5G could generate annual cost savings of $2 billion for the Canadian energy sector by optimizing energy extraction and distribution, enabling decentralized electricity grids and smart home monitoring, and could reduce the sector's GHG emissions by 10%.

5G Impact on the Energy Sector

The energy sector in Canada accounts for approximately 9% of the nation's GDP and 1% of total jobs, yet the oil and gas and electricity sectors together account for approximately 35% of total GHG emissions in Canada. In comparison, emissions from the transportation sector, including airplanes, trains, trucks and passenger vehicles, account for 24% of total emissions.

5G is a foundational component for addressing the many and diverse challenges facing the energy sector, including reducing emissions, meeting increasing demand for affordable electricity, and addressing the connectivity requirements of an increasingly decentralized grid system.

There is a variety of 5G solutions which bring multiple benefits to the energy industry, including:

	Benefits			
	Improves electricity supply and demand management	Enables grid decentralization	Reduces carbon footprint of oil & gas extraction	Improves system resiliency and safety
Smart grids that leverage artificial intelligence and predictive analytics to automatically react to changes in power demand	●	●	●	
Smart meters that provide real-time data on consumption and enable demand shaping to optimize consumers' costs	●	●	●	
Supervisory control and data acquisition (SCADA) systems that proactively detect infrastructure faults and supply interruptions	●			●
Drone surveillance to manage physical security risks				●
Optimized and automated drilling to increase well production and reduce emissions			●	

The International Energy Agency (IEA) estimates that the overall savings from digital services enabled by ubiquitous 5G connectivity could reach approximately US$80 billion per year from 2016 to 2040 for the power generation and distribution sector alone, or about 5% of its total costs. **In Canada, 5G could generate approximately $1 billion to $2 billion in cost savings, as well as decrease emissions of oil and gas extraction activities by 10%, or about 3% of Canada's total GHG footprint.**

Policy recommendations

Fast tracking the deployment of 5G infrastructure to remote and rural areas is critical as that is where industrial energy production is concentrated, and household energy use is highest. To that end, the federal government should:

- Avoid the use of set-asides in auctions, which have not been successful in delivering connectivity to rural and Indigenous communities;
- Prioritize rural investment, using rural deployment conditions such as strong build-out requirements for remote areas and coverage obligations for households with no internet access; and
- Require companies to deploy spectrum within three years of purchase rather than treat it as a speculative investment.

Policies to **support adoption** are also critical. For example, the federal government should:

- Support the reskilling of the energy sector workforce for the digital economy through training programs designed for the sector and its subsectors (power generation, distribution, oil and gas extraction and distribution);
- Support the adoption of digital technologies such as smart home monitoring to help end users reduce their electricity use; and
- Cultivate digital innovation in the sector by supporting collaborations between the sector, technology providers and research institutions to design, build and test 5G-enabled solutions that address challenges faced by the industry.

Further, the subscription of 5G services should be measured, tracked, and reported, to demonstrate the quantitative linkages between 5G use and the industry's performance.

Sources used to inform the figures in this brief are:

- Grijpink, F. et al. *How Tapping Connectivity in Oil and Gas can Fuel Higher Performance*. McKinsey & Company, 2020.
- International Energy Agency. *Digitalization & Energy*, 2017.
- Statistics Canada

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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