

# Why the Nordics is perfectly suited to locate data centers



What makes these cool and seemingly-remote countries so attractive to the world's data processors?

This paper summarizes the advantages, both natural and by design, of data center colocation in the Nordics.

## **The Nordic data center industry is expanding and maturing.**

The largest computing companies have invested in Nordic facilities, including Apple, AWS, Facebook, Google, Microsoft, and IBM.<sup>1,2</sup> Businesses and workloads of all sizes are also being accommodated by a wide range of data center colocation solutions being built across Denmark, Finland, Iceland, Norway, and Sweden.

<sup>1</sup> ZDNet. Dec, 2017. Inside Apple, Facebook, Google, IBM's frozen Nordic datacenters. <https://www.zdnet.com/pictures/the-nordic-datacenter-boom/>

<sup>2</sup> Microsoft. Dec, 2020. Microsoft announces plans to establish a new datacenter region in Denmark. <https://news.microsoft.com/europe/features/microsoft-announces-plans-to-establish-a-new-datacenter-region-in-denmark-to-accelerate-the-countrys-green-digital-transformation/>

## Executive summary

The data center investments you make today create a path your organization might follow for decades. A location that provides cost-efficient, sustainable, scalable infrastructure can serve growing data needs for decades; one selected for its familiarity or apparent convenience is less likely to.

## Data processing needs are indeed growing. 35 zettabytes (trillion gigabytes) of data were created around the world in 2020.<sup>3</sup>

High performance computing (HPC), artificial intelligence (AI), and analytics have become the domain of small businesses as well as enterprises, while demand for virtual desktop infrastructure (VDI), which enables remote working, has greatly increased in recent months.

The data center is therefore more important today than ever before. Infrastructure must be ready for growth and the financial challenges that brings. At many organizations, addressing environmental issues by operating more sustainably is equally important. Colocation in the Nordic region, with its low operating costs, welcoming business environment, renewable energy, and excellent connectivity, is seen as the answer by many businesses. This paper aims to help you decide if it is the answer for yours.

### The Nordic region

- The Nordic countries include Denmark, Finland, Iceland, Norway, and Sweden
- The Nordic region has a mild climate with cool summers (around 8°C to 16°C) and winters warmer than other northern territories (averaging around 0°C)
- All Nordic countries are part of the European Economic Area (EEA) and benefit from freedom movement of goods, services, persons and capital
- Nordic countries have a long-standing reputation for political and environmental stability<sup>4</sup>
- The General Data Protection Regulation (GDPR) is in force in all Nordic countries, including Iceland and Norway which are not members of the EU but are within the EEA and follow the same rules and legislation as EU countries.

<sup>3</sup> Forbes. Jan, 2020. 6 Predictions About Data In 2020 And the Coming Decade.

<https://www.forbes.com/sites/gilpress/2020/01/06/6-predictions-about-data-in-2020-and-the-coming-decade/?sh=5302816d4fc3>

<sup>4</sup> New York Times. April 2012. Nordic Countries Increasingly Attractive as Sites for Data Centers.

<https://www.nytimes.com/2012/04/30/business/global/nordic-countries-increasingly-attractive-as-sites-for-data-centers.html>

## Introduction

Data center operators planning their next big move are facing a number of challenges. The COVID-19 pandemic put many projects on hold in 2020, but also increased our reliance on digital services, remote working, and use of workloads such as analytics and machine learning.<sup>5</sup> The success of coming data center projects is more critical than ever before.

As always, the bottom line is critical; global IT spending fell year on year by 8% or \$300 billion USD in 2020, making cost optimization a priority for many organizations. At the same time, businesses are digitally transforming to put IT at the core of their operations, and now face the technical hurdle of how to run growing workloads, from AI to HPC, with the required performance, efficiency, and scalability. And as world leaders warn time is running out to act on climate change, many organizations are preparing for potential new laws on data center sustainability; many new green laws are already coming into force around the world.<sup>6</sup> The data center holds the key to solving these challenges. Organizations have more choice than ever before on where to invest, thanks to subsea fiber optic networking that allows workloads to run almost anywhere in the world. Why, then, are so many colocating in the Nordics?

## Nordic advantages

### Cost efficiency

Two features of the Nordic region enable low data center Power Usage Effectiveness (PUE), and therefore low operating costs: a mild climate that minimizes the need for refrigeration-based cooling, and low energy prices.

### Reduced refrigeration costs

While temperatures vary across individual countries, Nordic summers are generally mild and winter temperatures are warmer than other territories of similar latitude, such as Greenland and northern Canada. In Reykjavik, Iceland, low-cost air cooling is possible all year round because temperatures rarely dip below 0°C or exceed 15°C. When refrigeration is required, infrastructure runs most efficiently in stable climates with small fluctuations in temperature.

### Europe's lowest energy prices

The Nordics offer consistently low energy prices thanks in part to the surplus of renewable power generated in the region. In 2020, high snow and hydro-reservoir levels created a record surplus that pushed prices to their lowest level in 20 years.<sup>7</sup> Based on prices from Nord Pool, the wholesale electricity market of the Nordic countries, Nordic energy has been the lowest priced in Europe during the last decade, with Germany a close second.<sup>8</sup>

<sup>5</sup> Forbes. Aug, 2020. The Top 10 Digital Transformation Trends Of 2020 : A Post Covid-19 Assessment.

<https://www.forbes.com/sites/danielnewman/2020/08/11/the-top-10-digital-transformation-trends-of-2020-a-post-covid-19-assessment/>

<sup>6</sup> World Economic Forum. Jan, 2022. The war on plastic: 5 green laws for 2020. <https://www.weforum.org/agenda/2020/01/green-laws-environment-2020/>

<sup>7</sup> Montel. Jun, 2020. Nordic utilities suffer as prices fall to 20-year low. <https://www.montelnews.com/en/story/utilities-suffer-as-prices-hit-20-year-low/1123320>

<sup>8</sup> AleaSoft. Jun, 2019. European electricity markets panorama: Nordic countries. <https://aleasoft.com/european-electricity-markets-panorama-nordic-countries/>



## Performance

### Diverse workloads

Nordic data center facilities are suitable for a wide spectrum of workloads, thanks to their huge space and power capacities, a diverse range of facility types available, and high-speed connectivity with major markets.

The atNorth data center in Stockholm will typically provide between 6 and 20kW rack density and above with low-cost air cooling, while liquid cooling will much higher rack density or over 100kWper rack. The Tier 3-rated facility also offers redundant power, which is ideal for high-density compute requirements such as HPC, AI, and analytics. Fiber optic sub-sea routes can deliver latency below 20ms for users in the US and Europe, which is suitable for end-user computing workloads such as VDI. New colocation facilities can be readied and deployed in as little as two months.

### Sub-sea fiber routes

Nordic data centers connect to major European and North American markets via an expanding network of more than 25 high speed, sub-sea fiber optic routes, providing excellent networking that makes it possible for organizations in the USA, UK, and mainland Europe to run end-user computing workloads. Latency between Reykjavik and major markets is less than 20 ms. New routes are opening every year: in 2022, a new high capacity sub-sea route will directly connect Iceland with the Republic of Ireland.

## Network latency

Location	Reykjavik, Iceland <sup>9</sup>	Stockholm, Sweden <sup>10</sup>
	Round-trip latency (ms)	
London, UK	37	25
Amsterdam, Netherlands	35	19
Copenhagen, Denmark	29	9
Frankfurt, Germany	35	20

<sup>9</sup> Farice. Network Facts. <http://www.farice.is/network/network-performance/>

<sup>10</sup> atNorth. Average round-trip delay time latency in ms.

## Sustainability

### Towards carbon neutrality

Colocation in Nordic countries facilitates the pursuit of corporate sustainability and social responsibility goals, by leveraging the region's renewable energy and environmental programs. Two thirds of electricity produced in Nordic countries comes from renewable sources, and the region's electricity sector is on track to become fully carbon neutral by 2050.<sup>11</sup>

**In Iceland, 100% of electricity already comes from hydroelectric and geothermal sources,<sup>12</sup> leading IBM to name Iceland as "the place for sustainable data centers".<sup>13</sup>**

Other regional sources include wind, solar, and bioenergy. The Nordics now produce a surplus of energy, which is available to global data center operators as a green alternative to carbon-producing electricity sources at home. The Nordics' energy surplus is set to double by 2025, when it will produce 45TWh more electricity than it consumes (compared to 21TWh in 2019).<sup>14</sup> Investments in data center infrastructure today are likely to become more environmentally friendly over time.

### Using recovered energy

Data center facilities in the region are advancing these goals with "recovered energy" initiatives. The atNorth campus in Stockholm, Sweden is part of the city's Open District Heating program, which channels heat created by data center equipment as an energy source for heating citizens' homes. Stockholm aims to become the first city with a positive carbon footprint by 2040. in the USA, UK, and mainland Europe to run end-user computing workloads. Latency between Reykjavik and major markets is less than 20 ms. New routes are opening every year: in 2022, a new high capacity sub-sea route will directly connect Iceland with the Republic of Ireland.<sup>15</sup>

## Nordic renewable energy

**100%**

renewable in Iceland,  
2/3 renewable across  
the region

**100%**

carbon neutral  
electricity sector  
by 2050

**21TWh**

energy surplus in  
2019, growing to  
45TWh by 2025

## Ease of doing business

### Government support

Governments of Nordic countries have put in place legislation and initiatives designed to provide a smooth path for global organizations to locate their data centers in the region.

- Invest in Iceland offers low corporate tax levels and research grants
- Sweden offers tax cuts on energy used by data centers, which can reduce energy bills by up to 40%
- The "Norway as a Data Centre Nation" strategy provides tax exemptions for operators and funding to improve connectivity
- Denmark created a non-profit organization, The Danish Data Center Industry (DDI), to promote investment in the sectors

Investors can expect a smooth regulatory environment and may benefit from financial incentives.

### Easy to access

While it may be easy to imagine Nordic data centers located in remote and difficult-to-reach locations, most modern facilities are easily accessible. For example, the atNorth ICE02: MJOLNIR site near Reykjavik is only a 5-minute drive from Keflavik International Airport, which itself is an international hub that handled 7 million passengers in 2019. Many facilities are located on the outskirts of metropolitan areas with international airports; the atNorth campus in Sweden, which is set to open in 2021, is just outside the capital of Stockholm or a 20-minute car ride from the Stockholm Arlanda international airport.

### Highly scalable facilities

Government support for the Nordic data center industry has led to the creation of large campuses with additional land available for development. This environment has attracted investment by US hyperscalers and can meet data processing requirements at any scale. Thanks to the Nordics' renewable energy surplus, data centers also offer huge power capacity. The atNorth ICE01: THOR facility in Reykjavik, for example, offers 3.2MW of power and 2,700m<sup>2</sup> of physical space. The larger ICE02: MJOLNIR facility offers 80MW and 13,750m<sup>2</sup> of space. ICE02 has space for over 2,000 racks in its existing 10 buildings, and the site has scope for an additional 12 buildings. The 6,400m<sup>2</sup> atNorth Stockholm campus will offer 11.2MW of power and space for 400-600 racks.

## Independent market analysis

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Large and mid-sized businesses moved into emergency mode in 2020, moving major workloads to public cloud to support their newly distributed workforces. Hyperscalers' revenues were up in Q2, Azure by 48% and Google Cloud by 45%. As enterprises evolve their strategy to use hybrid cloud, new data center builds will pursue hyperscale-style builds to meet capacity needs, resulting in larger data centers.

As organizations attempt to reduce their carbon footprint affordably, and connectivity via under-sea cables becomes even more robust, investment in Nordic data centers and the low-cost renewable energy they offer is set to grow. ”

### Kevin Imboden

Director of Research, Cushman & Wakefield

## Conclusion

Data center colocation in the Nordics offers advantages for organizations that prioritize:

**1. Low operating expenses**, thanks to low energy prices and a climate that allows data centers to be cooled by air rather than refrigeration

**2. A welcoming business environment** with accessible locations and a range of government incentives available

**3. Sustainable operations**, thanks to the region's renewable energy-powered facilities and environmental programs

**4. High quality facilities** with excellent networking and features tailored to individual business needs

## About atNorth

**atNorth is a high-density computing technology company headquartered in Reykjavik, Iceland. It operates one of Europe's largest data center campuses in Iceland, harnessing ground-breaking colocation data center technology and smart cluster operations all powered by renewable energy.**

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