

World should consider limits to future internet expansion to control energy consumption

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The world should consider ways to limit data growth on the internet to prevent run-away energy consumption and help limit carbon emissions, say leading computer scientists.

Researchers from Lancaster University's School of Computing and Communications argue that the growth of remote digital sensors and devices that are connected to the internet – commonly known as the Internet of Things – has the potential to bring unprecedented and, in principle, almost unlimited rises in [energy](#) consumed by smart technologies.

In their discussion paper 'Are there limits to growth in data traffic?: On time use, data generation and speed', the scientists point out that internet usage has increased significantly in recent years with people watching more video, streaming programmes on 4K smart TVs, regularly checking their Facebook and Twitter accounts, and even using online social media to track their runs and bike rides.

According to Ofcom, the UK telecommunications regulator, home monthly broadband data volumes in the UK rocketed from 17GB in 2011 to 82GB in 2015. While data volumes for mobile devices are typically smaller they are growing rapidly – more than doubling every few years according to Ericsson and Cisco.

This increase in data use has brought with it an associated rise in energy use, despite improvements in energy efficiencies. Current estimates suggest the internet accounts for five per cent of global electricity use but is growing faster, at seven per cent a year, than total global energy consumption at three per cent. Some predictions claim information technologies could account for as much as 20 per cent of total energy use by 2030.

The researchers argue that up to now there has always been a potential ceiling for increases in data on the internet. These include the finite, albeit growing, number of people on the planet and the limited number of hours in a day that people can interact with online technology.

However, autonomous streaming of data by billions of sensors built into everything from street furniture, driverless vehicles, and smart home thermostats, to industrial production processes such as oil wells, removes the existing potential constraints to the growth in internet [energy consumption](#).

Dr Mike Hazas, Senior Lecturer at Lancaster University's School of Computing and Communications, said: "The internet is consuming an increasing portion of global electricity supply and this growing consumption is a significant concern in global efforts to reduce [carbon emissions](#)."

"The nature of internet use is changing and forms of growth, such as the Internet of Things, are more disconnected from human activity and time-use. Communication with these devices occurs without observation, interaction and potentially without limit."

The researchers believe serious consideration should be given to how limits to data growth could be planned, before the forecast growth of the Internet of Things occurs. There are currently 6.4 billion connected

Internet of Things devices and it is estimated this could reach 21 billion by 2020.

"The Internet of Things is still in the making and it is important to consider existing ideas for a 'speed limit' to the system, especially in comparison to having to retrospectively reduce internet traffic in the future," said Dr Hazas.

The idea for a speed limit to the [growth](#) of [internet](#) data was originally put forward by Kris de Decker of Low-Tech Magazine.

The Lancaster authors point out that it is not clear how data limits could be imposed, but options could include volume quotas and different traffic pricing for the most data-intensive online services.

More information: Are there limits to growth in data traffic?: On time use, data generation and speed; Mike Hazas, Janine Morley, Oliver Bates, Adrian Friday; Lancaster University; LIMITS '16, June 08-10, 2016, Irvine, CA, USA; [DOI: 10.1145/2926676.2926690](https://doi.org/10.1145/2926676.2926690)

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