

# CLOUD COMPUTING GIVES A DAM(N)

Professor Rob Procter & Justin Sutton-Parker take a look at 'the world's greenest public cloud'

The world's 8 million data centres are accountable for over 1% of global greenhouse gas (GHG) emissions. Each square foot consumes 30 times more electricity than office space, meaning data centre energy efficiency is critical to sustainability and climate change.

As is the case with all electricity consumption, two elements are key to achieving green credentials. First, energy consumption efficiency and second, being powered by renewable and low-carbon sources that drive down the carbon intensity.

Leading cloud data centre providers understand the impact of both factors.

## DATA CENTRE EFFICIENCY

With regards to efficiency, myriad strategies are implemented to reduce energy waste. These range from optimising power distribution and using free cooling, such as ice-cold fjord water, to cutting-edge activities including neural network algorithmic computation to mimic cognitive behaviour.

This latter practice enables statistical analysis of operations and the resulting machine learning improves data centre performance automatically in reaction to external influences such as workload or climatic temperature change or airflow.

How well the data centre energy is managed is measured by the I.T. industry standard of Power Usage Effectiveness (PUE). This value is created by dividing 'Total Facility Power' by 'I.T. Equipment Power'. The resulting ratio creates a benchmark; an average non-cloud data centre achieves 1.54 whereas cloud data centres are now achieving a PUE as low as 1.1. This suggests that inside a well-managed cloud data centre, 40% less energy is wasted on facility operations such as lighting, with the energy mainly used directly for computing.

## CUE PERFORMANCE

Regardless of efficiency, data centres consume vast amounts of energy. Even a moderately sized data centre will consume 5.7m kWh per year – equivalent to 10m car miles. The carbon intensity of a data centre's electricity at the point of generation is essential to its impact on the environment.

The I.T. industry measures this in carbon usage efficiency (CUE), calculated by dividing the total CO<sub>2</sub>e emissions caused by the total data centre energy by the I.T. equipment energy (kWh). This means the source of electricity will affect CUE performance.

As an example, coal-generated electricity has approximately 870g CO<sub>2</sub>e/kwh while wind and solar have 11-72g CO<sub>2</sub>e/kWh. Even if the most



David Rowe is founder and CEO of Hydro66 – the cloud service provider powered by a local hydroelectric dam in Boden, Sweden (opposite page)

Located at the head of a hydroelectric dam in Boden, Sweden, Hydro66 uses locally generated hydropower (0.05g CO<sub>2</sub>/kWh) and the naturally cool environment to power and manage operations.

## 'THE GREENEST PUBLIC CLOUD'

Hydro66 has arguably created the greenest public cloud on the planet, with sustainable land use, community support for local electricity use, a locally integrated design and build and an ultra-efficient water usage profile.

The company, named after its global map latitude coordinate and the power that drives the data centre, says it enables organisations to host computing as a cloud that 'is green', as opposed to one that has 'bought green'.

This strategy renders the carbon intensity held in any national grid irrelevant. Hydro66 connects directly to a natural power source that is over 99.99% less carbon intensive than fossil fuel energy.

In an interview with My Green Pod, Hydro66 founder and CEO David Rowe explains why this matters.

## How does renewable energy reduce the GHG emissions associated with data centre operations, especially on-premise data centres?

'Data centres are to some extent the hidden dirty secret of modern life and are not going away, so therefore we have to mitigate their impact on the environment, preferably to zero.

'During the lifetime of a data centre, the electricity used for I.T. and for cooling is by far the largest contributor to its environmental impact.

'Using renewable energy means we can continue innovating and improving our digital infrastructure without harming the planet by the back door.

'The challenge with 'switching to renewables' as a simple solution is finding a renewable source that doesn't remove someone else's ability to use it, otherwise you are just shifting the problem.

'On-premise operators have many business challenges around flexibility, scalability and cost, and yet the moral imperative to do the right thing by the planet is getting more urgent.'

## Why is Hydro66 different from other public cloud providers that also focus on renewable energy?

'We applaud the efforts of all providers who are transparent and open about their footprint. With regard to ourselves, we believe the journey towards true environmental responsibility has to begin before you build a data centre. It has to be built in, not bolted on.

## By using Hydro66, can companies now shift their equivalent scope 2 data centre emissions accounting to scope 3 supply chain as zero carbon?

'We know there are huge operational and transparency challenges for many legacy data centre operators and their customers seeking even basic reporting on their environmental impact.

'We make it easy for companies to allocate a CO<sub>2</sub> cost to their operations with us. Granular and in some cases near real-time reporting of kWh and CO<sub>2</sub> at the server level – or even at the cloud service layer – allows a new level of transparency for companies that share our commitment to simple and open green principles.'

## Finally, what would be your message to our readers and the companies they work for in relation to adopting sustainable cloud computing practices?

'It's time to do the right thing with your I.T. infrastructure. If you are in a leadership position, then it's with you to encourage strategic moves towards green cloud infrastructure.'

'Identify partners who can be trusted to advise you. And remember that moving to a greener future should be an opportunity to foster innovation and save money – done properly, this will affect your bottom line positively and do the world of good for your entire organisation and its stakeholders.'

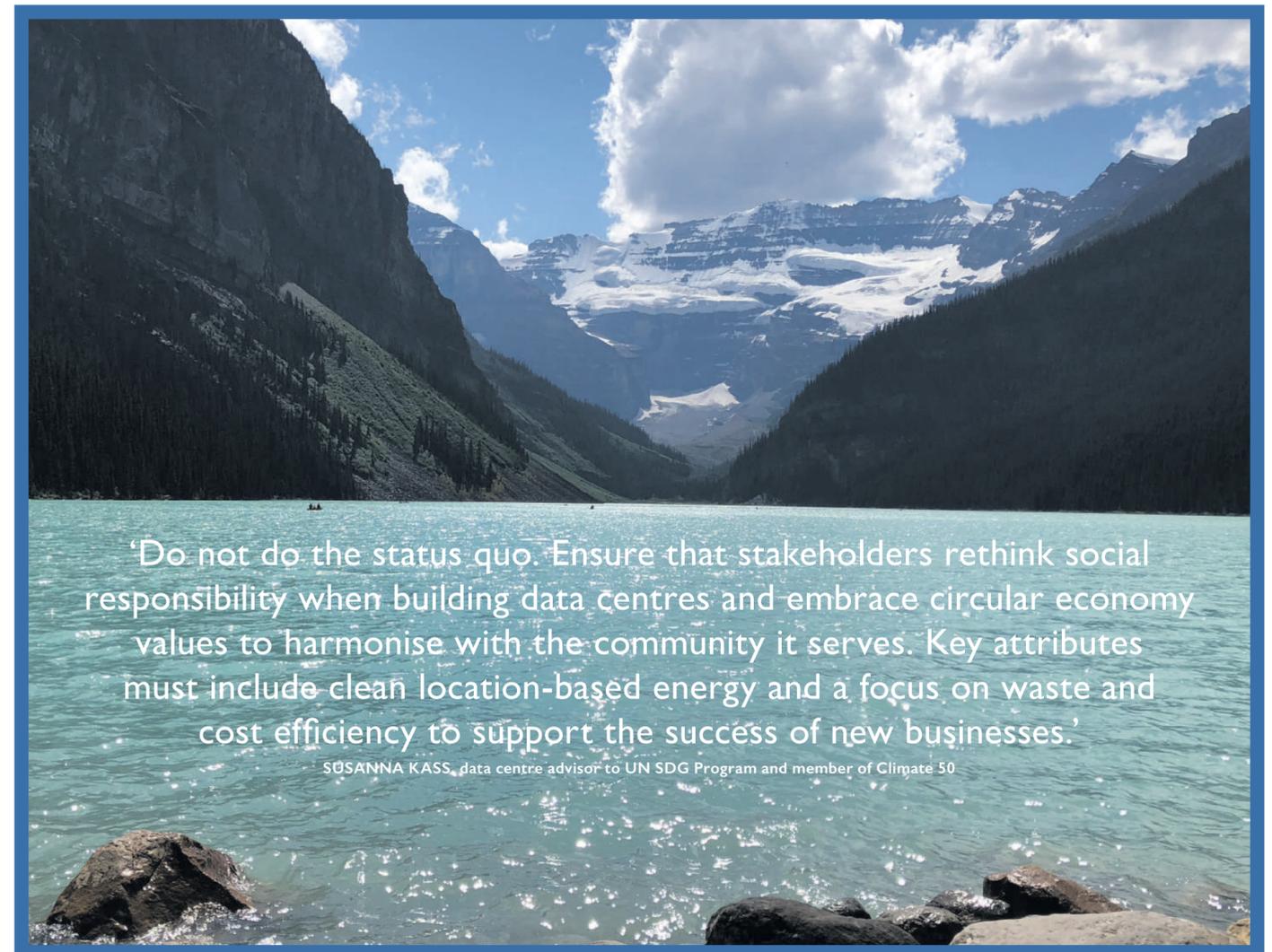
## LIGHTER CLOUD COMPUTING

It's evident that cloud computing as a whole is examining its carbon footprint and making great strides to lower the industry's overall environmental impact.

Through admirable investments in renewable energy offsets, solar and wind farm schemes and extreme 'green' measures such as Hydro66, it is reasonable to say that some cloud computing companies really do give a dam(n). ■

## FURTHER INFORMATION

■ More about Hydro66 and its green cloud infrastructure is at [hydro66.com](https://hydro66.com)



'Do not do the status quo. Ensure that stakeholders rethink social responsibility when building data centres and embrace circular economy values to harmonise with the community it serves. Key attributes must include clean location-based energy and a focus on waste and cost efficiency to support the success of new businesses.'

SUSANNA KASS, data centre advisor to UN SDG Program and member of Climate 50