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Low-Temperature Installation Solution for Iceland Edge Data Center



Overview

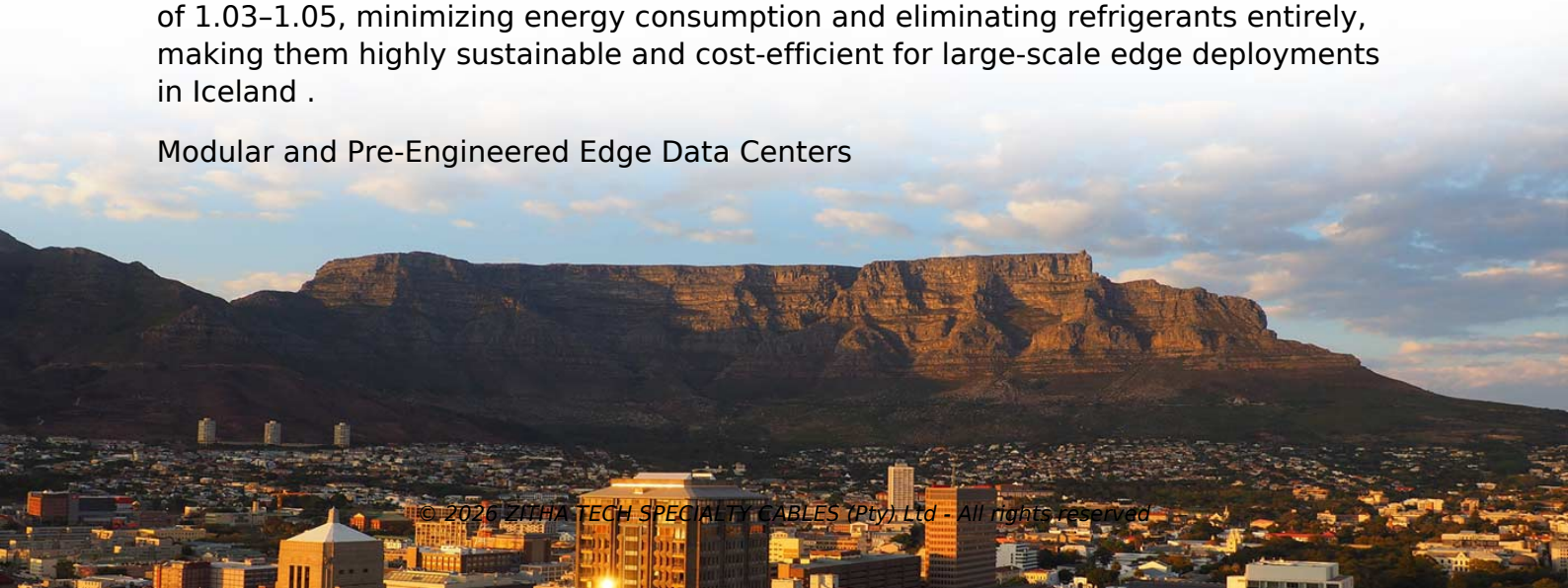
Edge data centers can be many things, from telecoms exchanges in the middle of nowhere to colo facilities in town.

Key Takeaways

Direct free-cooling and modular edge solutions provide energy-efficient, low-temperature operation for Icelandic edge data centers, ensuring reliability in harsh Nordic climates.Free-Cooling Solutions in Iceland

AtNorth, Iceland's largest colocation operator, demonstrates a successful low-temperature installation using direct free-cooling units. These units operate without mechanical cooling, leveraging Iceland's naturally cold climate to maintain supply air temperatures within ASHRAE recommended ranges year-round. Systemair adapted 14 DV190C units with 230 kW cooling capacity and airflow up to 57,000 m^3/h, incorporating 4-stage dampers, deflectors, and modular cowls to protect against wind, rain, and cold while ensuring optimal air mixing. The units achieve a partial PUE of 1.03–1.05, minimizing energy consumption and eliminating refrigerants entirely, making them highly sustainable and cost-efficient for large-scale edge deployments in Iceland .

Modular and Pre-Engineered Edge Data Centers



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For rapid deployment and compact edge sites, modular solutions like Vertiv SmartRow 2 offer pre-engineered, deployment-ready racks with integrated cooling, power, and monitoring. These systems simplify installation, reduce on-site assembly time, and maintain proper temperature control even in outdoor or constrained environments. Features include IP54-rated enclosures, roof-mounted condensers, and intelligent rPDU integration, ensuring IT equipment is protected from dust, moisture, and temperature fluctuations while enabling remote monitoring and management .

Advanced Thermal Management for Extreme Edge Environments

In addition to air-based free-cooling, liquid and immersion cooling technologies are increasingly used for edge deployments in harsh climates. Solutions like Nexalus Endeavor DX-800 and immersion-cooled tanks provide efficient heat removal, higher server density, and protection from environmental hazards such as dust, humidity, and vibration. These systems are particularly suitable for edge sites with limited space, unreliable power, or extreme temperature swings, offering energy-efficient operation and reduced noise while maintaining high compute performance .

Design Considerations

When implementing low-temperature edge data centers in Iceland, key considerations include:

• Climate Adaptation: Units must withstand cold, wind, and precipitation, with protective dampers, cowls, and air intake designs.

• Energy Efficiency: Free-cooling and immersion solutions reduce reliance on mechanical cooling, lowering PUE and operational costs.

• Modularity and Scalability: Pre-engineered or modular systems allow rapid deployment and future expansion.

• Monitoring and Reliability: Integrated sensors, remote management, and redundancy ensure uptime in remote or harsh locations.

• Sustainability: Leveraging Iceland's renewable energy sources and eliminating refrigerants aligns with green data center goals .

Conclusion

For Icelandic edge data centers, direct free-cooling units, modular pre-engineered racks, and advanced liquid or immersion cooling provide reliable, energy-efficient solutions for low-temperature operation. Combining these approaches ensures sustainable, high-performance, and resilient edge infrastructure capable of handling extreme Nordic conditions while minimizing energy consumption and environmental impact.

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The pPUE of the unit is 1.03-1.05, depending on load, which is low for a data centre cooling unit of this scale. Thanks to the

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How environmentally friendly are Iceland''s data centers? – Part 3

The environmental impact – cool or uncool? Natural cooling means that Icelandic data centers use between 24 and 31

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With such a wide range of potential Edge locations, versatile cooling solutions are needed, and this is where liquid

Deploying liquid cooling in the data center

With this data and partner support, IT and facility teams can model the desired hybrid cooling infrastructure in the data center and

High-Airflow Server Racks Enclosures for Icelandic Data Centers

High-airflow server racks designed for Icelandic data centers, enabling free-air cooling, higher density deployment,

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