

Data Centres & Sustainability in 2024

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IN MAY 2021, IN THE MIDST OF THE PANDEMIC, BROADBAND JOURNAL PEERED INTO THE INDUSTRY OF DATA CENTRES AND DIDN'T MUCH LIKE WHAT IT SAW. INERTIA, CYNICISM AND GREENWASHING SEEMED COUPLED WITH A PECULIAR MIX OF COMPLACENCY AND OPTIMISM. WHAT'S HAPPENED SINCE?





As with any highly contentious subject, establishing hard facts on a national, never mind international level can be difficult. Separating cynical marketing proclamations from hard data is challenging. Dig a bit deeper and uncovering the motivations and agenda behind much of this is bewildering, since with climate change we are also dealing with a highly charged, very 21st century phenomenon: conspiracy theory. As soon as one fact has been established it is dismissed by opposing parties as 'just weather', unprovable hocus pocus, a sinister global plot that if you look long enough, right to the far reaches of the Internet, it will eventually lead you to the tinfoil hats of the Flat Earth Society.

GETTING STARTED WITH SOME STATS

In 2021 there seemed barely any governance or joined up thinking; the landscape a bleak hyperscaler dystopia owned by profiteering tech giants, some of whom were working towards sustainability goals, but not many. There was a wild-west approach to planning, expansion, cooling and ESG, as well as patchy, opaque and subjective data reporting designed to please shareholders and excite the media. These huge, remote businesses appeared to be facilitating our daily lives and bleeding the planet dry while most of us were only dimly aware of their existence. Condemnation from grassroots activists and industry experts was noisy and widespread, but little affirmative action seemed likely in the short term.

Some impressive, if embryonic environmental initiatives were taking root within boardrooms and in parliaments and while the optimism about a brighter future was encouraging, there was no denying the situation was deeply alarming. At the time Data Centre Energy Efficiency Consultant John Booth, whom we will meet again later on, told us, "In the UK alone data centres take up 0.79% of energy consumption but that is just commercial. That figure doesn't include BT telephone exchanges, hospitals, universities, head offices government facilities, retail outlets and leisure facilities. It's more like 12%. So the number we have globally is completely off. It's far, far higher."

It is still difficult to establish the exact number of data centres worldwide, because the definition of a data centre varies enormously. However, Brightlio.com estimates a rise of nearly 3,000 data centres since 2021, to 10,978 globally. Some context: In May 2021, 55% of the world's population was online. It is now 66.2%. That's a lot of Instagram posts.

In 2021 we learned that the older, white, male-dominated culture of data centres was vastly at odds with the young, diverse, Silicon Valley app developers skateboarding to work. Junior engineers from a range of technical backgrounds had found themselves 30 years later running gigantic data centres in remote parts of the planet, embroiled in planning controversies amid tetchy media relations, where their marketing skills were found to be sorely lacking and their outlook dated.

They faced a serious communication and image problem. According to John Booth, however, three years on this too is changing. "I think they've finally realised that their tenure as senior executives in the industry is coming to a very quick end."

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WHAT PROGRESS SO FAR?

Booth remains cynical about the direction of travel however, and while progress has certainly taken place, it isn't nearly fast enough in his view. Susanna Kass, meanwhile sees things very differently. Founder of a US-based consultancy providing net zero solutions to the data centres industry, she is regularly fêted as one of the Top 10 Women in Sustainability Leaders, Top 10 Women in Data Centres and Top 50 Climate Change Thought Leaders. Broadband Journal reconnected with her to see what's happened since we last spoke.

"Today, the hyperscale cloud providers are leading the way with renewable energy power purchase procurement that no other industry has achieved in the past three decades; AWS, Microsoft Azure, Google Cloud, Meta-Facebook, and Apple are each responding to clean energy requirements with massive gigawatt scale renewable energy purchases."

Encouraging news, but as Booth pointed out, reporting from Big Tech is like reporting on global car emissions with a focus only on Formula 1. Reporting on other, smaller data centres is still far behind, though the new legislation will hopefully herald in a new era – honest reporting will be enshrined in law so the hope is that municipal buildings, schools, hospitals etc. will begin to do the same.

The opinions of opposing industry experts may differ, but undeniable, well-publicised strides have been made in right direction. Data centres have increasingly adopted the use of renewable energy sources – wind, solar and hydro. A case in point: in 2021 we reported on a proposed data centre in South Wales designed by 20th century architects powered by an outrageous 60 diesel generators; that is still the case but now, the generators will only be used as a back up, should the renewable sources it relies on via the National Grid fail.

Smaller data centres are popping up requiring less energy and designed with more efficient cooling systems in mind; immersed compute solutions, for example, where servers are submerged in dielectric fluid to capture and reuse the heat they are starting to proliferate. This waste heat can be used for other industrial processes, such as heating greenhouses or swimming pools. Green building practices, prioritising energy efficiency and sustainability are also more

commonplace in 2024. Underwater data centres constructed at sea or in caves are also on the cards.

There is still plenty of room for improvement. The industry continues to innovate and explore new technologies and practices to further reduce environmental impact and increase sustainability.

However, if sustainability targets are at the peak of Mount Everest, by any metric we are still at base camp. That said, legislation has been passed in Europe now and corporate ESG targets are being set, met and often exceeded. Attitudes have shifted considerably over this time and even in the three years I have spent editing this magazine, it is clear sustainability is now considered an industry-wide priority, as opposed to an obligatory nod to keep those vegetarian cranks in the office happy, or worse, spouting the kind of marketing spiel we are all familiar with without anything to back it up.

Dana Haidan, Chief Sustainability Officer at Virgin Media O2, is one of many companies we talked to doing impressive work. "As part of Virgin Media O2's sustainability strategy, the Better Connections Plan, we have set a goal to achieve net zero carbon emissions across our operations, products and supply chain (Scopes 1, 2 and 3 emissions) by the end of 2040. Our net zero target has also been validated by the renowned Science Based Targets initiative (SBTi), and we became the first UK telco to be recognised by the Carbon Trust for our net zero plan, being awarded the Advancing Level of the organisation's Route to Net Zero Standard."

Sandie Brodier is Global Sales/Purchasing & Partnerships Director at Rincon Technology in the US, and suggests the shift, while proactive, is reacting to global pressures we have all lived through in the past three years. She said, "We have experienced a massive turn-around in mentality, moving from the linear economy model to the circular economy model. The worldwide semiconductor chip shortages, delivery lead time issues and climate change urgency were all factors in driving the data centres to utilising secondary-market vendor circular economy pioneers like Rincon Technology."

There's that joined-up thinking that was missing before. Sandie agrees. "The IT industry is now considering the entire lifecycle of IT and critical infrastructure equipment when building new data centres."

Nuclear fusion is the next chapter in the data centres story. Amazon Web Services recently announced the acquisition of a \$650m nuclear powered data centre in Pennsylvania. There are plans in place for the UK's first commercial grade fusion reactor, which is going to be built in Nottingham and should be live by 2040. Small Modular Reactors (SMRs) are in the planning stages on both sides of the Atlantic, though it will be 10-15 years before any of them are active.

Despite the decades-old hysteria that has not kept pace with the innovation it's worried about, nuclear fusion is a clean and renewable source of energy that John Booth feels is a massive game-changer. "If we go to fusion, then climate change is over."



GREENWASHING

The trouble with industry-wide priorities is they are ripe for exploitation. While those hapless data centre engineers struggled to market themselves a few years ago, savvy opportunists across the sector have since identified a sweet spot to make their companies shine, with a brand-new word too: greenwashing. While there certainly are companies diligently carrying out their commitments with integrity, there are lots who aren't. The complexities of measuring net zero, confusing and evolving terminology and the lack of checks and balances have left the landscape vulnerable to inaccurate proclamations about green credentials, and until now companies have been getting away with it.

"In practice nobody's got time for sustainability - and you can quote me on that if you want."

Dom Robinson pulls no punches. The founder of Greening of Streaming, a UK-based, non-profit organisation that seeks to develop that joined up thinking in the streaming industry via an impressive membership of blue-chip companies and working groups, tempers his passionate optimism with healthy cynicism. "Sustainability is something that the CEO says, 'Oh yes, we do it.' But actually, when you dig deep, there's really an owner and that owner is more than less copy-and-pasting some calculator nonsense out of some third-party documentation."

He went on, "The actual amount of 'doing' in corporations is almost entirely about moving things off their accounts. And yes, I'm talking about the industry-wide picture."

Robinson works closely with Anthony Daly and James Dove of ClimateEQ, a small consultancy offering sustainability training courses to the media industry. Anthony and James recognised that ignorance and confusion were a large part of why that CEO thinks he's 'doing sustainability', when he's actually doing nothing of the sort. They feel that fear of getting it wrong is part of the issue, fear of expense is an element and as Dom points out, nobody has the time to get into the weeds of offsetting net zero targets and what's happening to their products further down the supply chain.

There is a fine line between ignorance, says James, and avoidance. Their

courses equip companies with the understanding of their supply chain, the correct terminology and the wherewithal to create legitimate sustainability practices without being accused of greenwashing.

Then there is The Flint, an online information hub passionate about sustainability, set up in 2022 by industry veterans Neil Howman, formerly of 202 Communications and Neal Romanek, who felt spurred into action by what they saw as inaction, duplication, poor organisation and the siloed nature of our industry. Their mission is to spread accurate information in a fast, efficient way, since "the environmental crisis is worse than you think it is. Even the gloomiest of scientists are shocked at how much earlier certain phenomena are occurring than models had predicted. It's all hands on deck now."

LEGISLATION, AT LAST

Greening of Streaming, ClimateEQ and The Flint are doing a noble, difficult and important job, often working together to achieve their goals, (and we will be featuring all three organisations, among others, in our upcoming Spring Lecture in March 2025, as their work needs amplifying and you will all benefit). In January the EU passed legislation that states that "Generic environmental claims and other misleading product information will be outlawed" this will become law across the 24 members states within the next 24 months. In 2021 there was nothing like this on the horizon (the Paris Accord didn't even mention data centres, it was so dated) so this is progress indeed. The UK is likely to mirror this legislation. As for the US, much of what happens next depends on who enters the White House next year.

The chest-beating we are familiar with in the media will become a thing of the past unless companies are willing to pay substantial and incremental fines over the coming years and withstand serious damage to their reputations. Dana Haidan agreed. "It's going to be tougher for companies to greenwash, and if they do, they'll face huge risks - reputationally, financially, and even regulatory."

Legislation is a good start and a deterrent to greenwashing. The opportunity to train your organisation is out there now. Knowing where to start is difficult. Anthony Daly helped explain. "It's broken down into Scopes 1, 2 and 3. 1 and 2 are pretty much energy, heat, cooling, things like that."

And then?

"Scope 3 is everything else in your supply chain. Carbon neutrality allowed you to just measure your Scopes 1 and 2 and then offset a little bit of your Scope 3, traditionally business travel, something easy to measure. That meant that companies could say, 'Hey, look at us, we're carbon neutral, or we're climate positive.'" But actually they've made no reductions in their actual emissions in a Scope 3.

Anthony explained that 98% of emissions come from Scope 3, and most businesses that make or sell something. "Net Zero is there to say you have to measure ALL of your scopes and reduce ALL of those scopes, and it's 50% by 2030 and it's 90% by 2050. You'll also hear other terms like true zero, absolute zero. True zero is like getting to zero emissions."

He went on, "If you can achieve Net Zero, amazing, we don't believe anybody will. It's about following a process and a framework to try to get to Net Zero. And that's the important distinction."

Susanna Kass doesn't agree with this. She points to the past as an indication of future developments. "Striving to reach an ambitious goal such as Absolute Zero is measured by actual progress. Results that have impact will open minds. What I was told decades ago when I started advocating Sustainable Development Goals to the Data Centre sector had similar echoes; the rest is history now, as each hyperscaler has embraced Carbon Neutrality (and Negative) Goals in its Corporate Imperative. Absolute Zero is NOT impossible; it is imperative to promote equity and humanity as we continue to innovate in the Digital Envoy." History is a great teacher after all.

Change can start small; it needn't be an overwhelming task, Anthony says. "We say, don't let perfect be the enemy of good. If you can't get every bit of exact data, don't worry about it. Get what you can and start to measure it and fill in the gaps later. The other thing is, take your top 10 suppliers; if they're 70 to 80% of your emissions, focus on them first."

"Focus on the quick wins. Get to the granular a bit later, but don't use averages, don't use all of the software that's out there that just takes your spend and purchase data. That's all greenwashing. Get into the measurement bit and you'll find efficiency."

LEADERSHIP

Good governance is a trickle-down affair; earlier this year Friends of the Earth, Client Earth and the Good Law Project took the UK government to the High Court over their 'inadequate' climate action plan. With accusations from all three organisations that the government is for the second time in breach of the Climate Change Act of 2008, it is hardly surprising that this culture has led to a somewhat casual relationship with the truth where corporate sustainability is concerned.

Some of the biggest brands on the planet have greenwashed on an epic, shameless scale to the detriment of the environment in the last year alone: Shell, FIFA, HSBC, Lufthansa, Amazon and Ryanair. FIFA crowed about being the first carbon-neutral World Cup in 2023, when it actually produced 4.67m tonnes of CO₂, making it the most polluting World Cup ever. It seems unlikely there will be any consequences.

Broadband was curious; given the poor leadership in place in the UK currently, would the new legislation eradicate spurious sustainability claims in time, or was it a toothless piece of legislation that would be difficult to enforce? Dana Haidan was upbeat.

"I welcome any legislation to spur on credible action to prevent global temperatures from rising above 1.5

degrees, which is in-line with the latest in climate science to mitigate the worst impacts of climate change. In the UK, the Digital Markets, Competition and Consumers Bill, which is passing through Parliament, aims to hold companies accountable when it comes to the green claims they use in their marketing activities to consumers."

Is this something consumers are aware of as well? Dana replied, "Consumers are becoming more aware of the impact of the climate crisis. They're seeing and being affected by more frequent natural disasters or occurrences of famine across the globe, and here in the UK, we're seeing repeated flooding events. People are demanding companies, governments, and countries act to protect the planet. Therefore, there's greater pressure and scrutiny on companies to have robust ESG strategies, with transparent goals aligned to climate science, which are also intrinsically linked to businesses' objectives and purpose, and which deliver meaningful results."

Data Centres are still being built at a rapid rate, though technology has, as John Booth predicted back in 2021, moved on a pace. Gigantic hyperscalers popping up on the Arctic Circle are being swapped for very small data centres on the edges of towns, and the heat generated from these is being redirected to local swimming pools, for example, something that made headlines this time last year. A partnership

between Deep Green, a small UK start up (with a £200m investment from Octopus Energy) and a Devon leisure centre has saved the facility £100,000 in electricity bills, and with local councils being forced to close swimming pools all over the country because of the cost-of-living crisis, such solutions are inspiring.

Deep Green say that if 1% of the UK's data centre processing demand was harnessed in this way, the company could heat every pool in the country continuously. According to figures from the company, up to 40% of the electricity used by data centres is allocated to cooling the servers.

Zoisa North-Bond, chief executive of Octopus Energy Generation said: "To tackle the energy crisis head-on, we need innovative solutions to unusual problems – by using excess heat from data centres to slash energy bills for communities across the UK, Deep Green solves two problems with one solution." Home-grown solutions will be increasingly important as the instability in Europe and the Middle East, jeopardising our energy supply, is clearly not going away.

John Booth welcomes the development of small local data centres where the heat is repurposed elsewhere. "It has a lot of benefits, there may be some cost elements to consider, but - and I hesitate to say it - to me it looks like the data centre of the future."



Photo: Kapish Mak

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Liquid cooling technologies are in high demand, but the conversion from traditional air cooling in large data centres takes enormous investment and is highly complex. Holland Barry, SVP and Field CTO of US based data centres provider Centresquare says that “While the evolution to liquid cooling is certainly inevitable, rapid uptake may still be a few years out due to the upfront investment and complexities involved in deploying these solutions in current data centre infrastructure. We’ll see definite growth in this category in 2024 but look for a steeper rise down the road once there is more technology standardisation.”

POLITICS AND DENIAL

Booth feels with the right direction and impetus at government level there is no reason why this sort of initiative couldn’t go on to heat thousands of new build homes in the future, as has been happening at scale in Scandinavia for some time, but the UK in 2024 is not in a good place right now. Having endured 5 prime ministers in 7 years and another election in a few months’ time, corruption scandals engulfing ministers and MPs on a weekly basis, promoted by a media so obsessed it has no time for sustainability news unless there’s a Cop 28 style conference to distract them. Such chaos and inertia affects long-term strategy, thwarting sustainability ambitions.

Throw in an increasingly noisy ‘it’s just weather’ lobby of prominent climate change deniers and the inertia is even more pronounced; such noise affects policy, public perception (it’s all about the clicks and likes after all these days), investment decisions, even research into cleaner solutions. It creates barriers to progress, on global cooperation especially if a climate change denier is reinstated in the White House later this year.

WHO’S POWERING ALL THAT AI?

While AI is busy making our lives easier, it comes at a significant cost to the environment, something nobody thinks about while they are busy talking to Alexa or asking ChatGPT to do their homework. John Booth explained that the power required to make our lives that much easier is actually going to be difficult to supply.

“A lot of the legacy facilities are in panic mode because the energy requirements for AI are three or four times what’s

currently available. Anybody that’s built a data centre in the last two years however is probably very well-placed to take advantage of this AI growth.”

He cited a case in Loudon County, Virginia, a hotspot for data centre construction, explaining that there are data centres all over the region that are lying dormant because the energy supplier simply isn’t up to the task of supplying the power required. There is a similar situation occurring in Dublin. “The crazy thing is this, construction costs for a 100-megawatt data centre would be in the regional about \$1.5 billion. You would only invest that sort of money if you knew you were going to get the power. Planning permission was granted before the pandemic, however, then halted. “It could be that the utility had to upgrade some of the backend electrical infrastructure, and because of the pandemic, they’ve not been able to do it.”

It is early days for AI however, and growing pains are inevitable for a few years until this settles down. The emergence of AI now, while all of the above is in such flux is not ideal. Dormant data centres are not a good look, and the data centre companies will be on the receiving end of criticism for this, even though the pandemic was certainly not their fault.

You have to feel for the data centre industry. They’re getting it from every angle: anti-greenwashing legislation, sustainability reporting pressure, expensive technology upgrades, begging the National Grid for power and the ongoing noise of NIMBYISM from residents the world over (would YOU want a data centre in your backyard?) Added to that is ongoing reputational damage from all of the above, even prompting a slightly sad, if instructive piece by techerati.com late last year. It was probably well received by weary executives. “Top 5 Tips to Shape Positive PR for the Data Centre Industry” offered advice on how to offer case studies, engaging journalists the right way and presenting a united front.

There is a mountain to climb for these guys, and it will get worse before it gets better. Overall however, there are reasons to be cheerful. The combination of rapid technology improvements, investment, a willingness by data centres themselves to improve matters should see a continued upward trajectory for the sector.

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www.greeningofstreaming.org

Climate EQ

www.climate-eq.co.uk

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