5G could help reduce greenhouse gas emissions in Canada by up to 20% and deliver other environmental benefits.

5G Impact on the Environment

5G is a key factor in reducing greenhouse gas emissions. 5G and the services it enables could **reduce Canada's GHG emissions by up to 20%**. Many 5G use cases have commercial viability because they reduce energy requirements. As a result, GHG emissions will decline with the scaling up of these use cases, to the extent these energy requirements are currently met by burning fossil fuels.

Put simply, without universal connectivity to high-quality networks, Canada may be unable to meet its climate targets. Ways that 5G helps reduce GHG emissions include:

- Enabling smart transportation systems to reduce traffic congestion and improve flow;
- Enabling low-emissions remote work through 5G-enabled robotic operations and virtual reality delivered training;
- Optimizing the energy efficiency of buildings through connected sensors that continuously monitor and predict energy consumption requirements;
- Optimizing the performance of electricity systems through connected sensors to better match supply and demand and monitor energy losses during distribution;
- Reducing energy use in high-emitting sectors such as agriculture and manufacturing through sensors that monitor and optimize production processes; and
- Enabling telemedicine through remote diagnostics and imaging, and remote surgery.

A second environmental benefit of 5G is it will help feed a growing global population and advance sustainable agriculture and natural resources management practices. Sensor-enabled digital solutions applied to farm planning, field mapping, soil sampling and tractor guidance could help increase crop yields, while reducing pesticide and herbicide use, irrigation water use, and nitrogen runoff from fertilizer use, which damages marine ecosystems.

A third environmental benefit is improvement in waste management practices. Smart labelling technologies enabled by 5G could improve the sorting and diverting of recyclable material away from landfills. Similarly, technologies such as smart labelling and packaging could reduce food waste and help divert what does get spoiled from landfills to alternative destinations such as energy recovery.

Deployment of 5G will introduce new challenges that need to be managed. First is the need to operate 5G networks while minimizing the increase in energy consumption. Energy consumption has tended to increase with the introduction of previous network standards, such as from 3G to 4G. However, **5G itself is expected to reduce energy use on a per bit of data consumed basis by 85% to 90% from what 4G required**. Building 5G with precision will facilitate the optimization of network performance on the new 5G frequencies while keeping capital and operating expenditures within reasonable levels. This means service providers will be able to limit energy consumption growth when introducing 5G.

A second challenge is the increase in electronic waste that could occur as devices and sensors that utilize 5G networks become obsolete or non-functioning. Supporting the growth of e-waste recycling markets, finding new ways to divert e-waste from landfills, and reducing the toxicity of substances used in these devices are important steps for government, industry and stakeholders to undertake in partnership.

Policy recommendations

As a country with high quality networks and high per capita GHG emissions, **Canada has an opportunity to become a world leader in leveraging telecommunications and digital technologies to address the climate emergency**.

The federal government should take the lead by establishing telecom policies that explicitly connect 5G deployment and adoption to the objective of achieving net zero emissions in Canada. The federal government should take the following recommended actions:

- Establish spectrum policies to ensure the timely and cost-effective deployment of spectrum and support robust networks and connectivity (e.g., use-it-or-lose-it);
- Subsidize investment in telecom networks in high-cost, underserved regions, such as remote and Indigenous regions;
- Subsidize the adoption of telecom services in underserved populations, such as low-income communities and older adults;
- Incentivize digital adoption in GHG-intensive industries, such as transportation, mining, agriculture, and manufacturing; and
- Digitize the delivery of public services to reduce travel (e.g., telemedicine, remote learning)

5G should be included in climate action plans at all levels of government. Federal, provincial, and municipal governments should lead by example by integrating 5G adoption into their own pathways to achieving net zero emissions. They should also actively collaborate with industry operators to support their needs to reduce their emissions footprints through research and development partnerships, funding of demonstration projects and pilots, and encouraging diffusion of proven innovations.

Deployment of 5G solutions that reduce emissions should be measured, tracked and reported on to demonstrate the quantitative linkage between 5G use and GHG emissions.

Sources used to inform the figures in this brief are:

- Accenture. *Accelerating 5G in Canada: The Role of 5G in the Fight Against Climate Change*. 2020.
- FarrPoint. *Digital Policy and Climate Change Canada Study Report*. 2022

Deetken Insight was commissioned by TELUS to complete a comprehensive review of published research about 5G and its potential socio-economic impacts, with a particular focus

on Canada. This brief is based on that report. Access the full report including a bibliography here: https://deetken.com/socio-economic-impacts-of-5g/. We provide no opinion, attestation, or other form of assurance with respect to the completeness, accuracy, fair presentation, and findings from research of others that are presented in the report.

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