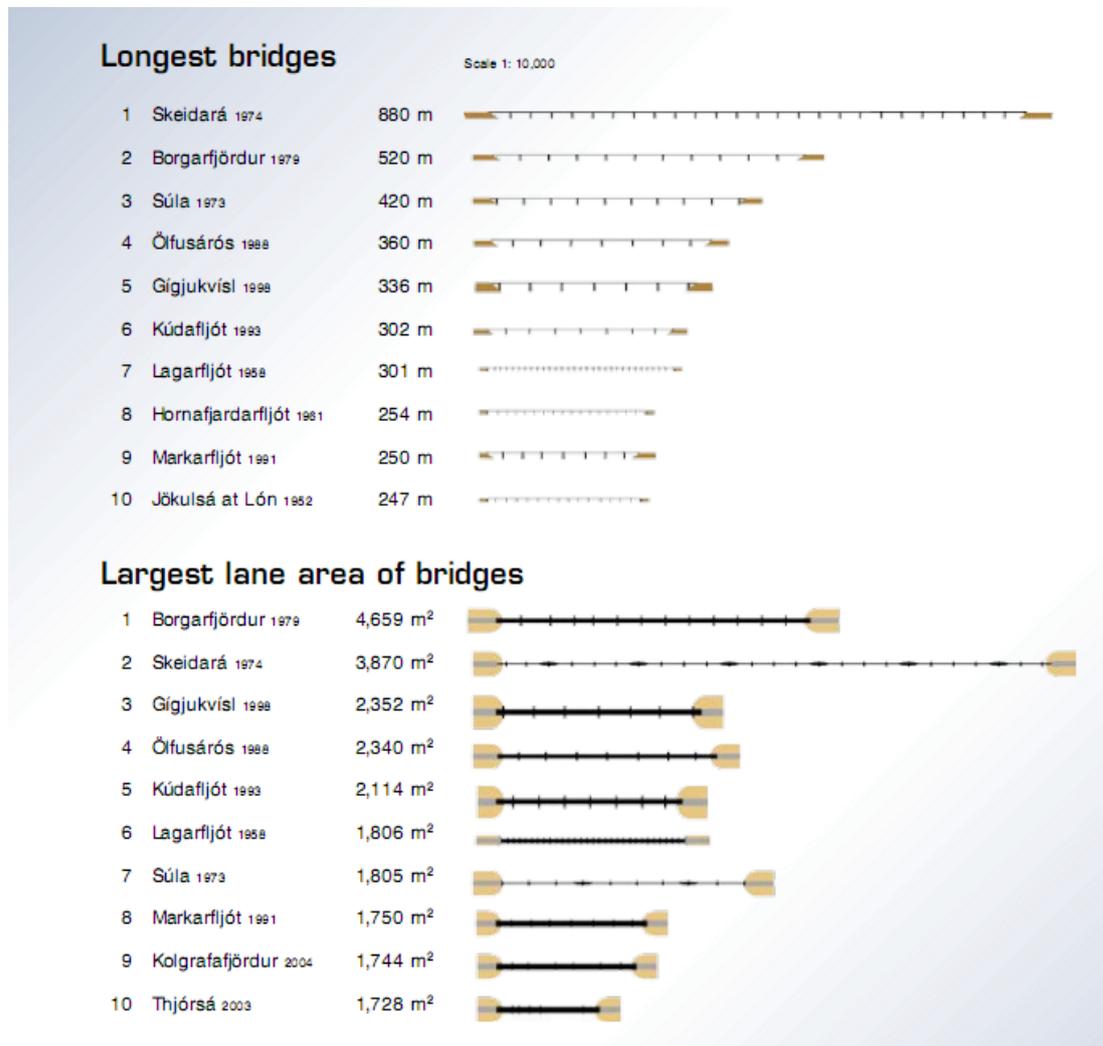


Access of 3G mobile network by Siminn phone company



Access of long range GSM and 3G mobile network by Vodafone

7. APPENDIX 4, BRIDGES



Longest bridges and largest lane area of bridges

Source: [http://www.vegagerdin.is/vefur2.nsf/Files/Vegakerfid_english/\\$file/ATTRJY5V.pdf](http://www.vegagerdin.is/vefur2.nsf/Files/Vegakerfid_english/$file/ATTRJY5V.pdf)