

Science, Innovation and Technology Committee

Oral evidence: Innovation showcase, HC 523

Wednesday 14 January 2026

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Members present: Dame Chi Onwurah (Chair); Emily Darlington; Dr Allison Gardner; Kit Malthouse; Dr Lauren Sullivan; Adam Thompson; Freddie van Mierlo; Daniel Zeichner.

Question 46

Witness

I: Daniel Carlotta-Jones, Chief Engineer, Wastewater Fuels.

Examination of witness

Witness: Daniel Carlotta-Jones.

Chair: Welcome to the Science, Innovation and Technology Committee's innovation showcase. The Committee wants to understand how the UK supports innovators and, obviously, what more can be done. To inform our work, we select an innovator to share their story before our main evidence session each week. Adam Thompson has suggested this week's innovator, so I will ask him to introduce him.

Q46 **Adam Thompson:** Thank you, Chair. This is Dan Carlotta-Jones. Dan is an old friend of mine from university. We played in a band together many years ago.

Chair: It was innovative!

Adam Thompson: Aside from being an excellent bassist, however, Dan studied biochemistry at university and went on to do a really interesting engineering doctoral project at the University of Warwick, focusing on waste water treatment and the use of waste water to create fuel for renewable energy. Dan then went to work for Severn Trent, which has a plant in my constituency of Erewash, where I think Dan spent some time over the years, and eventually branched out to start his own business, Wastewater Fuels. I am glad to introduce him today to talk about some of the great innovations that he and his colleagues at Wastewater Fuels have been making.

Chair: Fabulous. Thank you. Over to you, Dan.

Daniel Carlotta-Jones: Thank you very much. This morning, my journey from Leamington Spa, where I live, to London took about an hour and 20 minutes, but if I had taken that journey about 100 years ago on a lovely old steam engine it would have been less comfortable and less efficient, and certainly a lot longer. It is safe to say that, although steam engines are a lot more beautiful than the trains we use today, we have had amazing technological innovation in locomotion over the past 100 years.

While we were riding around in steam engines, another revolution in sewage treatment was happening at the same time that not many people know about. We refer to it as the activated sludge plant. To picture it, close your eyes: you are in a lovely jacuzzi with water and bubbles; just replace the water with sewage. That is what an activated sludge plant is. Although that is not a nice image, I can assure you that it has made an amazing impact on treating water to a high standard.

Over the past 100 years it has not really changed. It is still the same hole in the ground, with bubbles—blowing air to treat waste water. Is that a problem? Is it a case of, "If it ain't broke, don't fix it"? Actually, I think it is a bit of a problem because, in the UK, 2% to 3% of all the energy we



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use goes to treat waste water, and around 60% of it is attributable to that aeration—the activated sludge. If you want to deal with that in a more economical and environmentally friendly way, you will need to make a bit of a change. But it gets worse, because within the waste water there is value. There is the opportunity to recover hydrogen, methane and other products of value. The process stops that possibility.

That is where Wastewater Fuels comes in. We are a hardware start-up based in the west midlands, where we are trying to change the way we view waste water and, ideally, the way we treat it. We have developed a technology that can recover methane and hydrogen from waste water and effectively turn a sewage works into a power plant of the future. It really can be net energy positive, because the energy that we put into the system is less than the energy we get out. We have demonstrated that in real waste waters and simulated ones, in our lab.

We are able to make a big difference because our technology does not use aeration. It is what we describe as an anaerobic process—in other words, where there is no oxygen. We effectively supercharge micro-organisms, giving them a little bit of power, and make them consume all those lovely pollutants that we think are horrible but they absolutely love.

We have talked a lot about sewage, but there is a wider impact. Agriculture, drinks, food and breweries all produce waste water that can be incredibly potent—10 to 20 times stronger than domestic sewage. All that requires treatment, so next time you are in Strangers Bar enjoying a nice pint, about 4 to 10 pints of waste water will have been produced for every pint of beer that we drink. That is quite a big problem that we have to address.

In terms of impacts, just looking at untreated waste water across the world, around 50% of global waste water is not treated effectively. That is not even talking about the market in waste water that is treated effectively, which we can obviously target immediately. On the environmental impacts, 10% of methane emissions are derived from polluted waste water streams. Methane is a potent greenhouse gas, three to four times more powerful than carbon dioxide. If you can stop those polluted waste water streams from getting into the environment, you can stop the methane emissions; and there is obviously the recovery of value.

Then we get on to the health concerns. In 2022 the World Health Organisation identified that about 1.7 billion people are forced to use water that is contaminated with human faeces. That is a third of the world's population and it results in approximately 1 million deaths a year. That is a stark reminder: you can turn on the taps in your home, here, and know that it will not do you any harm, but that is not the reality for a third of the world's population.

Moving on to the economic benefits, let us just take hydrogen, let alone the savings on energy and the biomethane. If the UK were to capture all



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the potential hydrogen from waste water and human sewage, we could recover about 5.5 TWh of hydrogen. Wow—that is a big number; what does it mean? It is about 2 million homes' worth of energy a year. That is pretty significant—not to mention all the other energy that you can save.

To make this a reality, Wastewater Fuels has raised funding from venture capital and grants, and we have won prizes totalling about £7.5 million. We have used that to try to develop our technology further, and do as many technology demonstrators as we can, to continue to grow the business.

A lot of our work has been in partnership with the UK Ministry of Defence. They have funded a lot of our work, because they are very interested in resilience. That has culminated in our most recent project—Project Cavendish. It was set up at a real sewage works in the west midlands, in partnership with Severn Trent.

We are soon to start the next phase of our development with Ofwat. We won an Ofwat innovation bid and will deploy an even larger-scale version of the technology, targeting the stronger waste waters that I mentioned earlier. We are interested in strong waste water because the filthier and stronger the waste water, the more hydrogen and methane you can recover—so there is lots of value to be recovered.

So, there is a lot of progress, but there are certainly challenges that start-ups like ours have to overcome. One that we have overcome is about access to support. When you start a company, you have to think about HR, legals, health and safety, and organisation. That is quite a difficult thing to do, depending on how much experience you have. There are accelerators that can assist you, but as an entrepreneur and founder you have to struggle over where you split your time. Support there, and access to places, would be great.

The biggest challenge that start-ups like us have to overcome is what we call the valley of death. You may be aware that there is usually quite a bit of funding for small-scale innovation in academia, and there is loads of investment for technologies that are proven; but the technologies of today that require investment to demonstrate what they can do, and that will ultimately solve things like climate change, environmental challenges and future problems, do not have access to the funding so easily. The risk is not the most appetising thing for investors. It is particularly concerning for the water sector. Water is probably our most valuable resource; yet it is probably the most difficult to fund from a start-up perspective.

That is it: that is my soap box. Wastewater Fuels has been the most challenging but rewarding part of my career so far. If we deploy the technology at large scale in the UK, globally, across Europe or wherever we go with it, it is safe to say that we can have environmental, social and economic benefits. We do not have to be green for green's sake. We will be greener and better and give loads of value to everybody. Thank you very much. If you ever want to know more and come and see what we



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do, let me know.

Chair: Thank you so much, Daniel. I feel, now, that we do not talk about sewage enough. That was fascinating and inspiring. When people say that women are more interested in, for example, caring professions, I always say that engineering is a caring profession, because bringing safe water and addressing climate change are incredibly important for us all. Thank you very much for being our innovation showcase, and good luck in your future development.