



Data Centre and Virtualization

Making Sure that Your Data Centre Provider's Foundations are Green

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Biography

David Watkins heads up the Solutions Team at VIRTUS Data Centres, working with customers to provide customized solutions. He has been at VIRTUS since 2009, where he was previously head of operations. Before VIRTUS, David was head of UKMEA data centres at Unisys.

Part of ST Telemedia Global Data Centres Group, VIRTUS Data Centres is London's leading data centre company and owns, designs, builds and operates the country's most efficient and flexible data centres. Located in and around London's metro, VIRTUS Data Centres leads the industry with award winning innovation in hyper efficient, ultra-high density and highly interconnected facilities which are designed specifically to offer the flexibility modern users need.

David blogs at <https://virtusdatacentres.com/blog>

Keywords Data centre, Sustainability, Digital transformation, Carbon emissions, Green energy, Efficiency
Paper type Research

Abstract

The data centre industry continues to grow rapidly as more of our lives become digitally led. But, whilst digital technology is powering, some say revolutionizing, the way we work and live, the millions of data centres which store and process the digital data we create are purging metric tons of hardware, draining country-sized amounts of electricity, and generating carbon emissions as big as the global airline industry. In this article, the author explains that there are many shades of 'green' in the data centre industry and why it is more important than ever to ensure that your data centre provider's foundations are in fact green.

Introduction

Data centres are power hungry, it must be recognized that the industry has made huge leaps in efficiencies from the legacy data centres of years past. These positive changes are being driven at many levels: society is demanding that everyone takes responsibility for their own actions which could be detrimental to the environment; many governments are demanding more efficient, sustainable, environmentally considerate data centres; the data centre industry itself is changing from within; and customers are demanding that their providers are committed to sustainability and green energy solutions.



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Today, there are technical solutions and tools that enable data centres to operate more efficiently, using less energy, without compromising the reliability of facilities.



What data centre customers should look out for

Many of today's customers have exacting Corporate and Social Responsibility targets and these include the outsourced data centre power consumption and carbon emissions in calculations of their own carbon footprint. However, demanding more sustainable data centre solutions is one thing, but how can a business determine whether a facility is actually "green", and how "green" it is?

Many data centres will claim green credentials, but there are many different shades of green, for example, carbon neutral is not as sustainable as carbon zero.

1. Design and build

When designing large-scale sustainable data centres, there needs to be a balance between making it green without compromising its operations and reliability. Building a sustainable data centre means building facilities that don't have a lasting, detrimental impact on the planet. It also means considering the recyclable content of materials that have been used, minimizing waste to landfill, considering the recycling of waste heat generated, whilst ensuring facilities are well maintained.



The data centre industry has certainly evolved, especially in recent years, but although the basic data centre design hasn't changed much, some aspects have greatly improved. Reports show that infrastructure efficiency has improved by 16% since 2014¹ demonstrating that where steps are taken to improve issues like heating and cooling, cost savings can also be made.

When it comes to building facilities, BREEAM (Building Research Establishment Environmental Assessment Method) standards look at the green credentials of commercial buildings, verifying their performance and comparing them against sustainability benchmarks. BREEAM measures sustainable value in a series of categories, ranging from energy to ecology. Each of these categories addresses the most influential factors, including low impact design and carbon emissions reduction; design durability and resilience; adaption to climate change; and ecological value and biodiversity protection. As well as the commitment to meeting BREEAM specifications, many providers also employ a modular build methodology to deploy capacity as and when required. This drives up utilization, and maximizes efficiency (both from an operational and cost perspective).



2. Powering the data centre

Arguably one of the most difficult areas to account for is the energy consumed (and heat generated) by data centres. The constantly processing computers



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and servers which make life online possible and so ubiquitous have long been seen as significantly detrimental to the environment. Reports suggest that data centres globally currently use between 200 and 500 terawatt hours (TWh) of electricity per year². Even at the lower end of this estimation, this accounts for 1% of the global electricity demand – more than the energy consumption of some entire countries – and surpassing that of energy hungry industries.

Customers want to know if data centres are powered by renewable energy sources. It is in the use of renewable energy where being environmentally conscious is helping to better meet customer demand. Periods of electricity price surge or downtime associated with traditional energy sources can challenge providers to maintain service at the level that their users expect – renewables are already demonstrating increased reliability. Furthermore, fixed pricing in renewable energy can help manage budget volatility – again important in managing and meeting customer demand.

Today, renewable energy is often less expensive than brown power. As technologies develop, demand is driving down price, and it's now not just more affordable to be environmentally aware, but potentially fiscally beneficial too. Buyers can negotiate long-term fixed-prices or stable-price contracts for renewable energy and in recent years the cost of hydrogen fuel cells has plummeted, to the point where they are an economically viable alternative for standby generation.

More widely, the cost of renewable power is increasingly cheaper than any new electricity capacity based on fossil fuels³. Indeed, on average, new solar photovoltaic (PV) and onshore wind power costs less than keeping many existing coal plants in operation, and auction results show this trend accelerating – reinforcing the case to phase-out coal entirely.





3. Using the very latest techniques

In legacy data centres, for every kilowatt of power a server used, it generally requires another kilowatt of thermal energy to cool it down. Nowadays, using modern cooling techniques, accepting higher server “air on” temperatures and deploying hot or cold aisle containment, facilities can be cooled for a tenth of the power used by a server.

Examining plant management, there are now many technologies and methodologies which can be deployed to drive efficiency and produce less carbon emissions. In addition, there doesn't need to be as much engineering infrastructure in place to achieve acceptable environmental conditions:

- Highly efficient servers, mean that one rack can replace six older versions, placing more emphasis on air management, cooling and containment systems UPS (Uninterrupted Power Supply), means that unused capacity can ‘hibernate’ to reduce electrical losses;
- CRAC (Computer Room Air Conditioner) units are typically equipped with variable speed fans, which will regulate in line with demand to reduce energy consumption;
- Pumps are now equipped with variable speed drives, which again will regulate in line with demand to reduce consumption;
- Chillers often have “free cooling” functionality, where within certain temperature ranges cooling can be provided at a much lower cost;
- Ground and air source heat pumps are being deployed, along with local energy generation all making use of clean, naturally available resources.

In conclusion

Energy improvements in data centre construction and management ensures that the world's increasing data use does not necessarily mean spiraling energy consumption, and the associated environmental impact.

Every data centre operator in the world should feel an obligation to minimize the impact they have on the environment and surrounding communities. Being a responsible operator with a demonstrated commitment to sustainability is not just the right thing to do, it is increasingly what customers are demanding and can actually deliver commercial benefits – continuing the journey to greater energy efficiency and sustainability is more vital than ever.

Reference

- ¹ <https://www.techuk.org/resource/does-streaming-really-have-a-dirty-secret.html>
- ² <https://davidmytton.blog/how-much-energy-do-data-centers-use/>
- ³ <https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019>