

Iceland High Performance Computing

Proven Concept – Free Ambient Cooling – Renewable Energy – Connectivity

Iceland's value proposition for Data Centers

- Long term, fixed-price contracts for renewable energy
- Year round free ambient cooling
- Scalability in both locations and power
- Skilled multilingual workforce
- Fast redundant connectivity
- Safe location

Iceland is ideally located in the middle of the Atlantic, with 60 to 90 daily flight departures to most major airports in Europe and Northern America. A number of Data Centers and HPC facilities confirm the reduced operational cost and minimal carbon footprint in Iceland.

Low and predictable operational expenses

Iceland's cost efficient, state of the art, hydro and geothermal power installation allow the competing power companies to offer highly cost competitive green energy and long term contracts at fixed prices. Long term total cost of ownership is an important factor and Iceland's competitiveness has been confirmed by independent comparative research by KPMG Belgium and Broadgroup.

Free cooling and reduced energy use

Iceland's cool climate provides free ambient cooling all year round which reduces the need for energy spent on cooling. The equipment needed to ensure cooling is always based on the warmest possible days in each location. Accurate historical weather data is available, confirming Iceland's competitive advantage, even during the warmest days of summer.

The Safest Location

According to the Data Centre Risk Index 2016, Iceland ranks number one of the key established and emerging data center locations compared by Cushman & Wakefield. 37 countries were ranked according to a number of risks affecting data centre operations such as natural disasters, energy security, the share of renewable energy, ease of doing business and political stability.

Plan for future expansions

Unharnessed renewable energy resources, state of the art transmission grid and abundance of land for development facilitate future growth of data centers.

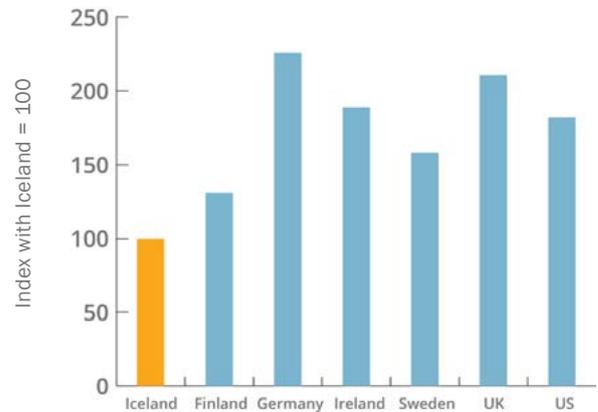
Examples of HPC installations

- Cray XC+ with 700 TFLOPS for the Danish Meteorological Institute (DMI) and Icelandic Met Office
- BMW auto manufacturer with 100+ cabinets
- The joint Nordic High Performance Computing Project
- Centro Epson Meteo – Expert Meteo

Examples of Data Centers in Iceland

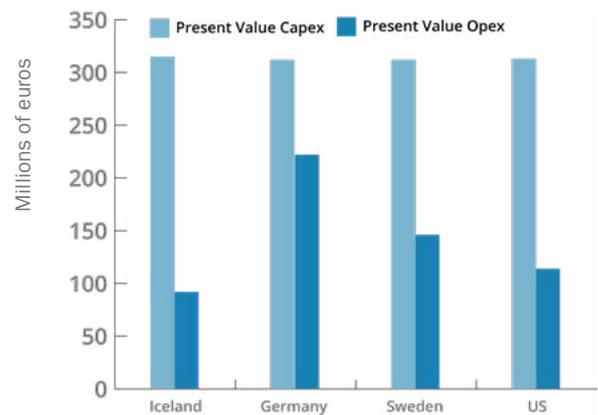
- Verne Global
- Thor Advania Data Center
- Mjöllnir Advania Data Center
- Etix Everywhere Borealis
- Wintermute Corporation
- Danish Meteorological Institute's HPC
- The joint Nordic High Performance Computing Project

10 year cost of data center operations



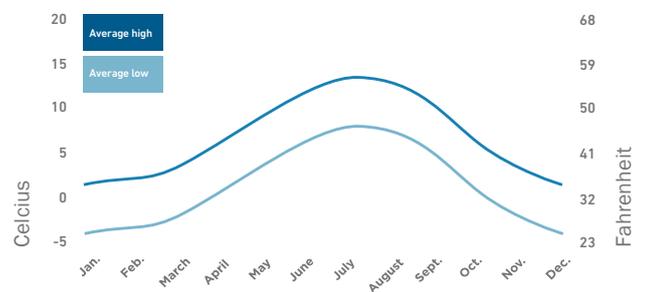
Source: BroadGroup, Data Centre Analysis and Benchmarking of Iceland, June 2013.

Present Value of total capital investment and 15-year operating expenditure by country*



Source: PriceWaterhouseCoopers comparative research, July 2012. *Discount factor 12%

Average in Iceland on a celcius/fahrenheit scale



“ The Danish Meteorological Institute chose to locate the future DMI Cray HPC in Iceland due to green energy, good network communication infrastructure, competent and capable Icelanders. We were able to establish a very strong partnership with the Iceland Meteorological Office in Reykjavik. The operational cost in Iceland is lower compared to former operations at the DMI in Copenhagen. It is my belief that others will follow this example. The overall benefits are compelling. ”

Dr. Thomas Lorenzen, DMI



Domestic fiber network

The main national fiber network is 1,800 km/1,118 miles and based on circular structures for redundancy. The initial capacity is 40x10Gb/s. The total optical fiber in the trunk network is over 4,000 km/2,485 miles. In addition there is an extensive microwave trunk network.

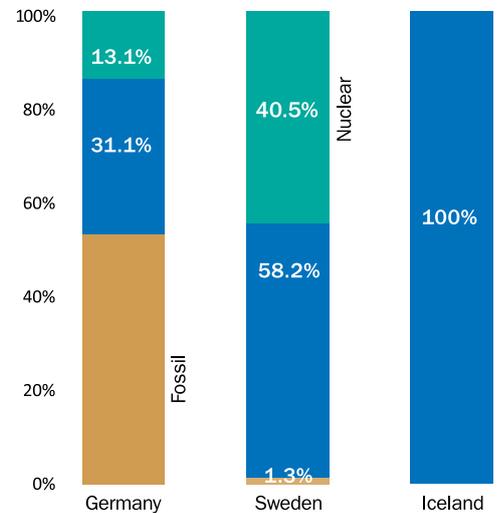
The electricity grid

Iceland's Energy Infrastructure ranks among the top five in the world according to IMD's World Competitiveness Yearbook 2016. Iceland's electricity transmission grid is circular and with redundant routes to ensure high uptimes.

100% Renewable energy

All electricity on the Icelandic grid is produced using renewable hydro- and geothermal energy. In 2015 the total electricity production was 18.8 TWh. 73% from hydro and 27% from geothermal.

Electricity production by fuel

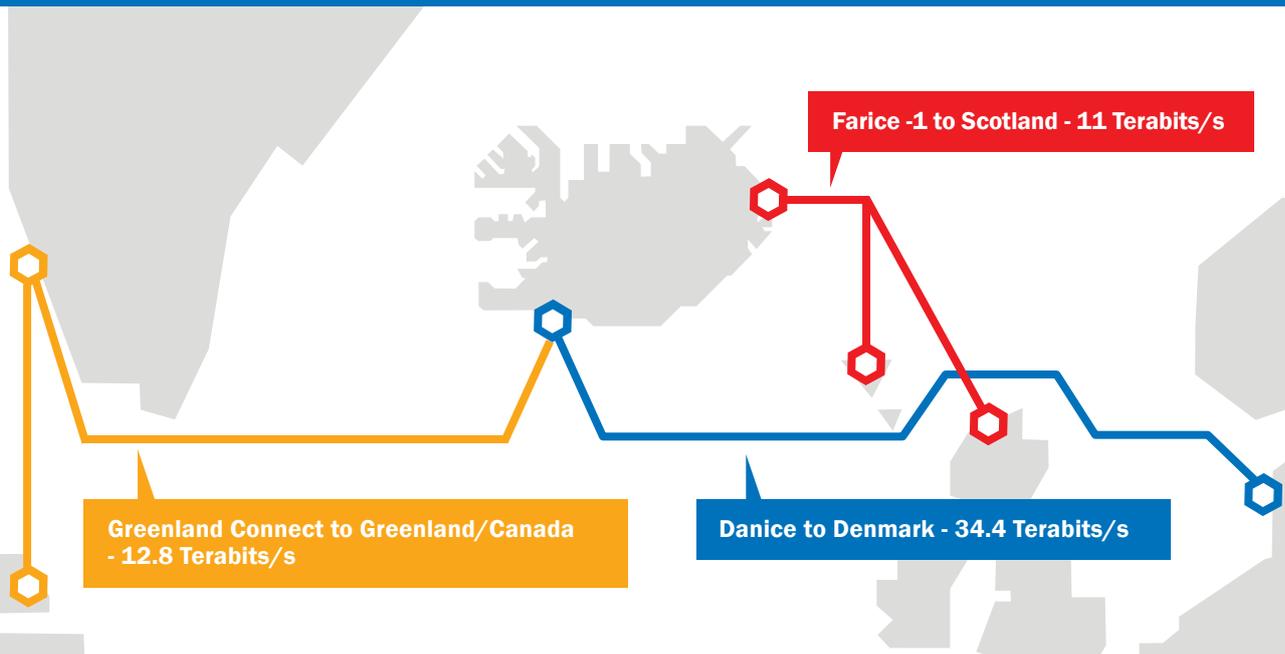
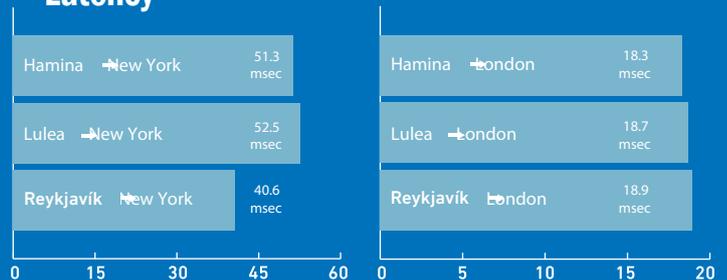


Source: International Energy Authority

International connections

Iceland is connected to both North America and Europe with high bandwidth submarine fiber cables. The operator Farice offers fast and reliable connections for international customers. Both the overseas connection and the backhaul is redundant. Even further trans-Atlantic high speed connections, with links to Iceland, are planned.

Latency



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