



# Solving climate change's invisible data problem

**Union St-based enterprise Mycelium discusses with writer and co-worker Julia Ross how data is the low-hanging fruit for carbon accounting and democratising access can make a difference.**

It's hard to work with something you didn't measure properly in the first place – just ask any surveyor or pastry chef. But while reducing carbon emissions is high on the agenda for companies everywhere, the unfortunate fact is that many are currently out – perhaps wildly out – in calculating them. So, what does that mean for pledges like Google's 'net zero by 2030'?

"Carbon accounting is all based on estimations," says Tom Carpenter, Union St member and founder of the Mycelium Network, the world's first open-source emissions database. Using existing tools, he says, "if we were calculating our carbon footprint and we looked at the computers we own, our calculation wouldn't be, 'You bought an Apple here, you bought a Dell.' The estimation would be [reduced to] 'You bought X thousand pounds of computer equipment!'"

At first sight, the emissions difference between two different brands of computer may not seem like the end-of-the-world. But when multiplied, the numbers add up quickly. If every company's recorded emissions (those companies that do record them) are based on estimations, how can we hope to make the informed decisions needed to hit net zero?

The central goal of Mycelium is tackling this almost invisible hurdle, Tom explains. "It's not a case of 'Solve the data problem, save the world. But I don't think you can leave it out.'" Since Mycelium was founded in 2022, it has gathered emissions data on over 15,000 UK companies. Hitting this figure was a watershed moment, Tom believes, and he feels huge optimism about the future. "The conversation is starting to turn," he says. "We haven't solved it – but we're now in a position of strength."

Tom balances Mycelium alongside Grizzle Animation Studios, which he started in London in 2014, before relocating to Sheffield and joining Union St as a co-worker. Mycelium's roots can be traced back to 2020, when Tom was arrested at an Extinction Rebellion protest in London. He explains that it was his first ever climate protest, which he attended after having children propelled him from just worrying about climate change, to taking direct action. Being arrested was "pretty boring", Tom says – he even had time to check his work emails. It just so happened that one of those emails concerned a project Grizzle was doing for BP. "In that moment I thought, 'What am I doing? I'm sitting here protesting climate change, and yet we're working for BP,'" he says. After being released with "a slap on the wrist", Tom had one big takeaway from the experience: "We need to decarbonise."

After tackling Grizzle's carbon footprint (starting with ditching BP), Tom was looking for ways to make a bigger, bolder move. This led to the creation of Neg10 – designed to be a "gold standard" accreditation to reach negative 10% CO<sub>2</sub> emissions – a clear step beyond the widespread but insufficient goal of "carbon neutral". Neg10 won a partnership with Sheffield University via the Sheffield Innovation Programme (SIP), a regional initiative that gives small businesses access to academic expertise and university facilities. During SIP's early stages, Tom had the chance to sit down with seven world-leading carbon accountants and learn more about the industry and its limits. "The real low-hanging fruit", he learned, was the lack of a central database to access and share emissions data – which is why the industry relies on "estimations". This knowledge changed everything. "Neg10 got put on permanent ice and Mycelium was born."

Named after the vast, underground fungal structures that allow plants and trees to communicate and exchange nutrients (sometimes called the "wood wide web"), Mycelium was created to "solve the data problem", says Tom. Its "primary social object", written into its articles of association, is "to accelerate

decarbonisation by democratising access to CO<sub>2</sub> data". The idea from the outset was for Mycelium to be a database of emissions data that everyone could access. Although Mycelium is initially focusing on gathering companies' emissions, this growing, open-source network of data will gradually provide carbon footprints for individual products and materials. With this information publicly available, manufacturers and companies will be able to make more sustainable choices from the outset. One day, Tom says, consumers may be able to simply scan a bar code to identify the greenest products. "Pretty utopian," he adds. "[But] that's a long way off."

Starting the project from scratch has been challenging and Tom says they were "scrambling" for a long time. The turning point came with a £50,000 grant from UK Research & Innovation in 2024. This funding enabled the team to build AI tech that scrapes emissions data directly from the internet – using sources like company websites, sustainability reports and data from Companies' House – and adds it directly to its database.

Another £50k grant in April 2025 was awarded to look at using smart meter data to auto-calculate carbon footprints, and Mycelium now supplies data to the Department for Energy Security & Net Zero to help track compliance with the UK's Streamlined Energy and Carbon Reporting framework.

After the progress it has made gathering data from UK companies, Mycelium's next big target is to reach 250,000 companies spanning Europe and the US. Tom cautions that AI-sourced data scraped has a higher margin of error than data gathered by humans, but there's still no comparison with "estimations". The next stage is for carbon accountants and platforms to start adding their data directly to the database. Tom is confident this will happen, though it "may take a while". "It'll be a eureka moment – or else one carbon platform comes on board, and there'll be a snowball effect."

Tom suggests that the database could one day even be publicly owned by the carbon accountancy industry through some form of co-operative model (like Union St itself). He thinks about it along the lines of German football's 50+ 1 rule, designed to prohibit too much influence from private investment, where a club must be "more than 51% owned by fans". It's not just the tech, but how it is used that makes Mycelium unique: "Carbon accounting 2.0", as Tom describes it.