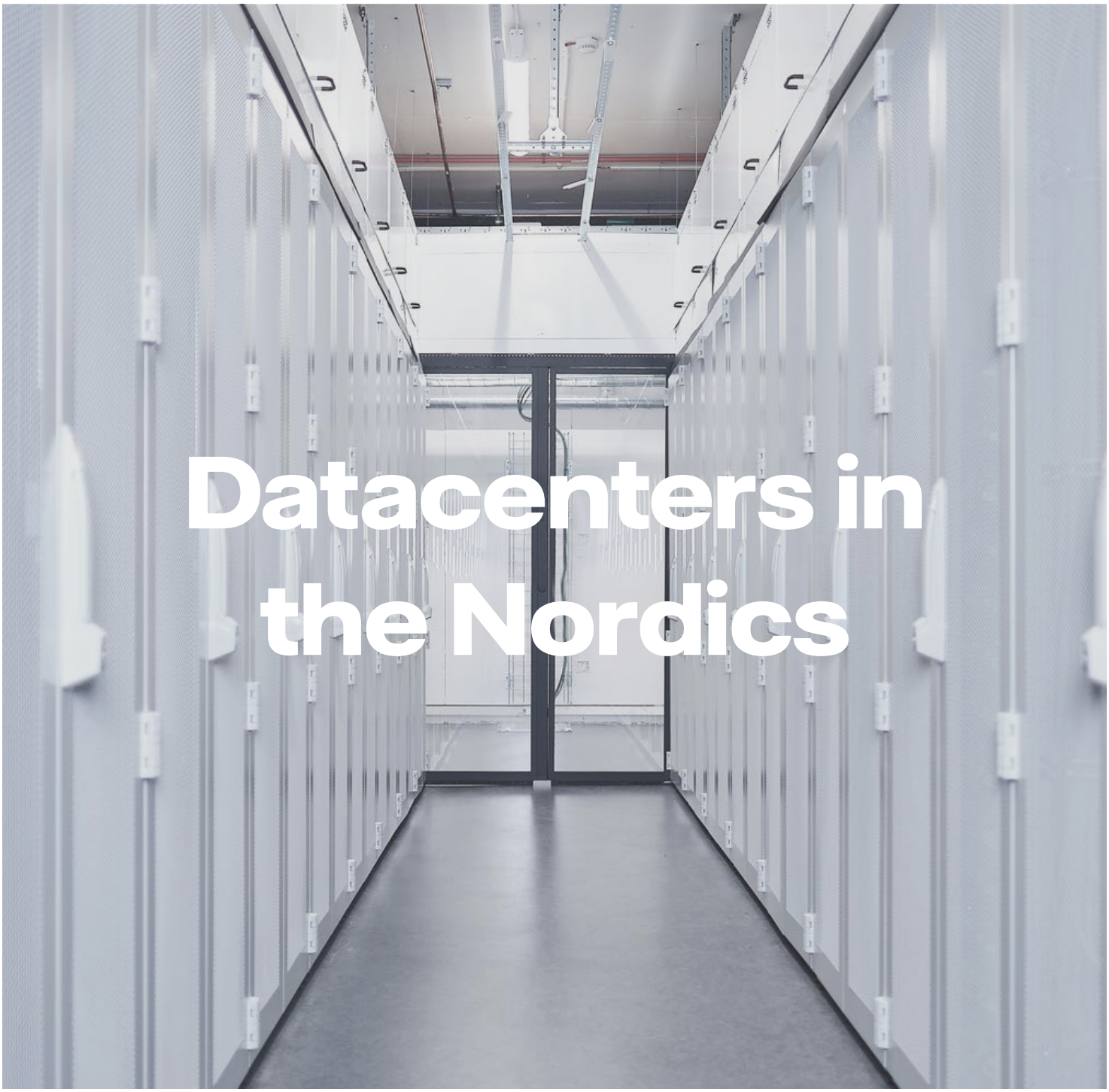
VATTENFALL



Datacenters in the Nordics

The Nordic region has emerged as a global hotspot for datacenter establishments in recent years, driven by the area's unique advantages and the explosive growth of data volumes worldwide. Datacenters play a pivotal role in addressing future challenges, from AI development to smart cities and sustainable digitalization. As the industry expands, the demands for energy efficiency and sustainability are also rising. Nordic datacenters benefit from the region's renewable energy sources and naturally cold climate, but they also face increasingly stringent regulations and expectations from authorities, customers, and investors. This balance between growth and sustainability is shaping an industry that not only drives digital innovation but also sets new standards for environmental responsibility in an increasingly connected world.

Chapter 1

Datacenters in the Nordics

In recent years, the Nordics have become an increasingly attractive region for datacenter establishments, drawing both international tech companies and datacenter operators. This appeal is due to a unique combination of geographical, climatic, and infrastructural advantages that benefit data centers seeking stability, sustainability, and cost-effective operations. Here, we outline the key factors that make the Nordics a smart choice for datacenter investments.

Climate Advantages: Cooling and Energy Efficiency

One of the most appealing factors for datacenters in the Nordics is the naturally cool climate. Datacenters generate immense amounts of heat, and cooling is one of their largest operational costs. With an average climate significantly cooler than in many other parts of the world, particularly during the long winter months, the need for energy-intensive cooling systems is reduced in the Nordics. Many datacenters in the region use free cooling, where cold outdoor air is used directly to cool servers, contributing to high energy efficiency and lower energy costs.

Energy: Access to Fossil-Free Power

The Nordic energy system is world-leading in renewable energy production and use. A large proportion of electricity production comes from hydropower, wind power, and, in some cases, bioenergy, which means that data centers established here can operate almost entirely on green energy. This is especially attractive for companies that prioritize sustainability and environmentally friendly operations, as it helps reduce their carbon footprint.

Many datacenter clients today demand that their data is managed with minimal environmental impact. Choosing a Nordic datacenter, where electricity is largely fossil-free, becomes a crucial competitive advantage for datacenter operators.

Stable Infrastructure and High Operational Reliability

The Nordic countries have a long history of stable, well-developed infrastructure, particularly in electricity and networking. Power grids are robust with high operational reliability, which means the risk of power outages is low. For datacenters, where continuous operation is critical, this is a major advantage. In addition to reliable power grids, the Nordics also place a strong emphasis on security and redundancy in both internet connectivity and data infrastructure.

This infrastructure ensures that Nordic datacenters can offer high availability and meet the security requirements of both local and international customers. For companies with large datacenter needs, this provides reassurance that their operations can run smoothly without unnecessary disruptions and uncertainties.

Chapter 2
Reporting Requirements for Datacenters

Datacenter, known for their high energy consumption, are increasingly at the center of sustainability discussions. New regulations and expectations from customers and investors are challenging the industry to optimize not only for efficiency but also for sustainability.

Reporting requirements are becoming more comprehensive and detailed, necessitating that datacenter implement robust systems to measure, analyze, and report their environmental impact. At the same time, there is mounting pressure to demonstrate concrete progress in reducing carbon emissions, increasing the use of renewable energy, and improving resource efficiency. This shift towards greater transparency and accountability represents both a challenge and an opportunity for the datacenter industry to position itself as a leading force in the global sustainability transition.

Energy Efficiency Directive

In the latest update to the Energy Efficiency Directive, the EU increased its energy efficiency target to 11.7% by 2030, meaning that the EU's final energy consumption in 2030 must not exceed 8,873 TWh.

Specific requirements apply to datacenter, with a focus on sustainability and transparency. Facilities exceeding 500 kW of capacity are now required to report detailed information about their energy efficiency and water consumption. Datacenter with over 0.5 MW must also publicly disclose extensive operational information. Additionally, facilities with more than 1 MW of capacity must implement systems for waste heat recovery to reduce their environmental impact.

In December 2023, a proposal was presented requiring datacenter to clearly specify how they contribute to the power grid, particularly in terms of stability, reliability, and resilience. The exact details of these requirements have yet to be finalized, but the European Commission has published a draft for public consultation under the title 'Datacenters in the EU – Reporting System', which is available on the EU's official website.

New Directives Proposed

A new energy efficiency directive requires datacenter owners and operators to publicly disclose information about energy performance and sustainability. A memorandum with legislative proposals is now open for consultation until November 12, 2024. Datacenter with an installed IT capacity of at least 500 kW must report this information to an EU database in aggregate form to promote efficiency, the use of renewable energy, and reduce environmental impact. A delegated regulation from the European Commission requires reporting datacenter to submit the information no later than September 15, 2024. Currently, it is not possible for datacenter in Sweden to report, but more information on this will follow. The law is expected to come into effect no earlier than July 1, 2025.

Chapter 3
Heat Recovery

EU's Energy Efficiency Directive and the new requirements for heat recovery in data centers aim to improve energy efficiency and reduce environmental impact. Data centers with an installed IT power demand of at least 500 kW must report their energy performance and sustainability data, promoting transparency and comparability between different facilities.

Through SamEnergi, from Vattenfall, you can sell your excess heat for recovery in our district heating networks, where the heat will be used to warm residential and commercial buildings. SamEnergi exists to facilitate heat recovery from operations that generate excess heat, such as data centers. By becoming our partner, you become an important part of the circular energy system and can profit from a resource that would otherwise have gone to waste.

Become our partner - 5 simple steps

1. Contact Vattenfall early in the planning process.
2. We help you find a suitable location for establishment.
3. Vattenfall prepares a business proposal.
4. Agreement.
5. Installation of equipment required for heat recovery.

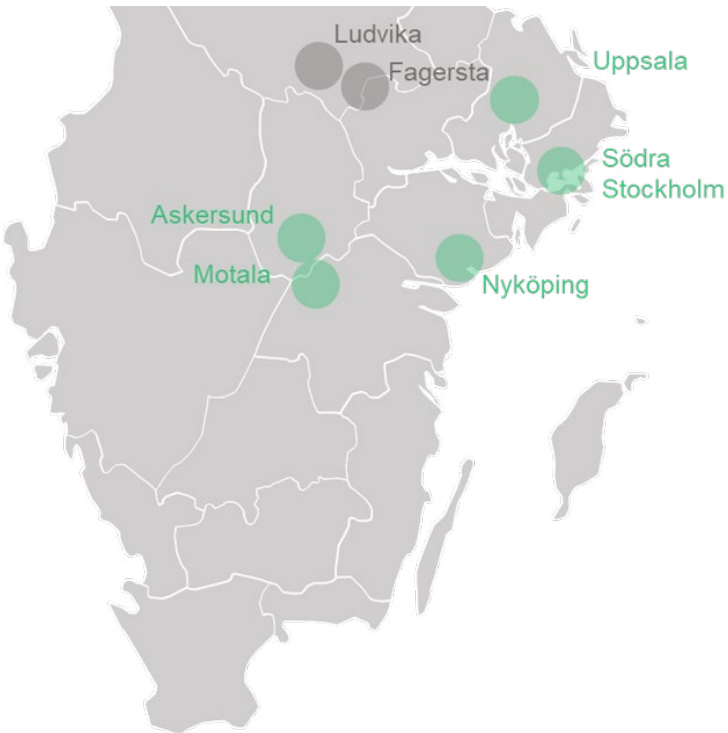
SamEnergi makes heat recovery easy, contributing to both economic and environmental benefits.

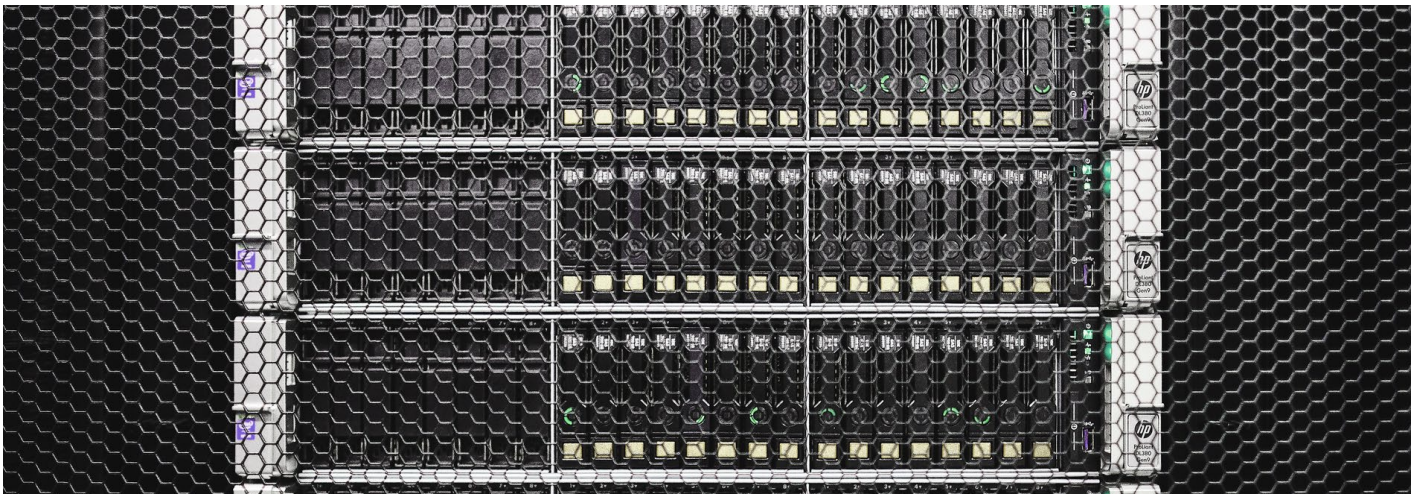
Vattenfall's district heating networks in Sweden

- Askersund
- Gustavsberg
- Haninge/Tyresö/Älta
- Knivsta
- Motala
- Nyköping
- Storvreta
- Uppsala
- Vänersborg

Vattenfall subsidiaries further operate the following sites

- Fagersta, Grängesberg,
- Ludvika, Norberg (VB Energi)
- Hemse, Klintehamn, Slite,
- Visby (Gotlands Energi AB, GEAB)
- Lilla Edet





Chapter 4

Datacenters – Flexibility Players in the Swedish Electricity Market

As the Swedish electricity system becomes increasingly complex and reliant on renewable energy, datacenters are emerging as strategic players in the flexibility market. Svenska kraftnät (the Swedish National Grid) now sees potential in these energy-intensive operations. Some datacenters have a unique opportunity to contribute to the flexibility market in Sweden, which can benefit both the electricity system and their own operations.

Opportunities for Datacenters - Datacenters can offer significant flexibility by:

1. Adjusting their energy consumption based on the needs of the grid.

2. Shifting energy-intensive tasks to periods with lower grid demand.

3. Temporarily reducing energy consumption when necessary.

4. Activating backup power systems to relieve the grid during peak demand.

How It Works

Datacenters participating in the FCR-D service can quickly shut down parts of their processes when the grid frequency drops below 49.90 Hz. This helps stabilize the grid and enables a greater share of renewable energy. Interruptions are short and infrequent, affecting only a very small portion of their total uptime.

- Benefits

- Economic gains through compensation for readiness to contribute to grid stability.

- Enhanced sustainability profile through active contribution to a more stable grid.

- Support for the transition to increased renewable energy in the electricity system.

Chapter 5

Vattenfall Takes Care of Your Datacenter's Electrical Infrastructure Investments

A datacenter houses servers and network equipment that manage, store, and distribute data. These servers demand reliable electricity to avoid downtime and data loss. However, investing in high-voltage facilities or backup power solutions for datacenters can be costly. With Vattenfall's Power-as-a-Service, we handle the investments, ownership, operation, and management of the high electrical voltage infrastructure so you can focus on your core business.

Power-as-a-Service

Through Power-as-a-Service, you can transfer the investment responsibility for your new or existing electrical infrastructure or backup power to Vattenfall. This comprehensive service includes ownership transfer and full operational responsibility, tailored to your datacenter's specific needs. Avoid large capital investments in high-voltage facilities or backup power while freeing up both capital and time. Partnering with Vattenfall lets you confidently concentrate on your core business.

How It Works

A practical solution for datacenters is to delegate the responsibility for their electrical infrastructure to a reliable energy partner. With Vattenfall's Power-as-a-Service, datacenters no longer need to handle the technical and financial complexities of their high electrical voltage equipment. We ensure compliance with all electrical safety and legal requirements through regular inspections and maintenance. This guarantees a well-maintained system and reduces the risk of failures.

Four Key Benefits of Power-as-a-Service for Datacenters

Focus on Your Core Business
By entrusting Vattenfall with complete responsibility for the safety, financial, and operational aspects of your electrical infrastructure, you avoid the associated risks and obligations. This allows you to dedicate your time and resources to your primary operations.

Fixed and Predictable Monthly Fees
With Power-as-a-Service, you gain a predictable monthly cost for your electrical infrastruture, making budgeting easier and avoiding unexpected expenses. Vattenfall handles all technical aspects and ensures everything runs smoothly, saving you from ongoing maintenance costs or surprise repairs.

From CapEx to OpEx
By transferring investment responsibility and ownership of your electrical infrastructure to Vattenfall, you free up vital resources and capital to invest in other parts of your business. Power-as-a-Service helps transform capital expenditures (CapEx) into operational expenditures (OpEx).

Customized Solutions
Power-as-a-Service is always tailored to your specific needs and circumstances. We can design solutions for high-voltage facilities, backup power systems, UPS, battery storage, and more. Additionally, scaling your electrical systems to meet increased power demands is simple and efficient.

Chapter 6
Inspiration

Microsoft

Vattenfall and Microsoft have co-developed a solution that offers electricity users a new level of transparency in their energy consumption. This solution provides detailed insights and unique precision to support business decisions, environmental goals, and communication strategies. Built on Microsoft Azure IoT, the tool integrates renewable energy sources like wind and hydropower from Vattenfall with consumption data from smart meters, delivering real-time usage information.

Bikupa Datacenter

Owned by the Canadian company Hive Blockchain, Bikupa Datacenter has implemented Frequency Containment Reserve (FCR) in collaboration with Vattenfall. Bikupa can instantly shut down up to 115,000 computers in just one second, freeing up 10 MW of FCR for the power grid. This contributes to grid stability, enables a greater share of renewable energy, and creates a new revenue stream for the datacenter.

Read more: How FCR became a sustainable win-win for the Boden Tech data centre

SamEnergi for Datacenters

The future of district heating is bidirectional. Vattenfall launched SamEnergi to make selling excess heat as simple as purchasing district heating. Now, Vattenfall is seeking datacenters interested in monetizing excess heat that would otherwise go to waste.