Total Data Centre Solutions

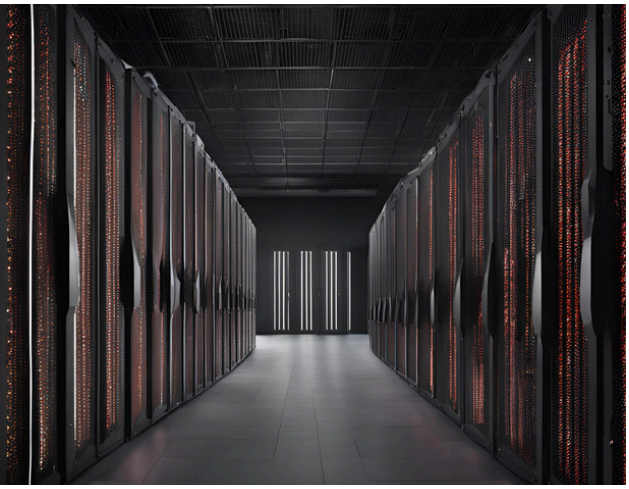
NEWSLETTER

Q3/Q4 SEPTEMBER 2024

INSIDE THIS ISSUE

The TDCS'S Data Center Partners within Scandinavia and Brazil

By combining land acquisition, strong partnerships, funding, and clean energy solutions, TDCS ensures that each data center is not only built to the highest standards but also positioned for growth and sustainability in a rapidly evolving digital landscape. - **Page 2**



Powering the Future: Analyzing Data Center Trends in Sweden and Finland vs. Norway's Power Allocation"

There is debate in Norway over whether to prioritize electricity for high-profile services or critical industries, with calls for government intervention to decide grid access. Meanwhile, Total Data Center Solutions is gaining ground by securing opportunities for local projects focused on heat re-use and other initiatives that are progressing quietly but significantly impact Norway's energy future. - **page 10**

INDUSTRY INSIDER

"Having strategic partners in Norway gives us leverage to secure long term projects in Norway that will not only be beneficial for the local communities but also for the AI era..." Aline Olseth - Director TDCS's Site Selection Nordics and Brazil/Renewable Energy Portfolio

The TDCS'S Data Center Partners within Scandinavia and Brazil

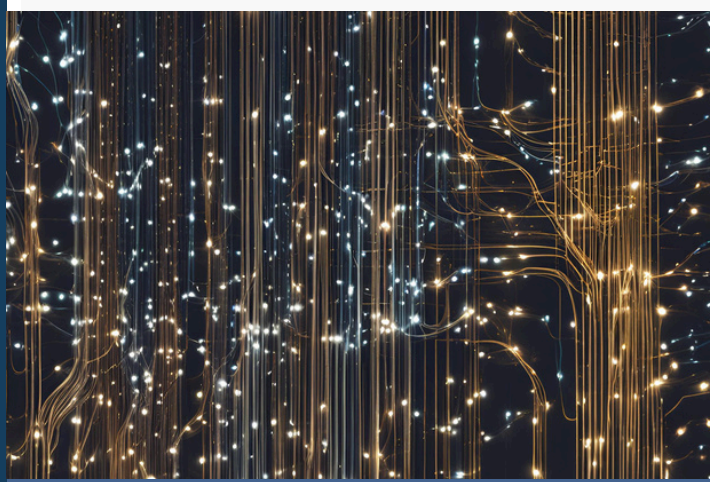
One of the key reasons TDCS established strategic partnerships with Norwegian entities is due to the unique power granting challenges in Norway. The Norwegian government has implemented a selective process for granting power to large projects, favoring those that align with national priorities and benefit society as a whole. By collaborating with local companies, TDCS has positioned itself to be part of these carefully chosen projects.
This approach gives us significant leverage to advance our data center developments across Norway. By aligning with trusted Norwegian partners and supporting the government's goal of responsible energy use, we ensure that our projects benefit not only the data center industry but also the broader society. Our deployments prioritize sustainable growth, offering job creation, infrastructure development, and long-term contributions to the local economy. Our partners deploy fibre, subcables, re-use of heat and more. These deployments start with a small capacity of 5 MW, with the intent to go over 100-200 MW. "We would say the project is visionary, and it is not for those seeking immediate high capacity, but yes for those seeking a long term opportunity in a stable country."

TDCS's commitment to responsible development, backed by these partnerships, enables us to contribute positively to Norway's energy landscape while advancing our mission to deliver world-class data centers that serve both local and global markets. This strategic approach ensures our projects are well-integrated into the national agenda, with long-term benefits for the communities we operate in.

This comprehensive approach is replicated in our projects in Brazil, where we leverage similar opportunities to build and deploy data centers in strategic locations. We collaborate with reliable partners to ensure that each data center is positioned for optimal success, whether through prime land selection or high-tech infrastructure.

Power Usage Effectiveness Power (PUE)

Far too much emphasis is placed on a data center Power Usage Effectiveness Power (PUE), a metric used to determine the energy efficiency of a data center. PUE is determined by dividing the total amount of power entering a data center by the power used to run the IT equipment within it. A ration typically 1.2-1.5 in avarage data centers. The IT Equipment load includes the server fans which can account for 10-15% of the IT load. Using immersion cooling these fans are removed and the equivalent load to the fans is used for the immersion cooling solution so what PUE is that?
by Jonathan Evans - Director TDCS



NAVIGATING DATACENTER CHALLENGES IN 2024: HOW IMMERSION COOLING STANDS OUT

MARKET TRENDS

As datacenters face increasingly complex demands—rising processing densities, stricter sustainability regulations, and a crowded market of cooling technologies—selecting the right cooling strategy is essential. Immersion cooling emerges as a versatile and forward-thinking solution addressing key challenges:

1. **Rising Density:** With CPUs and GPUs demanding more power, traditional air cooling is insufficient. Immersion cooling, enhanced by innovations like the Forced Convection Heat Sink (FCHS), effectively manages high-density processing, making datacenters more compact and efficient.

2. Water Consumption: Regulatory pressures are driving the need to reduce water usage in datacenters. Immersion cooling minimizes water waste through dry coolers and closed-loop systems, while repurposing waste heat for other uses.

3. Market Saturation: The cooling technology market is crowded, making TCO analysis crucial. Immersion cooling offers significant cost savings by reducing both CAPEX and OPEX, with benefits including reduced infrastructure needs and lower energy consumption.

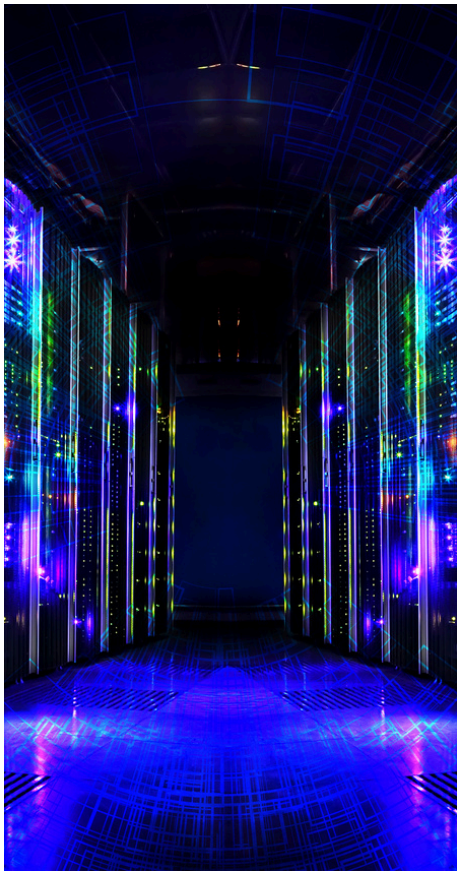
4. Flexibility: While Direct Liquid Cooling (DLC) is popular for AI workloads, immersion cooling proves more adaptable to a wider range of tasks, ensuring datacenters remain future-proof.

5. Climate Resilience: Rising global temperatures increase the risk of downtime.

Immersion cooling excels in high-temperature environments, lowering operational costs and contributing to sustainability by repurposing waste heat.

6. Sustainability Regulations: New global regulations demand better environmental performance. Immersion cooling meets these requirements by optimizing water usage, infrastructure, and energy efficiency.

Reflecting on Datacenter Challenges: Comparing 2024 to 2023



Last year, we identified three major challenges: rising chip density, resource scarcity, and the need for conscious consumption. While the landscape has evolved, managing increasing density remains a critical concern. Immersion cooling not only meets the demands of high-density operations but also does so with minimal environmental impact. Conscious consumption continues to be a significant issue, now under closer scrutiny by governments.

The sustainable practices of immersion cooling, particularly its closed-loop water circuits that repurpose waste heat, are gaining widespread recognition. Resource shortages, including power and water, were pressing concerns in 2023. In 2024, the proliferation of cooling solutions adds a new layer of complexity, best addressed through comprehensive TCO analysis.

These challenges are interconnected, and so are the solutions. Immersion cooling is not just a temporary fix but a sustainable, evolving strategy that supports your datacenter's growth within an environmentally responsible framework.

STELLIUM TO IMPLEMENT SUBMER IMMERSION COOLING AT NEWCASTLE DATA CENTER CAMPUS

''HAVING PROMOTED THE HUGE SUSTAINABILITY BENEFITS OF IMMERSION COOLING OVER THE YEARS TDCS ARE PLEASED TO SEE THEIR CLIENT STELLIUM DATA CENTERS DEPLOYING A SUBMER UNIT IN NEWCASTLE''

Stellium Datacenters has announced a partnership with immersion cooling company Submer and cooling fluid supplier ExxonMobil to integrate cutting-edge immersion cooling technology into its Newcastle campus.

Under this collaboration, Submer's immersion cooling systems will be installed at Stellium's data center, utilizing ExxonMobil's DC 3235 Super cooling fluid. While the exact scale of the deployment has not been disclosed, the initiative is part of a broader effort to develop and optimize hardware solutions based on Open Compute Project (OCP) principles, contributing to the advancement of open-source hardware designs.

We are excited to partner with Submer, a leader in immersive cooling solutions," said Ed Bissell, sales and marketing director at Stellium Datacenters. "As one of only two OCP data centers in the UK, this collaboration allows us to create customer-driven solutions that advance the OCP's objectives while setting new benchmarks for performance, energy efficiency, and environmental responsibility."

Stellium's Newcastle campus, which spans 4,264 sqm with four 4MW data halls, was launched in 2021 and can scale from 80MW to 180MW. The company has also announced plans to deploy solar panels at the site, furthering its commitment to sustainability.

Founded in 2015, Submer specializes in single-phase immersion cooling systems, including high-capacity tanks capable of providing up to 360kW of cooling. The company also offers large-scale containerized solutions housing multiple tanks.

"Collaborating with Stellium and ExxonMobil on this OCP project underscores our commitment to innovation and sustainability," said Oriol Chavanel, Submer's ecosystem enablement tech lead & OCP lead. "Our goal is to redefine data center efficiency and reliability through this partnership."

ExxonMobil, which entered the data center cooling market in October 2023, has developed a portfolio of synthetic and non-synthetic fluids to enhance hardware cooling. The company previously partnered with Intel and is now working with Stellium and Submer to advance OCP's objectives and introduce innovative cooling solutions.

"ExxonMobil is proud to work with Stellium Datacenters and Submer on this groundbreaking immersion cooling technology," added Glen Sharkowicz, ExxonMobil's global market development manager.

BATTERY ENERGY STORAGE & SOLAR SOLUTIONS FULLY FUNDED AT NO COST TO OUR CLIENTS

Energy Storage and On-Site/Near-Site Generation

Reduce Power Bills by Up to 10% with Zero CAPEX and OPEX

Total Data Centre Solutions (TDCS) has partnered with Energy Optimisation to introduce a new Battery Energy Storage System (BESS) in the UK. This system can cut electricity bills by up to 10% with no upfront or operational costs, making it a game-changer for data centers, commercial enterprises, and government organizations.

Electricity is a major expense for organizations, and costs keep rising. The BESS offers a simple, effective solution. Due to the drop in lithium-ion battery prices, Energy Optimisation Solutions (EOS) can now build and operate large-scale battery systems housed in 40ft containers. These systems connect to the building's electrical infrastructure and provide power during peak times, avoiding high costs and standing charges.

The savings are shared—50% goes to the host organization, and the rest covers EOS's costs for building, operating, and maintaining the system. This setup requires no balance sheet impact under IFRS16 rules, which is crucial for not-for-profit organizations.

To qualify, facilities should have a standing load of at least 1MW. A 15-year commitment is usually needed, though shorter terms are possible.
The evaluation process is straightforward and involves reviewing energy consumption data and a site visit.

In addition to BESS, EOS offers "BESS+" solutions, combining battery storage with on-site generation options like CHP, solar power, and EV charging systems. The on-site power solutions.

We would like to discuss how these solutions can benefit your organization and answer any technical or commercial questions you may have.

AVAILABLE

CARBON NEGATIVE, TIER3, 5 – 50 MW SITES FOR DEVELOPMENT

STOCKHOM – SWEDEN

T.Loop is a Swedish data center operator focused on building sustainable, energy-efficient facilities with full heat recovery, resulting in negative carbon emissions. Their expertise in energy optimization enables them to achieve a PUE as low as 1.05 and secure reliable electricity for their sites. The company has agreements in place to begin constructing data centers at various locations.

Sweden boasts world-class connectivity, supported by a government strategy to ensure widespread fiber penetration. Arelion's global internet backbone, formerly Telia Carrier, has been ranked the top backbone for several years and is known for excellent customer service. The national broadband plan aims for nationwide high-speed broadband access by 2025.

For more information contact Jonathan Evans - Director TDCS

SUSTAINABILITY IN CORE

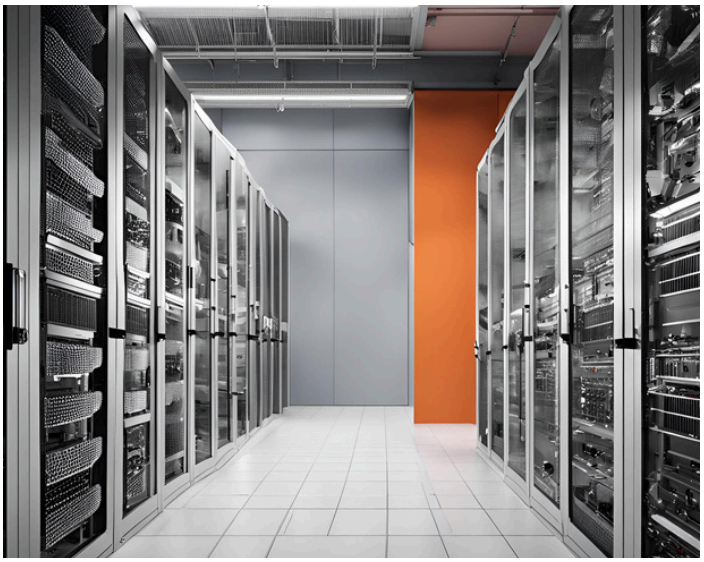
T.Loop is one of the most sustainable colocation operators globally, with a data center model focused on full heat recovery. Key factors include Sweden's green energy mix, cold climate for efficient cooling, minimal fossil fuel use, and advanced liquid cooling technology. T.Loop strategically places data centers near existing buildings for optimal heat reuse, offering some of the lowest carbon emissions in the industry.

HIGH SECURITY BUNKER DATA CENTER FOR SALE

Evaluation of sustainability carried out alongside the availability of electricity and the potential for excess heat utilization.

HELSINKI – FINLAND

- The area is within the largest international airport in Finland with the closest emergency support available
- Closest district heating center is located about 900m from site
- Vantaa Energia promises to buy waste heat for about 20% of the selling price
- Heat recovery solution is recommended to meet the requirements of lower electrical tax class
- Possibility of a 15 MW connections from 20 kV grid, negoations with Vantaan energia
- Deliver to this connection in less than 6 months
- Space allocation of two floors of the building, space for dry coolers, and gensets
- Space Allocation – Floors K2 and K3
- K2 Entrance level (about 4500 m²)
- Security check
- Meeting rooms
- Meet-me-rooms
- Main cable and pipe routes
- Some electrical and cooling equipments
- K3 Operation level (about 4850 m²)
- Building on Innovation
- Power Blocks
- Transformers
- Cooling plant
- Server rooms



K3 FLOOR PLAN EXAMPLE

This layout offers several advantages, including a power capacity of 7.8 MW based on 11.3 kW per cabinet, accommodating 690 racks spread across 11 spaces. The cooling system utilizes 322 in-row coolers, ensuring efficient temperature management. Additionally, the design includes space for six power blocks, a mechanical plant room for heavy equipment, two dedicated gas suppression bottle rooms, and a storage area, providing a comprehensive and well-organized infrastructure.

AVAILABLE

Land & Power
OFF MARKET OPPORTUNITIES

Location: North
Power Capacity: 100-200 MW
Price: Upon Request
Details: Upon Request

The main source of power is wind power

Location: Upon Request
Power Capacity: 10 MW - 100+ MW
Price: Upon Request
Details: Upon Request

Location: Various areas in the country
Power Capacity: 5 MW- 100+ MW
Price: Upon Request
Details: Upon Request

Location: Minas Gerais State
Power Capacity: 200 MW
Price: Upon Request
Details: Upon Request

Location: South Forth Worth
Size 283 acres
Power Capacity: 100 MW
Applied Power: 600 MW
Price: Upon Request

Location: Southwest Dallas
Power Capacity: 1000 MW
Price: Upon Request
Details: Upon Request

The lands in the U.S have a strategic location with tax incentives, infrastructure, benefit from low-cost natural gas generation of electricity, water, sewer, fiber, roads, and more

Powering the Future: Analyzing Data Center Trends in Sweden and Finland vs. Norway's Power Allocation"

In Norway, the energy landscape has undergone significant change. Grid access, once easy and affordable, is now a major hurdle for new entrants. Previously, grid access was not an issue, power prices were low, and supply security was high. Now, new players face long delays—up to 10 years if they're not already in line. As a result, many companies are turning to Sweden and Finland, where accessing the grid is less challenging. The pressure in Norway continues to mount as demand outpaces available capacity.

Statnett, the national transmission system operator, has reserved 8,000 MW for market participants that have yet to connect to the grid. However, demand is growing rapidly, with 30,000 MW of projects in development. This includes battery factories, data centers, and the electrification of industries. Additionally, the push for fossil-free steel production is significantly driving demand.

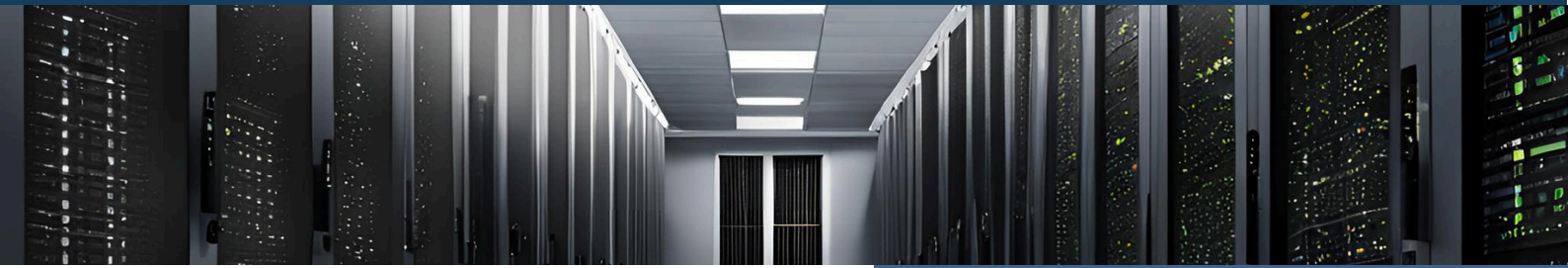
Power Priorities and Data Centers

One of the hottest topics in Norway is whether the country should prioritize electricity allocation to services like TikTok or reserve it for other critical sectors. High-profile politicians are suggesting the government should decide which companies get grid access, effectively choosing the industrial winners. This would determine which projects can move forward and which products will make it to market. In an attempt to manage the grid bottleneck, Statnett announced earlier this year that projects in the queue risk removal unless they show clear developmental progress. However, there is still uncertainty about how progress is being measured.

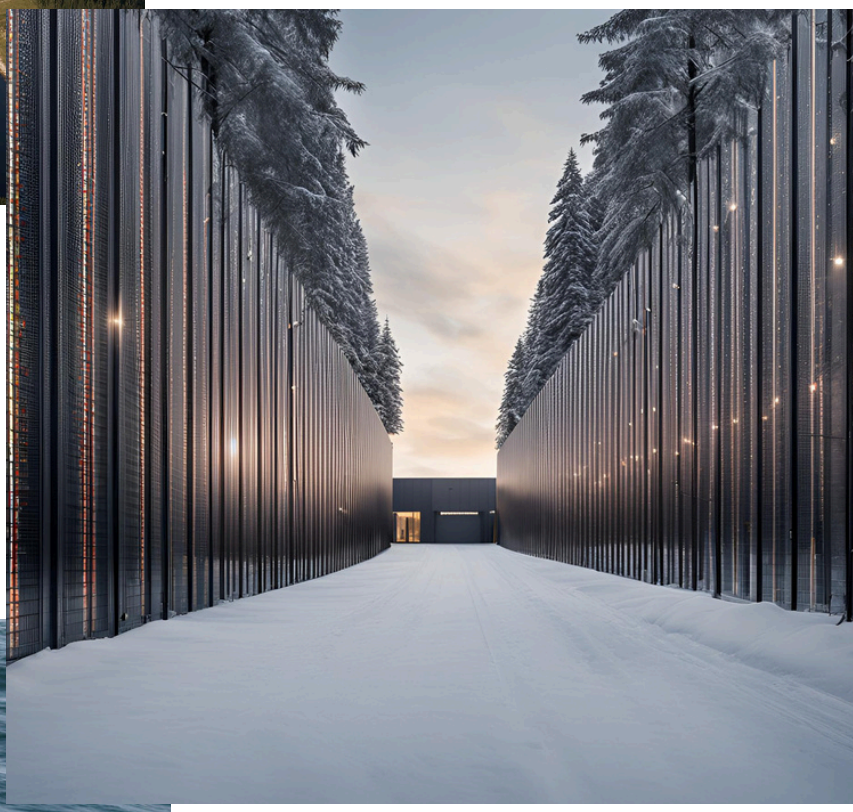
Why Sweden and Finland are Attractive Compared to Norway

While Norway has experienced a surge in demand for grid access, leading to long wait times and uncertainty for new data center projects, Sweden and Finland have maintained more flexible and accessible energy infrastructures. Companies looking to build or expand data centers are finding fewer regulatory hurdles and less competition for power in these neighboring countries. Additionally, Sweden and Finland offer stable power prices, abundant renewable energy, and government incentives, making them ideal for data centers prioritizing cost efficiency and sustainability.

In the midst of this challenge, Total Data Center Solutions is gaining an advantage. Numerous opportunities in Norway are being reserved for local companies, particularly those engaged in heat re-use and other projects progressing quietly behind the scenes. Though these initiatives receive little media attention, they are actively underway and playing a key role in shaping Norway's future energy landscape.



Total Data Centre Solutions



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