

# Promoting Norway's DC Credentials Through Members' Skills

DIGITAL REPORT 2022





**NORWEGIAN  
DATACENTER**  
INDUSTRY

# PROMOTING NORWAY'S DC CREDENTIALS THROUGH MEMBERS' SKILLS

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### **Bjørn Rønning, General Manager of The Norwegian Data Center Industry, explains the company's work in promoting the industry through its members**

**T**he Norwegian Data Center Industry is an association formed of seven data centre operators and power providers. Known as the 'founding fathers', these include Green Mountain, Stack Infrastructure, Lefdal Mine Datacenter, Bulk, Basefarm, Ringerikskraft and Statkraft. The association also noticed that there was significant interest from other areas of the ecosystem and today it consists of around 35 members – from power providers to hardware suppliers.

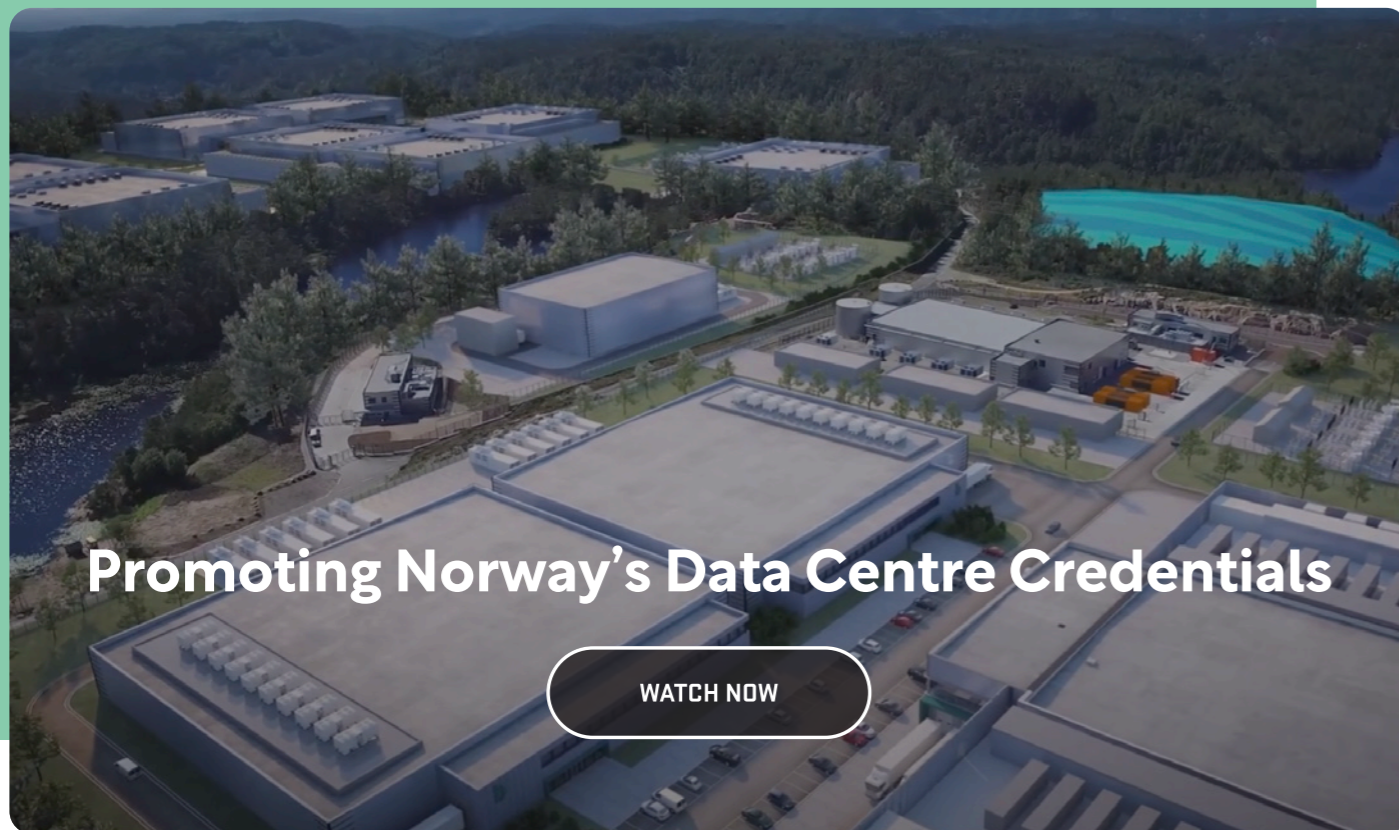
Its aim is to promote the country's data centre sector through its members and working groups.

"What really made us pull this together was the joining of forces on addressing the tax barriers that kept us from being competitive with our neighbouring countries," Bjørn Rønning, General Manager of The Norwegian Data Center Industry said.

The need for an association like the Norwegian Data Centre Industry increased during the height of the pandemic, which accelerated the company's growth further and allowed it to identify the main issues the Norwegian sector is experiencing and how best to tackle them.

According to an analysis conducted by Implement Economics – part of the Implement Consulting Group – data centre capacity in Norway has increased by 17% per year since 2010. In 2020,





Promoting Norway's Data Centre Credentials

WATCH NOW

**“It’s essential for us to grow as an organisation, to recruit more members, and expand the already quite large ecosystem”**

**BJØRN RØNNING**  
CEO,  
NORWEGIAN DATA CENTRE INDUSTRY

approximately 145 MW of capacity was installed, and this capacity is expected to grow sharply in the years to come. In the period 2019-2020, at least NOK 2.7bn (US\$3.06bn) was invested in new data centres in Norway. The investments are driven by both Norwegian and international demand.

“I think one of the key themes here is the energy situation and the total cost of ownership – the TCO – of energy,” says Rønning. “It’s all about turning around the perception of Norway that it is, in inverted commas, ‘not open for business’. Norway is absolutely open for business. We have a very mature digital population; we have a government that’s really backing the data centre strategy; and we have a vibrant data centre ecosystem that is led by five large data centre operators.”

**Working groups address key areas of the data centre sector**

In addition to reducing tax and improving framework conditions, the Data Center Industry association looks to advertise and promote the industry. It achieves this through its working groups. Based on requirements from the association’s members, there are four working groups categorised into Sustainability,

International Marketing, Power & Grid and Skills Development.

Each of the groups is working on different projects. The Sustainability working group, for example, is focused on heat reuse projects. As the Norwegian operators already tick the box for renewable energy and world-leading power-efficiency, heat reuse is the next step on the road to carbon neutrality. “We are also looking at how we can get consistent and transparent reporting on climate factors, so we can compare apples with apples in terms of other markets or other countries,” Rønning explains.

Rønning says that the global data centre industry is in short supply of personnel such as electricians and people who work with cooling and heating technology. Although the situation in Norway is not as critical, the Skills Development group aims to spur development of skilled resources to the DC industry. “We are actively working with schools to develop apprenticeship programmes to encourage more young people into the business,” he says.

Then there’s what Rønning refers to as the working group for power-related issues. He wholeheartedly believes that Norway is equal to other countries when it comes to building grids, launching projects, and having on-site power availability. This is, however, cumbersome work as Rønning points out. “You’re working with large, monopolistic organisations like grid providers and so forth, and we are actively working to see how we make the permit processes for power grid construction more effective.”

The last of the four groups is International Marketing, which aims to promote Norway as a sustainable data centre destination. “We have so many sites, so much renewable power and so much connectivity and competence to offer. We have a vibrant data

centre industry in Norway today that is open for business to take in new clients who are looking for cost-effective and sustainable solutions,” Rønning says.

**Norway’s unique position as a sustainable data centre location**

Sustainability also plays an important part in the association’s strategy, as the industry

**Continues page 12**

**BJØRN RØNNING**



TITLE: CEO

INDUSTRY: DATA CENTRES

LOCATION: OSLO, NORWAY

» Bjørn Rønning is the CEO of Norwegian Data Center Industry, a trade association, and the voice of the data center industry in Norway. Mr. Rønning is a telecom professional and has through his career worked as an advisor in the national and international digital infrastructure space, including terrestrial and subsea fiber optic networks, data centres and related digital infrastructure.

EXECUTIVE BIO



TAKING SUSTAINABILITY TO THE NEXT LEVEL WITH HEAT REUSE

In Norway, we are fortunate to have access to 100% renewable hydropower to operate and cool our data centres. This also means that we are in a good position to take sustainability to the next level, exploring new solutions to support the green shift. An area with huge potential is reuse of waste heat from data centres. Several operators in Norway have initiated pilot projects to address this challenge and, below, we present a few examples:

**1. Greenhouse plants** – Bulk Data Centers has signed letters of intent on the recovery of heat across all its data centres, to ensure any excess is utilised in the district heating network. This will provide heat for several energy intensive processes and ventures, including Bulk’s first step to realise its circular industry cluster vision at its NO1 campus in Kristiansand with Kristiansen Gartneri (Greenhouse Plant). In this instance, the heat provided will power Kristiansen Gartneri’s greenhouse vegetable operations – keeping vegetables sufficiently warm and reducing the greenhouse’s power needs – making food production more cost-effective and sustainable.



**2. Land-based lobster farm** – The company, Norwegian Lobster Farm, will use the waste heat from Green Mountain’s DC1 data centre. To grow optimally, the lobster needs a temperature of 20°C in the seawater. This is exactly the temperature of the seawater that has been used to cool the IT equipment. In a production facility adjacent to the data centre, this heated seawater can be used directly in the breeding of lobsters. As a result, the energy is reused, and Green Mountain is one step closer to making the facility climate positive. [More info](#)



**3. Land-based trout farm** - Hima Seafood is going to establish a land-based trout farm 800m from Green Mountain’s DC2-Telemark data centre. By connecting the two facilities together by a pipe system, we will deliver heated water to Hima. Heat exchange technology will then ensure that the Hima facility can use the energy from the water. The same water is subsequently returned to Green Mountain. The water now holds a lower temperature that can be used in the

cooling of the data centre. In other words, a truly circular project. The farm is estimated to be operational in 2023. [More info](#)

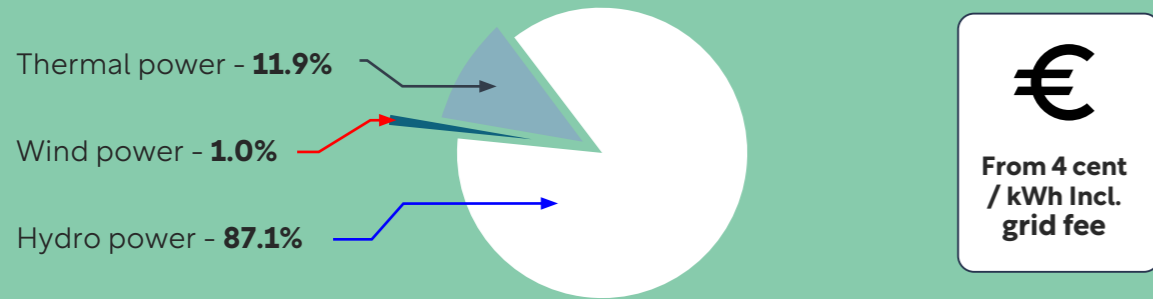
**4. Smolt production** – Lefdal Mine Datacenter cooperates with Sjomatstaden, a future-oriented seafood centre nearby their facility. They will use the waste heat from the data centre to produce smolt (a young salmon ready to live in saltwater.) Production with heated water is twice as fast, compared to using original ocean temperature. Estimated production in phase 1 is 6 million smolts/year, which in turn will result in 15.000 tonnes of salmon annually. This will also save the seafood centre an annual power capacity equal to 12MW. [More info](#)



## DATA CENTRES IN NORWAY

### SUSTAINABILITY WITH A COST BENEFIT

#### Electricity Generation in Norway



Source: SSB

#### Green Energy

- Electricity production in Norway is 98,9% renewable
- Consecutive annual energy surplus

Source: government.no

#### Lowest Energy Prices in Europe

- Lowest electricity prices in Europe
- Competitive grid fees
- Lowest energy tax in Europe

Read more on TCO on p.06

#### Sustainability to the next level

- Heat Reuse projects
- Average PUE: < 1.2
- Cold and wet climate

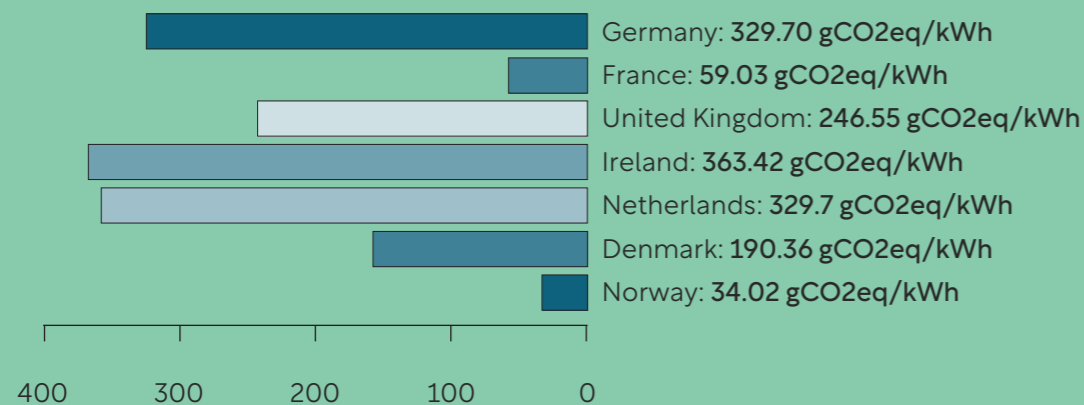
Source: PUE numbers from operators

#### Carbon footprint of electricity:

- Norway average: 34.02 gCO<sub>2</sub>eq/kWh
- FLAP-D average: 260.35 gCO<sub>2</sub>eq/kWh

Source: Average in 2021 Electricity Map.org

#### Carbon Intensity - Europe 2021



### EXCELLENT CONNECTIVITY

#### Fibre Routes

Recent investments in subsea fibre infrastructure have improved Norway's connectivity.

#### List of routes:

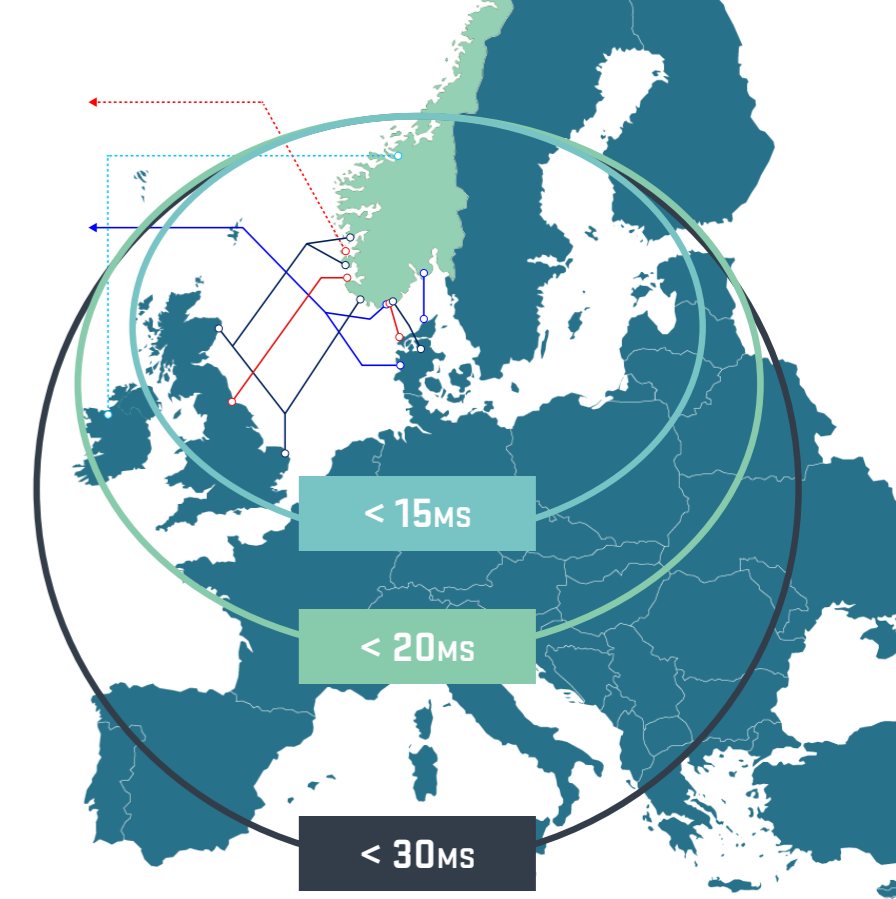
- Skagenfiber West
- Skagerak 4
- Havsil
- Havfrue/AEC-2
- NO-UK Cable
- Celtic Norse
- Leif Erikson

#### Latency

Examples from Oslo, the Norwegian capital and Stavanger, on the west coast of Norway.

RTD IN MS	FRANKFURT	LONDON	AMSTERDAM	PARIS	DUBLIN
OSLO	14.4	14.9	12.6	19.9	18.2
STAVANGER	14.1	11.6	16.3	17.4	12.1

Source: Invest in Norway



### STRONG ECO SYSTEM

#### Digital mature and skilled workforce

- High competence, independence, high efficiency
- Flat hierarchies

#### Political Commitment

The Norwegian Government issued the world's first data centre strategy in 2018 and updated it in 2021. This is a strong political commitment to continuously work to improve the framework conditions (taxes, energy, fibre) for the data centre ecosystem.

Source: government.no

#### Norwegian Datacenter Industry

Members of the association represent the whole data centre ecosystem, from site developers, designers, builders, suppliers, fibre operation, power providers to data centre operators. Currently there are 30+ members, the number is steadily growing.

#### Member of the European Single Market

Norway is fully integrated in the European Single Market through the EEA and Schengen Agreement.



itself has always been beleaguered by the difficulties sustainability poses. “I think that the data centre industry has always been challenged on the sustainability issue. That has, however, also led us to be in the forefront of developing and integrating sustainable solutions in the data centre industry,” Rønning says.

**“We are also looking at how we can get consistent and transparent reporting on climate factors so we can compare apples with apples in terms of other markets or other countries”**

**BJØRN RØNNING**  
 CEO,  
 NORWEGIAN DATA CENTRE INDUSTRY

In short, the long-term strategy for the Norwegian Data Centre Industry is quite simple, according to Rønning. “It’s promoting the existing data centre industry in Norway, which is welcoming all kinds of business because we have ample space and ample access to power. In addition, we have a fantastic connectivity infrastructure that had a heavy uplift during the last five, six years.”

**A partner ecosystem represented by its members**

The Norwegian Data Centre Industry’s partner ecosystem within the association is represented by its members. Our current members include Norwegian and international data centre operators, the MEP supplier industry, construction companies, HW/SW suppliers, communications

## AUTOMOTIVE DATA GOING NORTH

### Automotive data going north

The focus on the Nordics as the ideal data centre location has increased over the last few years, especially in light of the region's plentiful access to renewable power and beneficial climate for efficient cooling. An industry that has certainly set its eyes on the Nordics is the automotive industry. Their High-Performance Computing (HPC) workloads are a perfect fit for colocation providers in Norway.

The automotive industry is going through a massive transition. Electrical vehicles, autonomous driving, new business models and the race towards carbon neutrality are driving this industry through massive changes. This also means that automotive companies are having to store and process enormous amounts of data to make this transition. An increasing share of this data now finds its way to Norway. Here are two examples of international automotive companies who have made the move to the Nordics.



Photo credit: Lefdal Mine

**Lefdal Mine Datacenter welcomes Mercedes-Benz to its underground facilities**  
 In 2021, Lefdal cooperated with Infosys to sign a large data center agreement with Mercedes-Benz. The company moved its High-Performance Computing (HPC) cluster to Lefdal Mine Datacenter and was then one step closer to becoming a carbon-neutral company. Mercedes-Benz uses the global IT giant Infosys to operate its IT infrastructure. Infosys delivers “Green Data Center as a Service” to Mercedes-Benz from the facility in Nordfjord. [Read full story](#)

### Crash Tests Using the Power of Water

In 2019, Volkswagen group moved its HPC operations to Green Mountain’s data center in Rjukan, Telemark. Two new data halls were constructed on the Green Mountain premises in only six months. These halls are supplied with up to 2,75 MW of power – that generates plenty of computing capability that Volkswagen and Audi will apply to run HPC projects like simulated crash tests and virtual wind tunnel trials. In comparison to a conventionally operated computer center, the facility in Rjukan saves Volkswagen Group more than 5,800 tons of CO2 annually. [Read full story](#)

Photo credit: Volkswagen Group



**“You’re working with large, monopolistic organisations like grid providers and so forth, and we are actively working to see how we make the permit processes for power grid construction more effective”**

**BJØRN RØNNING**  
CEO,  
NORWEGIAN DATA CENTRE INDUSTRY

operators, power companies, and companies in the consulting industry. “If you start at the very bottom of the ecosystem, you have the site providers. You have several companies also owned by local municipalities that offer sites for data centre projects.

“We are working with them to really adapt the site to be even more attractive for new data centre projects,” Rønning says. The company also works with both designers and suppliers of plumbing, mechanical, and electrical equipment, as well as operators and their subcontractors. “The ecosystem is complete, in terms of covering the entire value chain.”

Rønning also adds that the Norwegian Datacenter Industry also welcomes new data centre operators to Norway.



“Our well established supply chain network can assist foreign data centre operators wanting to establish new data centre operations in Norway.”

Discussing the working relationship with the ecosystem, he says: “My organisation is created by my members and it's basically meant to serve my members. So, I think that one of my most important tasks is to listen to my members, hear them out, understand what their concerns are and the opportunities they want to develop, and that's why we have established these four working groups.”



- The Norwegian Data Centre Industry was founded to provide solutions to challenges faced in the data centre sector and to promote the country of Norway as an attractive market.
- It was founded in 2021.

INTERVIEW WITH DC BYTE ON THE NORWEGIAN DC MARKET

**1. In your view, what are the growth projections for the Nordic market? And what are the drivers behind this growth?**

The data centre market in the Nordics is 5 times the size it was a decade ago. With over 1.3GW of total capacity added between 2016 to 2021 and average yearly growth of 17.5%, it has the potential to grow by more than 60% of its current live capacity rate over the next 3-5 years.

The region has become a relatively attractive location for hyperscale public cloud operators, with around 58% of the live capacity in the region coming from self-built public cloud deployments. The key drivers for the popularity of the Nordics

are the area's cool climate, an established infrastructure, good network connections and a plentiful supply of renewable energy.

**2. Does Norway stand out in any way compared to the other Nordic countries?**

Each of the countries within the Nordic region has unique features. Some factors are more common across the region, whilst others are country-specific. Increasing global concern about climate change and the signing of the Paris Agreement is driving businesses to look for more

environmentally sustainable ways in which to operate. As an industry that



Jovita Januskeviciute

is heavily reliant on power, data centre operators are continually seeking more sustainable and efficient solutions. Norway has great potential in this regard due to an abundant supply of green energy. Almost all electricity produced by the country emanates from green energy sources. In addition, Norway has an industry-supportive government that favourably impacts national industry growth. In the last 4-year period, Oslo's data centre market has grown at an average of 42% annually. In 2021, planned capacity in Norway alone doubled the 2020 figure, representing the second largest planned capacity across the Nordics after Denmark.

**3. How do you think the Nordic market will develop compared to the FLAP-Ds? Will**

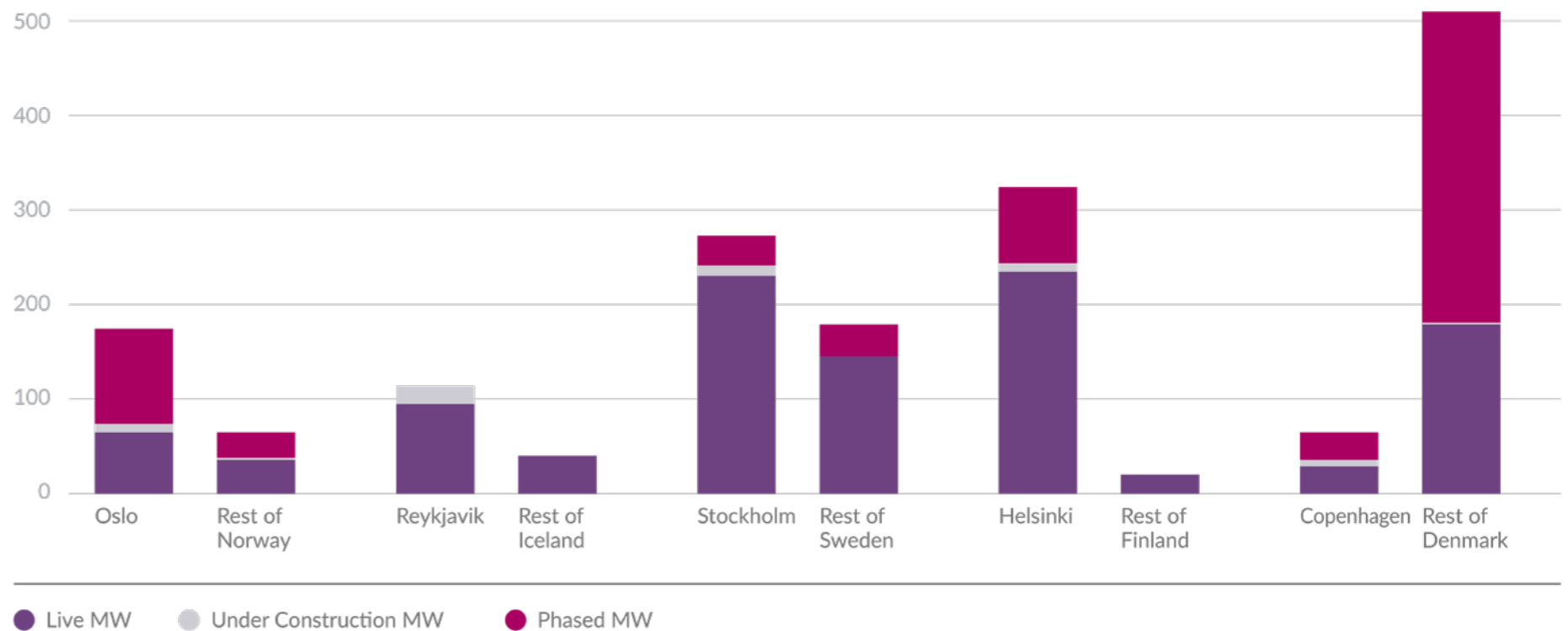
**there be a "migration up north" movement in the market? Especially in light of the energy situation in Europe, would this expedite any migration projects?**

Nordic national markets are on an upwards growth trajectory. The increase of technological integration in recent years, particularly during the pandemic, led to a significant rise in IT capacity of newly built facilities. This resulted in power constraints, particularly in the larger markets such as London, Amsterdam and Dublin. Whilst it is too early to say which particular markets will become more dominant, considering what the region has on immediate offer, the Nordics are well-placed to be potential front runners in attracting foreign investment and development.

DC BYTE...

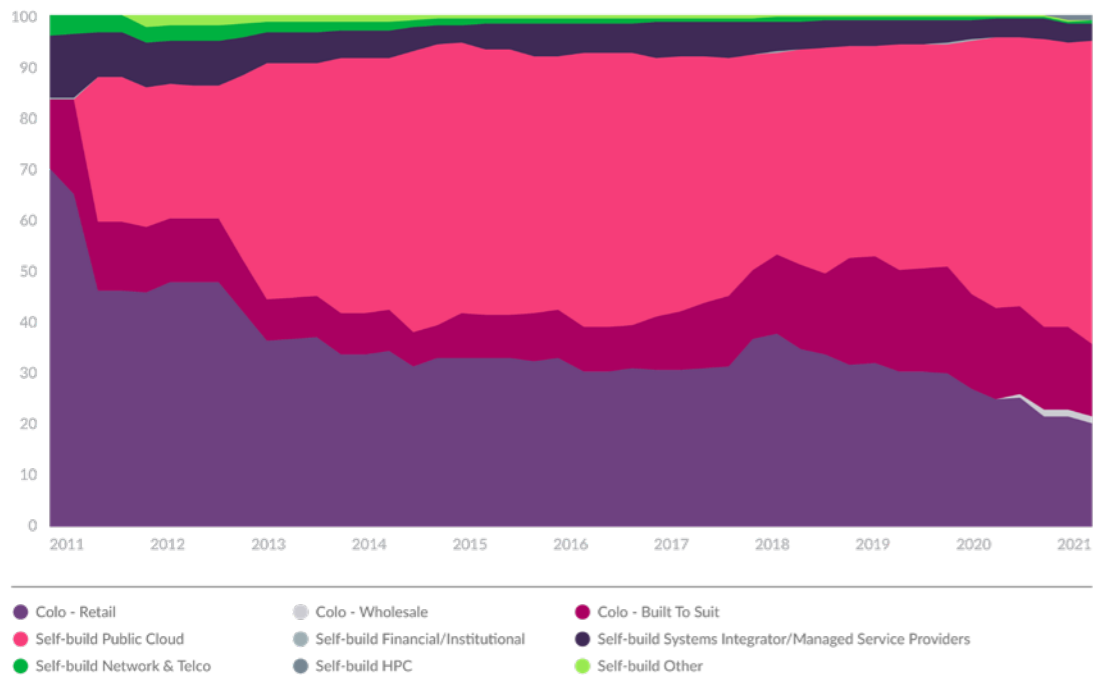
Nordics Comparison at Year End 2021

Total IT Capacity MW



Nordics Historic Market Composition 2011 to 2021

Percentage of Market by Total IT Power





## HOW TO ESTABLISH A DATA CENTRE IN NORWAY

Interview with Benedicte Fasmer Waaler from Invest in Norway

**Q: Norway is one of the few countries with its own data centre strategy. How important is this for the industry and potential clients?**

A: A national data centre strategy shows an overall commitment from the government to develop and promote the data centre industry. Our experience is that this is appreciated – both by investors and players in the data centre industry – at home and abroad. The existence of a data centre strategy is a strong signal that there is a will to establish and maintain a favourable business climate, including a stable regulatory landscape for the industry, in the years to come. This stability is important both from an investment and from an operational perspective. The new government continues to support the previous government’s strategy.

**Q: What are the different entry strategies when looking to move your data centre capacity to Norway?**

A: The Norwegian data centre market offers different solutions to suit different requirements. Whether it means leasing capacity from the Norwegian data centre operators, setting up your own data centre as a service, build-to-suit, ready-to-build,

or even build your own data centre. The Norwegian government is committed to making this process as smooth as possible and has provided an introduction guide with references to more detailed resources when needed. [More Info](#)

**Q: How does Invest in Norway cooperate with The Norwegian Datacenter Industry?**

A: We welcomed the formation of the business association Norwegian Data Center Industry in June last year and are pleased to see that it already represents the voice of the industry towards the public authorities and the market as such. In our view, it is valuable that the association rooms the whole data centre ecosystem, from site developers, power providers, communication service providers, and equipment suppliers to the data centre operators themselves. We cooperate with the association in the international marketing of Norway as a favourable and sustainable data centre nation, either by sponsoring marketing activities or by joint marketing efforts towards an international market. We also work with the association to identify and market beneficial locations in Norway for developing new and energy intensive data centre projects.



## Monitoring the international market and industry trends

The Norwegian Data Center Industry has several plans lined up for the next 12 to 18 months. According to Rønning, “the most important of these is to closely monitor the international market to determine how it can benefit the data centre operators already located in Norway. It’s also to see if it can create opportunities for new projects to commit to the Norwegian Market,” Rønning says.

“It’s essential to grow as an organisation, to recruit more members, and expand the already quite large ecosystem.” Moving forward, his goal is to be the voice of the Norwegian data centre sector that public authorities listen to.

Looking toward future trends in the industry, Rønning highlighted one in particular: energy efficiency.

“I would expect to see many technical solutions that would address this issue. That would include everything from exploring liquid cooling to having a more effective solution for heat reuse. In rural areas, the DC operators are already working actively with projects like heating greenhouses and fish farming projects. We would see huge developments on the sustainability side in terms of embedding it in the total project how you operate sustainably throughout the data centre’s whole lifecycle.

Rønning also expects to see growth in hyperscale installation, both in Norway and other Nordic countries. “I think you will see even more energy-efficient technology and even larger installations because we need to digitalise more, which, in the end, is the key to becoming more sustainable.”



## ABOUT THE ASSOCIATION

Norwegian Data Center Industry is a neutral business association and the voice of the industry towards the market and public authorities. We provide the most prominent meeting place for the industry to network, influence and promote the members of the association. We are passionate on spearheading sustainability and low TCO among the key reasons why you should establish your data centre or move your workloads to Norway.

Our members represent the whole range of players in the data centre ecosystem, from site developers, builders, designers, power providers, communication service providers, equipment providers and data centre operators.

### Links to resources:

- National Data Center Strategy
- How to establish a data center in Norway
- How Norway produces hydropower with a minimal carbon footprint
- Data Centers in Norway (in Norwegian)
- Connectivity in Norway

### Contact info:

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## FOUNDING MEMBERS



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## MEMBERS

