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Horizon Europe Applications: Time to consider the energy use impacts of AI on climate change

Frank Houghton, Lisa O'Rourke Scott & Jennifer Moran Stritch

Social Sciences ConneXions, Technological University of the Shannon, Limerick, Ireland.

It is a little over a year ago since ChatGPT was launched in the public domain. In that relatively short period of time ChatGPT and its competitors have ignited an ongoing debate both within academia and the wider world. Despite resistance and concerns in some quarters Artificial Intelligence (AI) has been firmly embraced by many fields, most notably in universities (1), including in engineering education (2). It is highly probable that numerous applications currently being made to the €95.5 billion Horizon Europe Research & Innovation (R&I) funding program which runs until 2027 will involve an AI component of some kind (3).

The potential benefits appear significant across many domains from medicine development (4) to manufacturing (5) which, according to a recent review of the literature is currently leading the publication field (6-7). However, even putting aside more controversial comments (8), the increased power required to run AI software, particularly in the short-term is a given (9). As noted in an earlier Engineers Ireland article, Google's AI alone may use as much electricity as all of Ireland (10). More alarmingly, estimates suggest that global AI training and inference activities may use as much electricity as all of the Netherlands (11). Even in scenarios in which improved processors are being installed in data centres with limited local power supplies, such

upgrades themselves incur an environmental cost in terms of raw material extraction, manufacturing, shipping and installation.

To many people such concerns are negligible, particularly in the context of Horizon Europe R&I grant applications. However, it is important to remember the varying mindsets and belief systems that may frame this issue among those reviewing such applications. Although inconsequential to many, some reviewers may approach any additional electricity use as exacerbating a climate emergency in which anthropogenic global warming is already leading to crop failures and desertification in some areas, alongside glacial melt and consequent sea level rise and flooding in others. Both scenarios inevitably appear to involve increased civil strife, war, forced migrations, hunger, disease and death.

Such framing is important as Horizon Europe Reviewers are routinely asked to evaluate: '*Is this proposal compliant with the 'Do no significant harm' principle?*'. Interpretations of the key term 'significant' may vary dramatically, but any perceived shortcoming may be crucial in the ultra-competitive, and often multi-stage, Horizon Europe review process. It is important to remember that although Ireland is currently led by a coalition government that includes the Green Party, the environmental movement here is extremely modest compared to that evident in some Scandinavian countries and the Netherlands (12-13). From such perspectives any increase in electricity use may be viewed as contributing to climate breakdown and a resulting climate catastrophe playing out in real time.

Therefore it is suggested that those submitting Horizon Europe R&I funding applications, especially those involving AI, strongly consider explicitly including details on reducing the carbon footprint of the proposal through energy and carbon offset mechanisms. Needless to say the initial proposal stages of such applications are obviously restricted in terms of pages and every sentence is valuable 'real estate'. However, between two and four lines out of a ten or more page proposal focused on mitigating the energy issue may a very wise move in future applications. This potential requirement may in itself lead to further linkages between companies and entrepreneurial opportunities, be it in retrofitting, carbon sink development, or renewable energy sources such as solar, wind or hydro.

Frank Houghton, Lisa O'Rourke Scott & Jennifer Moran Stritch

Technological University of the Shannon, Limerick

Dr Frank Houghton is Director of Social Sciences ConneXions at TUS and has an interest in the impacts of AI on Geographies of Health & Public Health. He teaches on the BSc in Applied Psychology and the Masters of Engineering (MEng) in Digitalisation of Manufacturing at TUS.

Dr Lisa O'Rourke Scott is the Principal Investigator of the EDGE (Exploring Diversity, Gender & Equality and has a strong interest in the use of AI in Psychology education.

Jennifer Moran Stritch is the Principal Investigator of the Loss and Grief Research Group, part of Social Sciences ConneXions Research Institute at TUS. She has an interest in the potential of AI for social engagement and communication.

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