Response to questionnaire for:
Assessment of strategic plans and policy measures on Investment and Maintenance in Transport Infrastructure

Country:
Iceland
1 INTRODUCTION

In the National Transport Plan (NTP) for 2011-2022, a new revision of the strategic transport plan for Iceland, a fundamental network of transport infrastructure in Iceland is defined. A transport network that is of the highest importance for movement of people and goods in the country and connects all external transport gateways, transport hubs and urban areas with more than 100 inhabitants.

The fundamental network today consists of a **5130 km** long road network, **37** harbours and **13** airports. Reykjavik harbour is defined as the main international gateway for general cargo transport by sea. Keflavik airport is defined as the main international gateway for passenger and cargo transport by air but airports in Akureyri, Egilsstaðir and Reykjavik also fulfill requirements as international airports.

![Figure 1 The Fundamental Transport Network in 2011](image-url)
**Airports**

Four airports in the fundamental network have paved runways and eight have asphalt stabilized gravel. One airport needs to be rebuilt. Runway safety area improvements are needed at many airports. In general, flight approach equipment is as good as possible given geographic conditions. Navigation and communication equipment for domestic flights is good and in many instances better than one can expect in a relatively sparsely populated country like Iceland. Considerable funding is needed to fulfill requirements on renewal and infrastructure maintenance in air transport. Various construction and renewal projects need to be implemented to fulfill international and Icelandic aviation requirements. Terminal and apron investments at the Keflavik International Airport are needed to accommodate increasing passenger transport demand. Cargo transport facilities at the airport can accommodate increased traffic. Reykjavik airport, the center for domestic flights, has been rebuilt and equipment has been renewed in recent years so it can accommodate more air traffic except for the terminal building where capacity investments are needed.

**Harbours**

The ports in the fundamental transport network are fundamental for export and import of goods. They are also fundamental for the fishing industry. With development in fishery, ship size and ship draft, dredging is needed in some harbors. Sediment movement in other harbors requires dredging on a regular basis. Piers and other harbour infrastructure in various places needs to be rebuilt or modified in the next years to accommodate increased ship draft and development in the fishing industry.

**Roads**

The road network is the part of the fundamental transport network that is the most expensive to construct, operate and maintain. It has progressed fast in the last years and decades but still road conditions vary widely from one area to another. Large parts of the network are gravel roads where axle loads need to be limited for certain periods each year. Fulfilling the transport needs of these areas of the country is costly and it is one of the biggest challenges ahead in the NTP. Length of gravel roads in the fundamental network is more than 1,000 km (out of 5,130 km total length) but a large part of these gravel roads are in the highlands.
1.1 Infrastructure

Airports

There are four airports in Iceland which fulfill requirements for international flights located in Keflavik, Reykjavik, Akureyri and Egilsstaðir.

**Keflavik International Airport** has 4 runways, capacity of 30 aircrafts per hour and can handle all aircraft sizes. In 2010 approx. 1.79 million passengers went through the airport, thereof 330 thousand transfer passengers. Runway facts are displayed in the table below.

<table>
<thead>
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**Reykjavík International Airport** is the center for domestic flights in Iceland. Approximately 400 to 500 thousand passengers travel through the airport each year. There are three runways at the airport; 01/19 which is 1.567 meters, 06/24 which is 960 meters, and 13/31 which is 1.230 meters.

**Akureyri International Airport.** In 2009, the runway in Akureyri was extended and repaved and now measures 2.400 meters.

**Egilsstaðir International Airport.** The runway is 2.000 m long and its surface is 10 cm thick asphalt.

Other airports and runways in Iceland

Scheduled Domestic Flight Airports in Iceland are:
- Reykjavik, Isafjordur, Akureyri, Egilsstadir, Vestmannaeyjar, Bildudalur, Grimsey, Hornafjordur, Pingeyri, Thorshofn, Vopnafjordur, Gjogur

Paved runways:
- Bakki, Husavik Rif, Siglufjordur, Stori – Kroppur, Reykjahlid, Saudarkrokur

Gravel runways:
- Budardalur, Holmavik, Blonduos, Borgarfjordur eystri, Husafell Reykholar, Grimstadir, Breiddalsvik, Hveravellir, Reykjanes, Herdubreidarindir, Djupivogur, Kerlingarfjoll, Kopasker, Fagurfjolsmyri, Kirkjubaejarklaustur, Raufarhofn, Nordfjordur, Nyidalur, Sandskeid, Skalavatn, Skogarsandur, Sprengisandur, Stykkisholmur, Vik, Thorsmork

Grass runways:
Hella, Melgerðismelar, Kaldármelar, Flúðir

**Harbours**

There are almost 50 harbour funds in Iceland and their number has decreased somewhat in recent years following mergers among small municipalities and the establishment of port associations. There are 20 harbours in Iceland that annually handle over 10,000 tons of cargo or 8,000 tons of fish catch. More than 50,000 tons of cargo are shipped annually through 11 harbours. These harbours and six ferry harbors are included in the fundamental transport network, a total of 37 harbours. Reykjavik harbour is defined as the main international gateway for general cargo transport by sea but four other harbours serve scheduled international passenger and cargo transport.

Reykjavík harbour – Cargo to/from Europe and North America
Grundartangi harbour – Cargo to/from Europe
Vestmannaeyjar harbour – Cargo to/from Europe
Mjóeyri-/Reyðarfjörður harbour – Cargo to/from Europe
Seyðisfjörður harbour – Car and passenger ferry to/from Europe

The 28 harbours listed below also fulfill port security requirements to serve international cargo and passenger ships:

Akranes harbour, Litla-Sands harbour in Hvalfjörður, Grundarfjörður harbour, Stykkishólmur harbour, Patreksfjörður harbour and Bíldudalur harbour in Vesturbyggð, Tálknaðarfjörður harbour, Ísafjörður harbour, Skagaströnd harbour, Sauðárkrókur harbour, Siglufjörður harbour and Olafsfjörður harbour in Fjallabyggð, Dalvík harbour, Akureyri harbour, Húsvík harbour, Þórshöfn harbour, Vopnafjörður harbour, Neskaupstaður harbour, Eskifjörður harbour, Fáskrúðsfjörður harbour and Stöðvarfjörður harbour in Fjarðabyggð, Djúpavogur harbour, Hornafjörður harbour, Þorlákshöfn harbour, Grindavík harbour, Sandgerði harbour, Reykjanes harbour and Hafnarfjörður harbour/Straumsvík.
Roads

According to the Road Act (from 2007), Iceland’s road system is categorized into national roads, municipal roads, public paths and private roads, where national and municipal roads make up a coherent and continuous road system that connects the country’s urban and rural areas. The public road system is divided into categories: primary roads, primary highland roads, secondary roads, local access roads and highland roads. The length of national roads in each category, length of paved national roads and an overview of tunnels, bridges and mountain roads are shown on the maps below.
Road tunnels, largest bridges and mountain roads

Three pages show an overview of the road tunnels, largest bridges and mountain roads. These are represented by symbols that are in scale. Bridges are listed according to the surface area, Iceland's largest bridge, action, distance, in meters, length, and width. The bridge across Jökulsá North is a double-decked and therefore longer than the bridges below.

Road tunnels include the longest road tunnel in Iceland, a road through the fault of the Hrafntinnusker Fault Zone. The tunnel is 8.3 km long and has 7729.3 meters of grade. It is the longest road tunnel in Iceland, with a grade of 8.3 km long and has 7729.3 meters of grade. It is the longest road tunnel in Iceland, with a grade of 8.3 km long and has 7729.3 meters of grade. It is the longest road tunnel in Iceland, with a grade of 8.3 km long and has 7729.3 meters of grade.

Largest bridges

<table>
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<td>km</td>
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<tr>
<td>10</td>
<td>600</td>
<td>km</td>
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</table>

Largest lane area of bridges

<table>
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<th>Bridge</th>
<th>Lane Area (m²)</th>
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</thead>
<tbody>
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<td>970</td>
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<tr>
<td>10</td>
<td>940</td>
</tr>
</tbody>
</table>

Mountain roads

Mountain roads are shown on the map. They are indicated by a black line and a red dot. The highest mountain road in Iceland is the Snaefellsjökull Glacier, which is 1681 meters above sea level.
1.2 Performance

Recurring congestion is quite rare in transport in Iceland, most of the time network capacity is sufficient and more traffic volumes by air, sea and road can be accommodated. Delays and disruptions in transport in Iceland vary widely from one part of the country to another. During the winter, weather causes far more disruptions and delays in air and road transport in the northern half of the country than in the south. Occasional natural hazards such as volcanic activity and river floods have more impact on the reliability of transport networks in the south part of the country.

2 MAJOR PROJECTS AND FUNDING

According to the NTP terminal capacity at the Keflavik International Airport and the Reykjavik International Airport will be increased in the next decade. These projects will be funded with user charges.

With state funding the ferry harbour at Landeyjar, serving the islands of Vestmannaeyjar, will be improved and the current passenger and cargo ferry replaced with a new one. If necessary to fulfill the needs of new major industrial projects, industrial harbours will be built and funded with user charges.

According to the NTP the following major land transport projects funded by the state will be implemented in the next decade along with a large number of smaller projects:

- A number of bridges on highway 1 will be replaced including major projects at Hornafjarðarfljót, Ölfusá and Jökulsá á Fjöllum.
- Tunnels will be built to replace non-reliable mountain roads, major projects are Dýrarfjörður tunnel and Norðfjörður tunnel.
- Old roads and bridges in the southern part of the West fjords will be replaced with shorter, safer and more reliable roads, improving road transport between that area and highway 1 significantly. Mountain road Dynjandisheiði, connecting the southern and northern parts of the West fjords, will also be replaced in conjunction with the neighboring Dýrarfjörður tunnel project.
- Sections of the three major roads, a total of approx. 50 km, connecting the capital area with the rest of the road network will be widened and opposing driving directions separated to improve traffic safety.
- The Icelandic Road Administration will partly fund a network of bicycle infrastructure with over- and underpasses, connecting all the municipalities in the capital area.
The national government will provide significantly more funding for public transport than before with a focus on the operation of a robust bus system in capital area and its surroundings.

Keflavik International Airport is fully funded with user charges. Other airports in Iceland are partly funded by the state and partly with user charges. User charges at Reykjavik Airport will be raised from 2012 to meet the growing needs for airport maintenance funding.

Harbours and coastal protection structures are owned by the municipalities, which are also in charge of their operation. The state provides support for harbor and coastal protection projects by undertaking and funding basic research in full, and also provides financial support for new harbour and coastal protection projects.

National road infrastructure projects, maintenance and operations of the national road network are funded by the state, mostly with gas tax revenues. In the newly revised NTP more funding is allocated to maintenance than before and alerts are raised that even more funding is needed to maintain the value of current road infrastructure.
3 STRATEGIC PLANS

The financial crisis encourages us to think differently and reconsider how we can maintain the mobility of people and goods in Iceland in the future at lower costs for the society and the environment.

In 1995 the number of passenger cars per thousand inhabitants was 445, which is close to the European average today. In 2007 that number reached 658 which indicates high levels of mobility in our society but at the same time high levels of automobile and oil dependence. Over 99% of the passenger car fleet today is powered with fossil fuels. According to a recent household expenditure survey, the average household spent around 16% of its total consumption on transport. Transport cost for the general household in Iceland now weighs more than the cost of food. Without policy revisions and actions to decrease fossil fuel and automobile dependency, this cost will probably continue to rise.

The oil dependency of the transport sector, the increasing cost of travel and environmental impacts need to be addressed. We need to act fast so the economy and people’s mobility will not be severely impacted. This is a complicated task. While improving energy efficiency, increasing the share of sustainable fuels and changing transport patterns, there is still a lot of work to do in building sufficient reliable infrastructure for transport in certain areas of Iceland.

A proposal for a National Transport Plan for 2011-2022 was approved by the Parliament in June 2012 accompanied with a proposal for a short term project plan, a detailed plan that displays how the strategic National Transport Plan will be implemented in the next four years. The National Transport Plan includes an integrated policy for all modes of transport for the next twelve years with a fiscal plan that displays revenue and expenditure. The strategic plan has a focus on five main goals: mobility, environment, economy, safety and accessibility. With the approval of the national transport plan important steps towards a more efficient and cost effective transport system that is safer and has less impact on the environment will be taken.

Collecting revenue from land transport to implement the national transport plan is one of the biggest challenges ahead. With increasing energy efficiency of vehicles and increased use of alternative fuels, current gas taxes will not suffice as a funding source. New user charging methods for road usage such as pay-per-mile that will replace conventional gas taxes need to be developed and implemented.
3.1 Long Term

With the implementation of the NTP the following major investment projects will be carried on beyond 5 years:

- Replacement of a number of bridges on highway 1 including bridges at Hornafjarðarfjót, Ólfusá and Jökulsá á Fjöllum.
- Dýrafjörður tunnel, replacing a non-reliable mountain road.
- Old roads and bridges in the southern part of the West fjords will be replaced with shorter, safer and more reliable roads, improving road transport between that area and Highway 1 significantly. Mountain road Dynjandisheiði, connecting the southern and northern parts of the West fjords, will also be replaced in conjunction with the neighboring Dýrafjörður tunnel project.
- Sections of the three major roads, a total of approx. 50 km, connecting the capital area with the rest of the road network will be widened and opposing driving directions separated to improve traffic safety.
- The Icelandic Road Administration will partly fund a network of bicycle infrastructure with over- and underpasses, connecting all the municipalities in the capital area.
- The national government will provide significantly more funding for public transport than before with a focus on the operation of a robust bus system in capital area and its surroundings.

3.2 Mid Term

With the implementation of the National Transport Plan the following major investment projects will be finalized within 5 years:

- Increased terminal capacity at Keflavik and Reykjavik airports.
- Improvements of the ferry harbour in Landeyjar and the renewal of the ferry.
- Highway 1, widening of a 20 km long section between Reykjavik and Hveragerði.
- Renewal of Alftanesvegur, a 5 km long national road in the capital area.
- Vestfjarðavegur, Eiði-Kjalkafjordur, replacement of a 16 km long road in the southern part of the West fjords.
- Norðfjörður tunnel, a new two-lane tunnel replacing a non-reliable mountain road with an old, short, single-lane tunnel.
4 ASSESSMENT METHODOLOGY

Assessment methodology is discussed in the newly revised NTP and the following policy is set forth: Different transport mode networks will be considered as one total transport network when assessing investment projects. Socio-economic analysis will be used to plan and prioritize new infrastructure investments.

Decisions for investment projects today are based on different assessment methodologies by transport mode.

Airports

Priority in airport development has in recent years been placed on improvements in the domestic airport system to meet regulatory safety standards and requirements, and to allow international operations at airports in category 1. Principal priority items:

1. International gateways
2. Other scheduled flight airports in the fundamental transport network
3. Airports and landing grounds for air ambulance service
4. Landing grounds for safety of general aviation and training

Harbours and Coastal Protection

Harbour projects are currently prioritised according to the condition and scope of the harbours’ activities. Audits are used as the basis for assessing the need for a project and what improvements such a project would provide to the harbour in question, as well as to the country as whole. Coastal protection has been assessed in a similar manner using, however, a simpler calculation model. Assessments are made of the wave load, the valuables at stake and the likelihood of loss or damage when requests are submitted for coastal protection work. Each project is then allocated points that are calculated on the basis of these three aspects. It is safe to say that since the Icelandic Maritime Administration (IMA) began prioritising harbour and coastal protection projects in the above manner, a consensus has generally been reached on the selection of state supported projects. The IMA intends to continue to use these models when prioritising projects.

Roads

In recent years road investment projects have been prioritized using the following construction goals as a baseline:

- Highway 1 and all roads connecting urban settlements with more than 200 inhabitants shall be paved.
- Urban settlements shall be connected with roads of good standard.
- Important tourist roads with heavy traffic shall be paved.
- Bridges on main cargo routes shall be rebuilt to good standard.
- Roads shall be widened to increase capacity and safety.
- Paved roads that do not fulfil current standards shall be rebuilt.
- Narrow bridges (single lane) on Highway 1 with heavy traffic shall be widened.

Prioritization of construction projects with the goals above has in general been successful. As more road safety measures have been introduced in road standards, new road safety goals have been added to the list above. The Icelandic Road Administration will use Teresa, a cost/benefit model for transport investment developed by the Ministry of Transport in Denmark and adapted to Icelandic conditions, to assess larger projects that will be subject to socio-economic analysis in the future.