



Central 'spine' of datacenter

### HEAVYWEIGHT JUDGING PANEL

The judges were Google's leading energy efficiency advocate Joe Kava who is responsible for data centers worldwide, Beth Whitehead of Operational Intelligence who has published numerous papers on data center sustainability, Carlos Morard an Engineer and long time evangelist on energy efficiency in Latin America, and Tanuja Randery from Schneider Electric. "Sustainability is at the heart of our strategy. Our mission is to help businesses manage the energy challenge while achieving better operational efficiency. We are delighted to support this flagship award that recognizes excellence in this field," says Randery, President UK & Ireland, Schneider Electric.

# HYDRO66

## WINS GLOBAL ECO-SUSTAINABILITY DATACENTER DYNAMICS AWARD 2017

"Hydro66 is the first large-scale colocation provider to deploy this technology combination of direct free air and 100% hydropower."

*The company has changed the economics of colocation by rejecting expensive traditional designs and adopting techniques pioneered by large internet companies for the colocation market for the first time.*

**R**eceiving the award in London on behalf of Hydro66, Andy Long, Director, Strategic Development, said, "We are delighted to receive this global award and to see the innovation and hard work of our team recognised. 2017 has been the year when making the right choice for the planet and for the pocket has gone mainstream. Large numbers of companies are realizing the environmental and cost benefits of locating processing power in a cool climate close to abundant green power.

I would like to thank Schneider for sponsoring the award and all the members of the judging panel who took the time and effort to fully understand the depth of our commitment to the environment." Despite its energy usage intensity, the data center industry has shown leadership and a true pioneering spirit when it comes to the subject of energy efficiency and what sustainability means in the digital infrastructure sector. Hydro66 had to demonstrate an innovative and pioneering approach to sustainability through the design of our new data center and through partnership with other organisations in the energy ecosystem.



Switchgear and Uninterruptible Power Supply

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PHOTOGRAPHER: MAT RICHARDSON

## INNOVATION AND VISION

Hydro66 is an ultra-green data center using Europe's lowest cost 100% hydroelectric energy and free air cooling.

Hydro66 is the first large-scale colocation provider to deploy this technology combination of direct free air and 100% hydropower. The company is dedicated to making the economies of scale and innovation available to customers of all sizes that global scale internet companies use on their dedicated sites. Since opening the firm has sold out 90% of the initial 3.6 MW deployment and has subsequently announced the start of construction of a 15 MW expansion.

Many of the unique features in the Hydro66 data center stem from the disruptive design that takes advantage of the local environmental and operational climate to minimise the impact on the environment as well as significantly reducing costs.

Andy Long commented, "Data centers are increasingly under the spotlight as being energy-intensive, and with that scrutiny comes the need for innovation and transparency."

Datahall Number 1 

*"In adopting free air cooling and rejecting compressor based or indirect free air solutions Hydro66 needed a solution that would process and filter large volumes of air efficiently and also be able to control humidity."*



## 5 KEY DIFFERENCES

The data center has five key differences to the 'normal' data center found in major European cities. These are:

### A "SPREAD-OUT" DESIGN TAKING ADVANTAGE OF THE RELATIVELY LOW COST AND HIGH AVAILABILITY OF LAND IN OUR LOCATION

The data center is not a normal multi-floor 'square box' design, but a unique 'spine and branch' design that enables innovative ideas for lowering carbon footprint impacts as well as dramatically lowering the overall PUE of the data center.

### THE USE WHEREVER POSSIBLE OF LOCALLY SOURCED MATERIALS AND LABOUR TO BUILD AND OPERATE THE DATA CENTER

The design draws on decades of local building experience. All of the major construction materials were sourced and fabricated in Sweden or the wider Nordic area using 100% local labour for the major superstructure. Where sourcing within the Nordics was not possible, European based companies were selected in preference.

### 100% "FREE AIR" COOLING, 100% OF THE TIME

Hydro66 does not use any indirect transfer mediums or split forced chilling units. Even in the height of summer when supplemental water based adiabatic cooling is required this is done 'in-hall' and all cooling is housed entirely within the building. There is no compromise in terms of the rack environment provided, with temperature and humidity controlled within ASHRAE guidelines.

### RESILIENT POWER DESIGNED-IN AND USED AS THE BASE LINE

The facility has the unique attraction of being directly adjacent to a new 120 MW substation that is multi dropped from separate regional grid infrastructures. There is an 80 MW hydro-electric power station just 500m away with other grid feeds coming from the local, regional and national grids, including the 16 other hydro-electric power stations further up the Lule river which generate 4300 MW.

Contained cold aisle 



## COLLABORATION WITH MANUFACTURERS

In adopting free air cooling and rejecting compressor based or indirect free air solutions Hydro66 needed a solution that would process and filter large volumes of air efficiently and also be able to control humidity. Through close collaboration with EcoCooling a customised and patented version of the ECT10800 evaporative cooler was created and has been deployed in the data center.

## INFRASTRUCTURE

True renewable power from nearby 100% hydroelectric generation. Inner city data centers buying green energy certificates do not make windmills spin faster or the sun shine brighter – by using power close to the generation source transmission losses are avoided.



Datacenter exterior with Northern Lights ▲

Cold climate enables efficient cooling ▼

For many years the high cost of bandwidth made it impossible to make economic use of the climate and power in regions such as the Node Pole. Now that connectivity is incredibly cheap it makes sense to ship photons not electrons.

Design innovation has resulted in a significantly lower build cost per MW enabling lower rentals for end customers without sacrificing quality.

## OBJECTIVES MET

- Over 90% of initial 3.6MW build sold in first year
- Groundbreaking building design with ‘whole wall’ air intakes and engineered resilience through independent distribution of power from diverse generation sources throughout the data center
- 100% renewable hydroelectric power located directly adjacent to abundant generation to avoid power transmission losses
- 100% direct free air adiabatic cooling
- Achieved operational PUE of < 1.07

## HYDRO66 SETS EXAMPLE

Hydro66 has changed the economics of colocation by rejecting expensive traditional designs and adopting techniques pioneered by large internet companies for the colocation market for the first time. Customers have been able to reduce their carbon footprint and reduce their costs compared to conventional colocation.

Hydro66 has been able to pass on the new ultra-low power cost enabled by the Swedish government’s new tax incentives applicable only to large data centers. Hydro66 has supported design innovation in partnership with partners such as Ecocooling to bring new products to market.

Hydro66 believes that forward-thinking, innovative companies deserve better, cheaper, and environmentally friendly colocation solutions.

For more information visit:

[Hydro66.com](https://hydro66.com)

"Northern Sweden has an average annual temperature of 1°C. However, it can be down to -40°C in the coldest winter and, when we are lucky, in the summers it can reach up to 27°C. So a huge range of ambient temperatures has to be accommodated. When the temperature goes below 0°C humidity also more or less vanishes. This requires a cooling system that can handle this range. It will be cold, it will be hot, it will be dry and it will be wet."

