

Pandemic freight emissions reached 2030 target in just months. How do we make the changes stick?

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During the coronavirus pandemic, railways have been used more heavily to transport Europe's freight. Credit: Liberaler Humanist/Wikimedia, licensed CC BY 4.0 International

The pandemic left a visible imprint on car, bus and bicycle use—and at its height brought about cleaner city air—but it also disrupted another, less obvious but highly polluting sector: freight transport. Coronavirus plunged millions of planes, trucks, trains and ships into a massive experiment, disrupting supply chains as national borders closed and industries shut down. Researchers and industry are now looking to see if any of the changes will stick.

Daily carbon emissions from EU [freight transport](#) dropped by [37% at the height of the pandemic](#), says Professor Alan McKinnon, a freight logistics expert at Kühne Logistics University in Hamburg, Germany. Coincidentally, he says, the EU freight transport sector achieved within two to three months the target the industry has set itself internationally for 2030.

"If only there was a way in which we could hold the freight-related emissions to where they were ... but that's just not going to happen," he said. It's particularly a problem for an industry that is forecast to grow three-fold globally by 2050.

One area where the pandemic appears to have done what decades of effort have failed to achieve is to rationalise the filling of trucks.

"About a third of the distance that trucks travel they go empty," said McKinnon. "Even the ones that are loaded are often only partially loaded, so anything we could do to fill the vehicles better would reduce the demand for transport and the demand for energy.

"For several decades people have been encouraging companies to collaborate to ... share their vehicles and their warehouses because that obviously yields [economic benefit](#) but it yields big environmental benefit as well."

There has been progress, though more could be done, he says. But some companies—for example grocery and household appliance manufacturers in the UK—did collaborate during the pandemic. And some online freight exchange platforms offered free load-matching services too.

"The hope would be that companies may realise what the benefits are," said Prof. McKinnon.

Online retail

The problem extends downstream to the small van that drops your order on your doorstep. The coronavirus measures triggered an explosion in online retail, which many believe is a permanent shift. This may have reduced carbon emissions largely because shoppers aren't driving to shops, but it's a delicate balance, says Prof. McKinnon, hinging partly on how well-loaded that van is.

"Ten years ago, when the system was more leisurely, you could get maybe 120-130 orders in the van being delivered over an eight-hour cycle," he said. Today the push is for instant delivery, where 'the number of drops per delivery may come down to 30 or 40 and the vehicle is less well-loaded."

Thierry Hours, vice president of Volvo Group's CTO office, agrees that rationalising the loading of trucks, one of the company's key products, is a key element of greening the industry.

"There is still a lot of room for drastic improvement in the efficiency of the logistics chain," he said.

"The big question is related to [data management](#) ... and how the systems are integrated, how the vehicles and the transport company are

interacting with the infrastructure, with the people who are giving the goods to transport."

Lorry loads could be optimised by artificial intelligence asking questions such as, "Are the customers willing to have their goods one day after, five days after ... tomorrow?" Hours said. "In order to manage this potential, it's a lot a matter of organisation, of data flows, of the capability to compute a lot of data in a very powerful way."

This is where research and innovation need to focus in order to reduce energy use, he says.

Green fingerprints

Researchers could also take a look at other points in the [supply chain](#) where the pandemic left green fingerprints, says Prof. McKinnon. As it emptied the trains of commuters, it provided greater opportunities for freight to be transported by rail.

"The feeling is that rail freight operations have had a good crisis. People say that COVID has demonstrated how you can improve the quality of the rail freight service and make it more competitive—if somehow we can alter the way that passenger and rail freight services compete for the available track."

As companies wrestle with their supply chains to prevent severe disruptions ever happening again, they may turn to more locally sourced goods—another potential carbon saver since it means there is simply less to move around.

One innovation that reduced dependence on long supply chains was 3-D printing. Prof. McKinnon highlights a study [published last month](#) which showed how it was swiftly deployed to manufacture testing kits, personal

protective equipment and emergency quarantine facilities close to where they were needed—showing how decentralised manufacturing could reduce the freight transport burden.

Prof. McKinnon says that while there is a need for research into what has happened in the last few months, the window during which EU-funded research can support the huge changes required in the freight transport sector is shrinking fast, with only two research cycles left before 2030, the date by which it aims to drastically cut its emissions.

Behavioural

A lot of the changes needed are behavioural, rather than technical, according to Prof. McKinnon, and they involve the cooperation of the freight sector's customers as well as the sector itself. Research and innovation therefore needs to be multi-disciplinary and involve social science.

It's a challenge getting the business community interested and reacting to research results, Prof. McKinnon says. "There is a need to make the research relevant and to do whatever one can to get industry decision makers receptive to the research," he said, adding that this includes disseminating results through the channels that they use and respect such as trade and industry association conferences, newsletters and other non-academic forums.

And pandemic-related innovations have not tackled one of the core [technical challenges](#) facing freight transport—the need to shift to cleaner fuels. Several low carbon energy sources are competing for the large EU freight market—hydrogen, batteries, biofuels, synthetic fuels and electrified highways—but there's still a lot of uncertainty about which will be the most cost-effective.

For Hours, the trucks of the future will run on electricity or hydrogen. The technical area that needs most attention is how to produce hydrogen sustainably. Hydrogen has huge potential in the freight industry, he believes, but currently it is mostly produced from fossil fuels. Changing that is an urgent topic for researchers, as is further development of green electricity production and charging infrastructures.

"We need huge R&I efforts on electrification, and we need to prioritise hydrogen vehicles if we are to support the green transformation challenge and make those new technologies affordable for the transport industry and the citizen."

Prof. Alan McKinnon and Thierry Hours will be speaking at a panel to discuss how transport can become cleaner after changes brought on by the pandemic at the [European Research and Innovation Days conference](#) which will take place online from 22-24 September.

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