

Smoke gets in your eyes, even at the edge - how do we clean up our data center acts?

By [Cath Everett](#) June 28, 2021

SUMMARY: With the tech sector generating as much as three percent of the world's carbon emissions, the time is now for the industry to take action on the climate emergency.



Each year, the world population emits about 35 gigatonnes of carbon dioxide, a figure that, despite some optimism to the contrary, dropped by only two or three gigatonnes during lockdown.

The tech sector as a whole, meanwhile, is estimated to generate between one and three per cent of this total, a significant proportion that, as Chris Adams pointed out during a presentation at the UK's BCS Insights 2021 conference last week entitled 'Defining good, doing good', is difficult to ignore. Adams is Director of the not-for-profit Green Web Foundation and organiser of ClimateAction.tech, a community of tech workers committed to making systemic change in their organisations and industries to fight the climate crisis.



In order to put this number into perspective, he indicated that it is similar to the total carbon footprint of Germany or Canada. It is also in the same ballpark as the entire shipping or aviation industry and the combined emissions of commercial and heavy industry in Europe. But as Adams said:

"When we talk about carbon footprints, we're usually talking about how to make them as small as possible before we go back to our normal lives. But it's not about one person, or even one company any more. It's about the entire system, and as the scientists say, it's about making rapid, far-reaching, unprecedented change. In response to this state, I think we should talk less about personal carbon footprints and more about climate response. It's now about safety and avoiding harm – climate emergencies require honking great ambitious climate responses."

As to what the tech industry can do to affect systemic change, he believes there are three main "levers", which may at least help people to "see when we might be missing something obvious, or think about stuff we might do anyway in a different light". These consist of:

1. Consumption – can I change how much we need?
2. Intensity – can I change how much we pollute?
3. Direction – can I change where we are heading?

Consumption

A key means of reducing consumption is by ensuring energy efficiency. While making computers and other equipment causes emissions, running data centers and networks 24/7 generates significantly more. But despite an explosion in the use of digital services over the last 10 years, the total amount of energy used by data centers and internet infrastructure has changed little. Adams explained:

"This has been made possible largely by us moving away from running code in relatively inefficient, smaller-scale data centers with relatively low levels of utilisation to running code in hyperscale, cloud data centers, which can have 10 times as many applications using the same hardware. Also because they're so much larger, they can afford to replace older, inefficient kit more quickly, making better use of Moore's Law."

In future though, efficiency gains will increasingly need to come from "closer to the top of the stack" rather than the hardware level:

"This means that, as a developer, understanding performance and efficiency is likely to become more important over time."

Intensity

A major problem for the tech industry is that it still runs predominantly on fossil fuels, which not only generate carbon emissions but also impair air quality.

But replacing them would require a massive four times more renewable energy generation – wind and solar being the most common - than takes place today, although other alternatives include nuclear, geothermal and hydrogen production, Adams said.

Potential options to help in this context include following the example of big tech players, such as Google and Microsoft, by signing up to power purchase agreements. Here companies agree in advance to pay for all the power generated by a new wind or solar farm to help pay for it being built.

A UK-based tech start-up called Ripple Energy has also adopted a not dissimilar model by making it possible to buy a share of a wind turbine in return for lower electricity rates. As Adams said:

"It's much more compelling than offsets – if you're a tech firm and your emissions are caused by fossil fuels on the Grid, this way you're addressing the source of the problem and buying power in a way that is both scalable and greener than a lot of green energy tariffs - and it gives you a wind turbine you can point to on a map."

Direction

Adams believes that many of the problems associated with technology result from a failure to think through the consequences of going down a particular route, especially because "technology is very much an accelerant of what's already there".

Other problematic issues include "leaving people out of the conversation" or simply not questioning "how we got to where we are in the first place". As a result, he believes the focus should be on making more "deliberate choices":

"If you don't think about where you're headed or the things you do that you think are helping, you can end up doing more harm than good."

Adams cites the example of ride-sharing services, such as Uber and Lyft, which were initially considered a "sustainability win" because of their potential to replace cars in urban environments. Instead, the convenience they offered ended up being a double-edged sword. He explained:

"Ride-sharing in many cities can end up displacing greener forms of transport especially when they're subsidised to be even more attractive price-wise compared to other options. Direction in this case refers to understanding the implications of going down a route and, if necessary, adjusting when you have a better idea of the consequences."

Re-use and recycling

But there are other things that technologists can do too, which include re-use and recycling.

In fact, John Booth, Managing Director and Principal Consultant of sustainable IT consultancy, Carbon3IT, pointed out that by 2022, all organisations participating in the [European Union's Code of Conduct for Data Centres \(Energy Efficiency\) 2021 \(12th Edition\)](#) will be required to undertake a lifecycle Assessment of their entire facility. Doing so will include calculating the "in-body carbon" of their equipment to understand of which raw materials each bit of kit consists and how it could potentially be reused and recycled elsewhere.

However as Adams pointed out, to make such reuse a reality particularly in large organizations, it will also require process change. He explained:

"To re-use things, you have to have ways to recognise and accredit that. The system currently incentivises the use of virgin materials as they're cheaper. It's actually more expensive to use recycled stuff."

Another possibility, said Amanda Brock, Chief Executive of OpenUK, a not-for-profit that supports open source collaboration and technology, is to explore the possibility of using waste heat from so-called 'edge' data centers, to support local communities and businesses, which today includes lobster farms in Finland and greenhouses in the Netherlands. OpenUK itself is [developing a blueprint for a carbon-negative, edge data center](#), which it plans to unveil on 11 November at the United Nations' COP26 Climate Change Conference in the UK.

A significant problem when trying to introduce edge data centers in the UK though, pointed out Booth is a lack of local government understanding of what they are and what benefits they could bring:

"If you're using the district heating grid, you need the buy-in of local authorities. It has to be put in the master plan. But where the disconnect is happening is that there's a lack of awareness among planning people, and data center operators, who are miles apart. Docklands, Slough and Manchester are the UK's three main data center hubs and there the local authority planners are on the job, but if you go to Birmingham, for example, they'll ask 'What is a data center?' So if you're going to have edge sites up and down the country, there will be more guidance."

My take

I would tend to agree with Adams' stance that there is a need to "enshrine and protect the idea of not doing harm" when thinking about and working with tech in all its facets. But in the case of building things like edge data centers, it would also appear imperative to ensure that the voices of as many stakeholders as possible are heard and taken into consideration, including those of the wider community.

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