Online shopping, streaming, banking and other services urged to count carbon emissions

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Software designers developing IT systems for streaming, shopping and

online banking could use the first formula that factors in CO_2 emissions at the drawing board.

A study published by The Institute of Electrical and Electronics Engineers outlines a new framework to estimate a software platform's potential carbon emissions at the design stage.

IT systems are expected to account for as much as 20% of the [global energy demand](#) by 2030, leading to large amounts of CO_2 emissions. Governments and industry have for years focused on lowering levels of CO_2 their technology produces. But emissions from [software systems](#) —the likes of Netflix and Amazon, Tesco and Twitter—have gone under the radar.

Providers such as Amazon, Google and Microsoft let companies see an estimate of how much CO_2 their software will produce over time. But until now, there has been no way to predict software's potential CO_2 emission at the design stage before people start using it.

Writing for the journal *IEEE Access*, Brunel University London and leading global database company Aerospike set out a way to measure CO_2 emissions of software platforms. Using this new framework, they estimate and compare potential emissions of two well-known databases, Apache Cassandra and Aerospike.

"Reducing CO_2 emissions not only has a positive impact on the environment, but can also be cheaper and reduce costs," said digital media lecturer Dr. Damon Daylamani-Zad.

The CO_2 calculating formula they spell out in the study means companies and [software developers](#) can now estimate the potential emissions their at the design stage and so adjust their solutions to use more efficient tools and designs. These more efficient tools are also

cheaper for the company to deploy and run compared with less efficient software solutions.

Looking at running costs, researchers call for CO_2 Emission Efficiency to be made a Non-Functional Requirement for IT systems to reflect their impact on the planet.

They suggest introducing a universal CO_2 emissions scale that measures different technologies based on their predicted CO_2 emissions. This would help IT managers think about the environmental impact when they buy software platforms. It would also encourage technology firms to reduce the environmental impact of their products.

Dr. Daylamani-Zad added that "we don't necessarily have to choose between one or the other. We can satisfy our budgets and our consciences at the same time."

More information: Behrad Babaee et al, CO2 Emission Efficiency as a Measurable Non-Functional Requirement: An Emission Estimation Framework, *IEEE Access* (2022). DOI: 10.1109/ACCESS.2022.3205016

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