

## DATA CENTERS

# The secret ingredient behind smart cities

In order to make the most of the vast quantities of data generated by digital services, smart cities need massive data storage and processing capabilities – in short, they need data centers. However, since such facilities require enormous amounts of power, energy-saving technologies are a must. ABB has helped customers around the world achieve exceptionally high levels of efficiency. Two examples illustrate how.

With over 50 percent of the world's population living in cities, urban areas are under pressure to improve the efficiency of their infrastructures. Probably the best way of achieving this is the smart city concept – the integration of information technology and the Internet of Things (IoT). This, in turn, sets the stage for the seamless

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**ABB supplied Lefdal's power infrastructure, which provides energy generated by hydropower stations and wind farms.**



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integration of services such as traffic control, smart parking, electric vehicle charging and mass transit; and building and neighborhood energy management with wind and solar parks.

Smart city services generate data that results in a virtuous circle, producing ever-improving analytics that in turn improve services. But smart cities require massive data storage, and processing capabilities – in other words, in order to make the

most of all the technologies they've implemented and to realize the full capabilities of the data they collect, advanced cities need data centers.

## Europe's greenest data center in Norway

The Lefdal Mine data center [1], which has been in operation since May 2017, is built 150 meters into a mountain in what was formerly an olivine mine →01. Olivine is a green, high density-mineral used in steel production. Located on Norway's west coast, between Måløy and Nordfjordeid, the six-story mountain hall facility sets a new standard for the data center industry.

The massive data center (about 120,000 m<sup>2</sup> or 1.3 million square feet), which is capable of storing an estimated 30 billion GB, is powered exclusively by renewable energy produced locally, while being cooled by water from a nearby fjord. ABB supplied the critical power infrastructure, which provides clean energy generated by four glacial hydropower stations and two wind farms, which have a combined capacity in excess of 300 MW.

The Lefdal Mine is remarkably energy efficient, because it uses cold water from the 565-meter-deep fjord as a coolant. The result is that the data center's cooling solution will have a power

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01 The 120,000m<sup>2</sup> Lefdal data center in Norway is powered exclusively by locally-produced renewable energy and is cooled by water from a nearby fjord.

usage effectiveness (PUE) – the industry standard for energy efficiency – of between 1.08 and 1.15, making it among the greenest data centers in the world.

To meet the powering challenges of such a huge plant, ABB built a medium-voltage backbone for the entire facility. To meet any emergency situation, ABB has also provided a decentralized

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Capable of storing an estimated 30 billion GB, the Lefdal Mine data center will have an expected peak power of 300 MW.

UPS (uninterruptible power supply) system, which means that each section inside the data center has its own UPS installation. If there is

a problem with the grid, the UPS ensures reliable power supply until backup generators come online.

ABB has been an integral partner from the beginning of the project, providing tailored power supply solutions and extensive knowledge and expertise. It has supplied a powering system that will remain reliable as the center grows to an expected peak of 300 MW. When it reaches its maximum capacity, Lefdal will be among Europe's largest data centers.

The Norwegian government's 'Powered by Nature' data center strategy stresses that attracting data centers and international investments is an important part of its industrial policy. Thanks to this strategy and the world's rapidly growing need for more data centers powered by renewable energy, Lefdal Mine will have an edge with its unique location and engineering. As more of the world becomes digital, ABB expects to power Lefdal and Norway for a long time.

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— 02 ABB is providing NextDC with a comprehensive solution that includes complete power distribution systems, a critical services monitoring system and associated implementation and support services.

**Helping NextDC deliver energy savings and 100 percent uptime to Australia**

ABB has been selected to partner with NextDC →02, a Brisbane, Australia-based data center operator, to provide its electrical infrastructure and automation technology, which enables NextDC to monitor and tune its critical data center infrastructure in real-time [2]. All of this is critical to delivering on NextDC’s 100 percent uptime brand promise guarantee.

As Asia’s most innovative data center-as-a-service provider, NextDC delivers enterprise-class colocation services to local and international organizations. With a focus on sustainability and renewable energy, NextDC is building an infrastructure platform for the digital economy.

**References**

[1] ABB Solutions, “ABB solutions power Europe’s greenest data center in Norway,” June 28, 2018. Available: <https://new.abb.com/news/detail/5407/abb-solutions-power-europes-greenest-data-center-in-norway>

[2] “ABB supports NEXTDC in delivering Australian businesses with 100% uptime,” March 10, 2020. Available: <https://new.abb.com/news/detail/58276/abb-supports-nextdc-in-delivering-australian-businesses-with-100-uptime>

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**Integrated solution**

As NextDC’s data centers enter service, the company’s goal is to reduce its overall cost-per-megawatt with every new facility it builds. ABB’s integrated power distribution and critical services monitoring system (CSMS) solutions, particularly its ABB Ability™ Data Center Automation solution, are helping NextDC achieve its goals by providing energy efficiency and cost and time savings.

**Cost, energy and time savings**

Monitoring the power usage, temperature and relative humidity in the data halls is a primary function of the CSMS, which ensures reliability and enables energy savings in every data hall.

The CSMS utilizes data aggregation and visualization, providing real-time visibility, including both high level (aggregate) and low level (granular)

— **The ABB Ability™ Data Center Automation system integrates data from IT, power, cooling and building systems.**

views of the data center infrastructure – including enterprise, floor plan, zone, system and component views.

All in all, the ABB Ability™ Data Center Automation system integrates data from IT, power, cooling and building systems, thus eliminating the need for manual data entry when calculating utilization metrics and other KPIs – factors that are helping NextDC meet its efficiency and sustainability goals. •

