5G networks will consume significantly less energy than previous generations. Ericsson's test pilots indicate that 5G technology is up to 90% more efficient than 4G in terms of energy consumption per unit of traffic[1]. That said, the environmental impact of significantly increased data traffic will counteract this benefit somewhat.

In addition to the increased energy efficiency of the networks themselves, 5G's biggest impact on climate change will be its ability to enable significant avoided greenhouse gas emissions in sectors across the economy. Telefónica aims to avoid 10 tons of CO2 emission through its services, for every ton of CO2 it emits[2]. This is achieved through providing digital solutions that decrease energy consumption, travel, or otherwise reduce GHG emissions through the use cases listed earlier in this section[3]. For example, O2 forecast that 5G deployment in the manufacturing sector could take 40 megatonnes of carbon out of the economy by 2035[4].

A study by Omdia of five, ranging European countries (Belgium, France, Poland, Romania, and Spain) found that 5G will help reduce GHG emissions in 2030 by between 1.9% (Romania) and 2.5% (Spain) per year[5]. As this range is so narrow, a simple average can be used as a baseline for Northern Ireland. This results in an estimated 2.3% reduction Northern Ireland's projected total GHG emissions in 2030. This projection currently stands at 18 MtCO2e[6]. 5G-enabled avoided greenhouse gas emissions are therefore projected to be around 0.41 MtCO2e in 2030.

It is worth noting that Northern Ireland has considerably lower projected total GHG emissions in 2030 than the five countries in this study. However, the avoided emissions were derived from a wide range of 5G-Advanced use cases, including transport, manufacturing, agriculture, and energy. These are all sectors likely to see similar results in Northern Ireland.

This estimate is also supported by another study conducted by Accenture, 'Accelerating 5G in Canada' which found 5G could up to 2% of the total GHG emissions forecast in Canada in 2025.

The report we used for the basis of our economic analysis – DCMS' Realising the Benefits of 5G – also modelled the environmental impact of 5G. Their estimates ranged from roughly 5.5 MtCO2e to 17 MtCO2e per year by 2030[7]. Projected total emissions for the UK in 2030 is currently 312 MtCO2e according to Climate Action Tracker[8]. The report's estimates therefore vary from somewhere between 1.8% and 5.4% of 5G-enabled avoided greenhouse gas emissions. It therefore supports a 2.3% reduction in greenhouse gas emissions by 2030, as a realistic but conservative estimate of the environmental benefits of 5G to the Northern Ireland economy.

[1] https://www.ericsson.com/en/blog/3/2021/1/achieving-sustainability-with-energy-efficiency-in-5g-networks

[2] https://about.att.com/ecms/dam/csr/PDFs/10x-ProgressReport-2019.pdf

[3] https://www.bbc.co.uk/news/business-65842845

[4] https://news.virginmediao2.co.uk/archive/o2-reveals-vision-for-a-greener-connected-future-5g-to-play-key-role-in-building-a-greener-economy/

[5] https://5glab.orange.com/wp-content/uploads/sites/37/2021/05/5g-impact-2030.pdf

[6] https://www.daera-ni.gov.uk/news/northern-ireland-greenhouse-gas-projection-statistics-released

[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147979/realising_the_benefits_of_5G.pdf

[8] https://climateactiontracker.org/countries/uk/