

CASE STUDY



RESULTS

Under full production all phases

10-year lifecycle KWh saved:

1,037 million KWh

10-year lifecycle water conserved:

286 million gallons

10-year lifecycle operational

savings: €103 million-plus

10-year lifecycle CO² reduction:

625,411 tons

Equivalent to 118,000 fewer cars

Design: Siemens

KPN, the leading telecommunications and ICT service provider in the Netherlands, was seeking a data center solution. In response to growing customer needs, the company – which offers wireline and wireless telephony, Internet and TV to consumers and end-to-end telecom and ICT services to business customers – wanted to explore new data center operating models. It sought a model that would meet both environmental and cost challenges, while ensuring mission-critical reliability for at least 15 years.

To meet those needs, KPN approached KyotoCooling®, which implemented four data centers in 2007.

“The enormous reduction in the amount of energy required to cool the data center equates to an annual financial savings of approximately €8.4 million (\$12 million),” said Frans Sas, project manager at KPN. “In terms of CO² savings, annually this is approximately 51.2 million kilograms

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– Frans Sas, project manager, KPN

of carbon. To put this in perspective, a single, fully grown tree absorbs, on average, between 20 and 25 kilograms of CO² every year.

“Clearly, our decision to build a data center using KyotoCooling is more than substantiated by these results, allowing us to achieve huge energy savings while meeting our environmental goals, increasing data center reliability and reaping large cost benefits,” said Sas.

The data centers have helped KPN improve services for clients in Germany and Belgium, where it serves high-profile blue-chip companies, 80 percent of which are listed among the top 600 Dutch companies.

According to the 2011 KPN annual report, its new data center model is a success.

- Installed in 2007 (2) 2008 (1) 2012 (1)
- Trade data centers for outsourcing
- 600kw, 1.2 Mw, 1 Mw, 12 Mw
- Covering 400,000 square feet
- Free cooling: 89% achieved
- Annual average mechanical PUE: 1.10

“Our energy savings program is yielding results at our data centers, as well. These have been of such a scale that we were bold enough to raise our original energy efficiency target (20 percent relative to 2005 by 2020) to 30 percent (expressed as a PUE percentage).”

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10-year lifecycle KWh saved:

392 million KWh

10-year lifecycle water conserved:

127 million gallons

10-year lifecycle operational

savings: \$23 million-plus

10-year lifecycle CO² Reduction:

236,642 tons

Equivalent to 44,649 fewer cars

Design consultant:

Urbacon Architecture

Constructor: Urbacon Construction

Thanks in part to a KyotoCooling® System, Bell Canada and its partner, Urbacon Architecture, were recently awarded the 2012 Green Enterprise IT Award for Facility Design and Innovation by the Uptime Institute. The institute, an independent international research, education and consulting organization focused on the data center industry, recognizes companies that significantly improve energy productivity and resource use in the IT sector. It recognized Bell for the sustainable green building and development practices used in constructing its Ottawa region data center. The data center's cutting-edge design combines green architectural approaches with energy-efficient operational features, resulting in an industry-leading power usage effectiveness rating of 1.26, including office and meeting rooms.

"The key energy-efficiency aspect of the award-winning facility is the cooling system, which uses free cooling from the air-to-air-based heat

"The key energy-efficiency aspect of the award-winning facility is the cooling system."

— Antonio Mancini, principal, Urbacon Architecture

exchange KyotoCooling System," said Antonio Mancini, principal at Urbacon Architecture, the design consultant on the project. "I designed the first installation of this system in North America three years ago and strongly recommend it for energy conservation and reduced mechanical construction time, and significant reduction in maintenance and operating expenses."

The data center's energy efficiency will cut typical carbon dioxide emissions by 12,000 tons initially, and total annual power savings are estimated at 17 million kilowatt hours for the first phase — enough to power more than 1,400 homes. Built to meet LEED Gold status for design and construction, the new Bell data center is also Tier III-certified by the Uptime Institute for high availability and resiliency.



- Bell Canada National Hosting Services
- Installed late 2012
- Primary federal colocation facility
- 3.2 Mw N+1, Phase 1; new build
- 82,000 square feet UTI Tier III
- Installation of 5 KyotoCooling® 800Kw units
- Free cooling: Anticipated 98%
- Annual average mechanical PUE: 1.08

As a result of its work with a KyotoCooling System, Bell Canada was named the greenest company in Canada and the 13th greenest in the world on *Newsweek's* list of World's Greenest Companies.

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10-year lifecycle KWh saved:

140 million KWh

10-year lifecycle water conserved:

39 million gallons

10-year lifecycle operational savings: \$10 million-plus

10-year lifecycle CO² reduction:

84,515 tons

Equivalent to 15,946 fewer cars

Lead consultant: Bob Mobach (Logicalis)

Constructor: Hoffman Construction

BendBroadband Vault has been receiving a lot of recognition as a result of its partnership with KyotoCooling®.

The company, which employs full Kyoto Controls™ integration into its data center management, was awarded the Uptime Institute's Tier III Certification of Constructed Facility. This recognition followed the Tier III Design Certification it received from the institute in March.

In addition, it received an Innovation Award from the Environmental Center of Bend as part of the 2011 Sustainability Awards and achieved LEED Gold status under the LEED 2009 Building Design and Construction rating system.

"This was a monumental achievement and one that we had been working toward since the initial concept stage of the facility," said Leonard Weitman, the Vault's vice president of technical operations. "Achieving LEED Gold status put the Vault in the upper echelon of data centers as one of only five data centers in the world to attain this level."

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— Leonard Weitman, vice president of technical operations, BendBroadband Vault

While LEED certification is an indicator of a company's environmental commitment, the bigger concern for the data center owner/operator is energy consumption.

"Data centers traditionally haven't been very energy efficient, and they've rightly been tagged as energy hogs," said Weitman. "As far as efficiency or green, the true measure is the power you're consuming."

Bob Mobach, Logicalis managing director, Data Center Consulting Group, backs up the success the Vault has achieved by installing KyotoCooling units.

"The premise underlying this is that a ratified and optimized design with controls can achieve levels of quality



- BendBroadBandVault
- Installed mid 2011
- Primary colocation & DR facility
- 675 Kw N+1, Phase 1; new build w/2Mw cap.
- Installation of 2 KyotoCooling® 450Kw split
- Free cooling: Anticipated 85%
- Annual average mechanical PUE: 1.08

control and repeatability," he said. "This is in addition to the optimization that comes from years of continuous improvement as a complete product, solution, development and research effort."

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Under full production all phases

10-year lifecycle KWh saved:

294 million KWh

10-year lifecycle water conserved:

95 million gallons

10-year lifecycle operational

savings: \$32 million-plus

10-year lifecycle CO² Reduction:

177,481 tons

Equivalent to 33,487 fewer cars

Installation: KyotoCooling® BV

Constructor: Turner Construction

Project management: Turner Logistics

Hewlett-Packard's new Streetsville data center in Mississauga, Ontario, Canada, is a first for the company. It is HP's first data center to use KyotoCooling® and the associated KyotoWheel™ heat exchanger for its primary cooling. The cutting-edge technology reduces the need for mechanical cooling by transferring heat to the outside air stream through an energy recovery wheel heat exchanger.

HP has made it a priority to reduce the energy used by its network of data centers. With more than 100 client-serving data centers worldwide and six internal data centers in the United States, the KyotoWheel is helping it achieve that goal. There is a growing customer demand for data services managed by HP's trade data centers. As a result, building, retrofitting and operating highly energy-efficient data centers

and consolidating existing facilities is very important – typical data centers consume 20 to 40 times as much energy per square foot than offices.

The facility is the largest trade data center implementation of KyotoCooling in North America and incorporates full KyotoControls™ integration into its data center management center. In addition, the KyotoCooling units support full 30KVA/cabinet load density.

HP is a leading provider of products, technologies, software, solutions and services to individual consumers, small and medium-sized businesses and large enterprises, including customers in the government, health and education sectors.

- Streetsville data center expansion Phase 1
- Installed late 2012
- Primary outsourcing facility for *Fortune* 1000 company
- 2.4Mw N+1, expansion of existing data center
- Installation of 4 KyotoCooling® 850Kw units
- Free cooling: Anticipated 96%
- Annual average mechanical PUE 1.09

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RESULTS

Under full production all phases

10-year lifecycle KWh saved:

420 million KWh

10-year lifecycle water conserved:

119 million gallons

10-year lifecycle operational

savings: \$38 million-plus

10-year lifecycle CO² reduction:

253,545 tons

Equivalent to 47,839 fewer cars

Design, engineering & architecture:

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Installation: The Hill Group

Constructor: Mortenson Construction

Owners' representative:

Jones Lang Lasalle



When United Airlines needed a new data center, it sought one that could withstand severe weather conditions while maintaining the integrity and security of the cooling requirement. It found the solution in the KyotoCooling® System. The system's design gives the airline – the world's largest in terms of scheduled passenger-miles flown – a design that supports its commitment to act in a manner that is both fiscally and socially responsible.

"The new installation, combined with an existing underground data center on United property, will handle all airline operations worldwide," said Michael Landers, United's director of design and construction. "It is a very secure data facility that will handle all of our computer operations and our airline operations globally."

The new data center will be based on N+2 1000Kw KyotoCooling Units, and the first

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– Michael Landers, director of design and construction, United Airlines

phase of the capacity provides 4Mw of redundant capacity.

"At United, we are committed to leading commercial aviation as an environmentally responsible company by taking actions today that shape an environmentally sustainable future, while continuing to comply with applicable laws and regulations," said Landers.

The facility is the largest enterprise data center implementation of KyotoCooling in North America.

- United Airlines Mount Prospect Phase 1
- Installed mid 2013
- Primary critical worldwide data center
- 172,000 square feet
- 4Mw N+2, Phase 1; first stage infrastructure
- Installation of 5 KyotoCooling® 1000Kw Split Units
- Free cooling: Anticipated 85%
- Annual average mechanical PUE: 1.09