



CANCONNECT

*Connecting Canadians for a Prosperous and Sustainable
Future for Generations to Come*

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Situation

- The future is data-intensive - the demand for fast and responsive internet outpaces our current infrastructure.
- Canada is not ready for the next generation of innovation in autonomous cars, energy management, smart cities and telemedicine.

Complication

- Canada's Internet is relatively slow and expensive.
- Rural Canadians are excluded from the benefits of digital transformation.
- Canada may lose competitiveness in innovation, technology and connectivity.

Resolution

- Improve coverage of internet in underserved areas
- Rapidly adopt 5G Internet
- Increase digital infrastructure spending
- Partner with government communities and industry



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Bruce, remote village in AB, Age: 21

He has to contend with slow and expensive internet - this limits connectivity to the outside world

He needs to drive far to see a specialist for his chronic condition

He does not have access to higher education since the closest school is a day's drive away



Stories of Three Canadians

Jordy, Windsor, ON, Age: 29

He was laid off from a local factory and wants to work in robotics, but there are no local jobs

He does not have access to retraining programs; he would have to study in another city

He cares about the environment and wants to use renewable energy instead of fossil fuels



Janice, Suburb in Montréal, QC, Age: 41

She has to commute 3 hours a day to support her family, but barely spends any time with them

She has no time to take online courses to improve her education and does not feel immersed in these virtual courses

She has to wait for months to see a specialist after her car accident





5G IN 5 STEPS

WHAT, HOW, WHY?

What is 5G?

TRANSFORMATIVE WIRELESS TECHNOLOGY

Fifth-Generation Wireless Broadband Technology

Compared to 4G:

1000 X faster

50 X less latency

1000 X more devices connected per meter

SUPER FAST AND RESPONSIVE

What is new about it?

LITERALLY EVERYTHING

Better productivity for all capable devices

Immediate data response - approaching real-time experience

Network stability - immersible virtual office experience

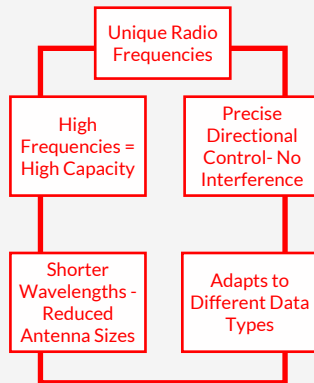
Bypass fixed lines - reduced cost and time to adopt

Fulfills the demanding requirements for new IoT technologies

IT'S GOING TO CHANGE OUR LIVES

How does it work?

FUNDAMENTALLY DIFFERENT THAN 4G



NEW DESIGN - NEW INFRASTRUCTURE

Where are we now?

HERE IS AN OPPORTUNITY

4G is at its technological limits

Canada has lowest Internet standards amongst OECD

1 in 5 Canadians do not have adequate access to internet (CRTC)

5G IS THE ANSWER

How do we get it soon?

WORKING TOGETHER

Increase R&D Support

Open the door to 5G test beds

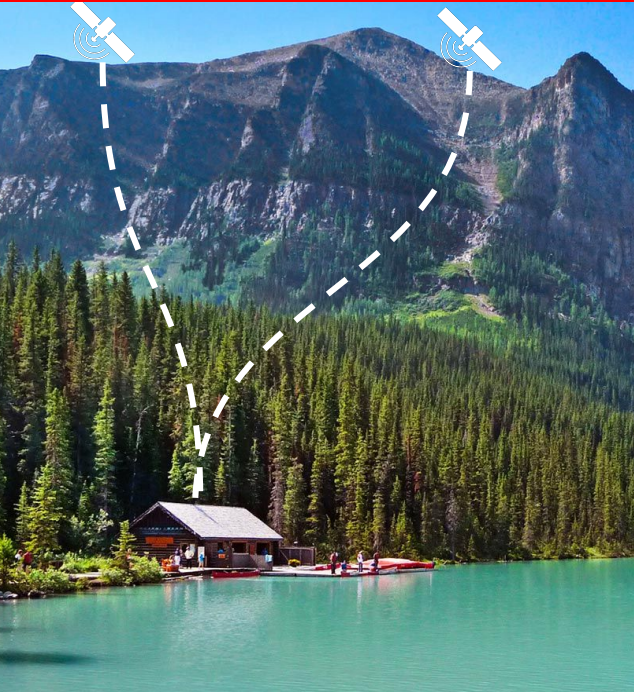
Government, academia and industry to partner together

Develop a comprehensive national strategy

NATIONAL TRANSFORMATION



A Crown Corporation that will oversee a comprehensive 10-year digital infrastructure strategy ensuring all Canadians are connected with 5G technology and exceptional internet speeds



For Underserved Communities

CANCONNECT will function as a wholesale network provider to connect Canadians to 4G and eventually 5G through low orbiting earth satellites by using government funding.



For 2nd Tier Cities

CANCONNECT will function as a wholesale network provider to connect Canadians to 5G by funding the capital cost of 5G infrastructure.



For Major Urban Centres

CANCONNECT will support rapid implementation of 5G by partnering with telcos to build the infrastructure.

CANADA: RICH IN LAND AND DIVERSE IN RESOURCES

We have three realms with unique challenges to connectivity

UNDERSERVED/UNCONNECTED COMMUNITIES

1

- Stable to declining population (natural attrition or urbanization)
- Low industrial activity, with zero to 3G or limited 4G LTE connectivity
- Within 50 - 500 km of UR and 2T
- Significant backbone upgrade necessary for 5G connectivity.

SECOND TIER CITIES AND URBAN CENTRES

2

- Not part of major urban centre metropolitan region
- Less than 550,000 population, within 500 km of UR, or have 3 other 2T's within 150km radius. Backbone requires major upgrade for 5G







MAJOR URBAN CENTRES

3

- Demonstrated growth and industrial capacity
- Backbone requires upgrading for 5G, or new backbone required



CANCONNECT

<p><u>Organization</u> </p> <p>Mandate:</p> <p>Regulated and directed by the CRTC</p> <p>Acting as the national telecom utility provider by coordinating the development of 5G and LEO satellites.</p> <p>Partnering with:</p> <p>Current and planned digital innovation clusters and initiatives</p> <p>ENCQOR - the proposed 5G test beds in Ontario and Quebec</p> <p>Industry leaders in 5G technology</p> <p>telcos to gather knowledge and expertise in exchange for discounted wholesale prices for services</p> <p>Programs such as the strategic innovation fund, to support satellite technology</p> <p>Local municipalities and provincial governments that have independently planned a 5G network</p>	<p><u>Activities</u> </p> <p>In scope:</p> <p>Provides multi-level coordination and development of 5G technology and LEO satellites</p> <p>Fund and support 5G and LEO R&D</p> <p>Fund and build backbone digital infrastructure</p> <p>Work with stakeholders to fast-track infrastructure upgrade</p> <p>Provide 4G LEO capability to Underserved regions with capability</p> <p>Upgrade to 5G once technology matures</p> <p>Wholesaling to ISPs</p> <p>Out of Scope:</p> <p>Operate and maintain retail digital infrastructure</p> <p>Provide retail 5G internet services</p>	<p><u>Value Proposition</u> </p> <p>Full 5G connectivity for 2T regions and full 4G/5G connectivity for Un regions</p> <p>Closing the gap in our “2-speed” economy</p> <p>Fostering opportunities for 2T and Un customer segments to participate in the knowledge economy</p> <p>LEO satellites to provide backup connectivity for government and emergency services if 5G network is down</p> <p>Enable IOT (internet of things) - autonomous cars, energy management, smart cities and telemedicine.</p> <p>Industries to benefit from increased economic activity, skilled workforce and competitiveness</p>	<p><u>Customers</u> </p> <p>All Canadians will be served directly or indirectly by CanConnect</p>	<p><u>Resources</u> </p> <p>Capital investment from the Canada Infrastructure Bank</p> <p>Federal government to direct CanConnect’s mandate through Infrastructure Canada</p> <p>Governments and regulatory agencies expedite/fast-track approval process for 5G implementation and 4G LEO</p>
		<p><u>Stakeholders</u> </p> <ul style="list-style-type: none"> • Telcos • Education and Academia • Healthcare • Provincial Governments • Local Governments • Industry Groups • High-Tech • Banking • Manufacturing 		

Revenue Stream 

1. Wholesale service fees collected from ISPs
2. \$2 per month CanTax per internet bill fee
3. CRTC fee for internet services at 0.56% of telecom revenues
4. CanConnect addition to Municipal Levy
5. Infrastructure Levy (Federal)
6. Additional: Revenue from international service from LEO Satellites

Cost Structure

1. R&D Costs for 5G & Leo Satellites
2. Capital expenditure for 5G
3. Cost of Production and Launch of Leo Satellites
4. Cost of infrastructure maintenance and operations
5. Cost of infrastructure upgrade and rehabilitation


CANCONNECT

ECONOMIC AND SOCIAL IMPACTS

What is in it for Canada?

Short-Term benefits



Improved quality of life

Better access to education, healthcare and resources | Reduce commute and travel times



Increased economic activities

Enables growth of new markets in autonomous vehicles and renewable energy | Productivity improves and supply chain bottlenecks diminish



Increased tax revenue

More economic activities = more tax revenue



Reduced cost of services

Healthcare and education savings from reduced spending in remote regions | savings can be used elsewhere



Reduced regional disparity

"two-speed economy" no longer a reality and prosperity can be experienced by all Canadians regardless of where they live

Long-Term benefits



Stimulate telecom and tech R&D



Encourage foreign direct investment



Establish Canada as a leader in telecom and tech



Provide a platform for >6G network upgrades



\$71.75B increase in GDP



\$127B autonomous vehicle market by 2027 growing at 40% CAGR

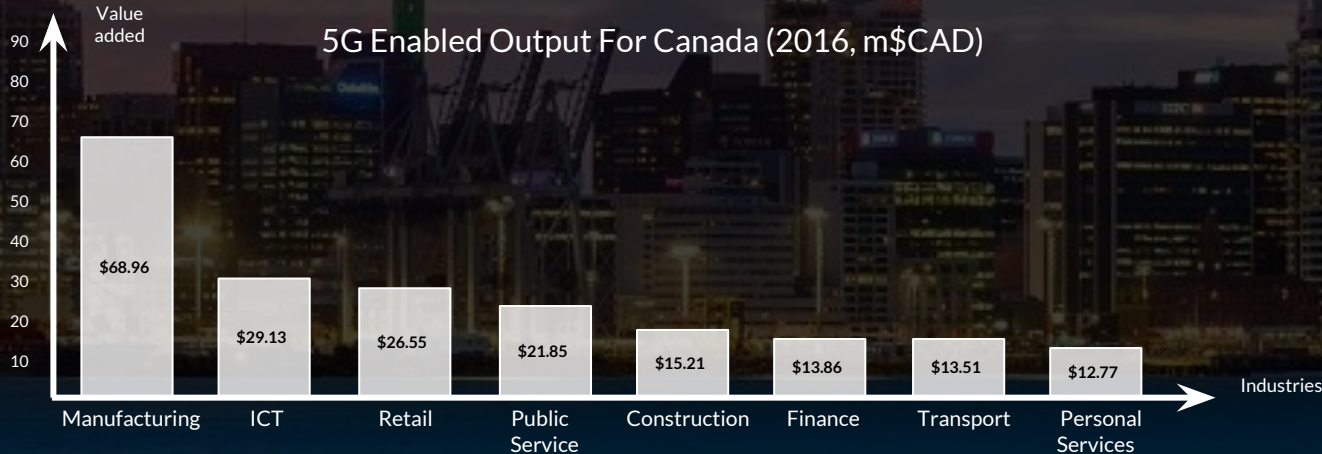


Creation of 377,000 new jobs by 2035



For Canada, \$250B revenue increase across a broad range of industries

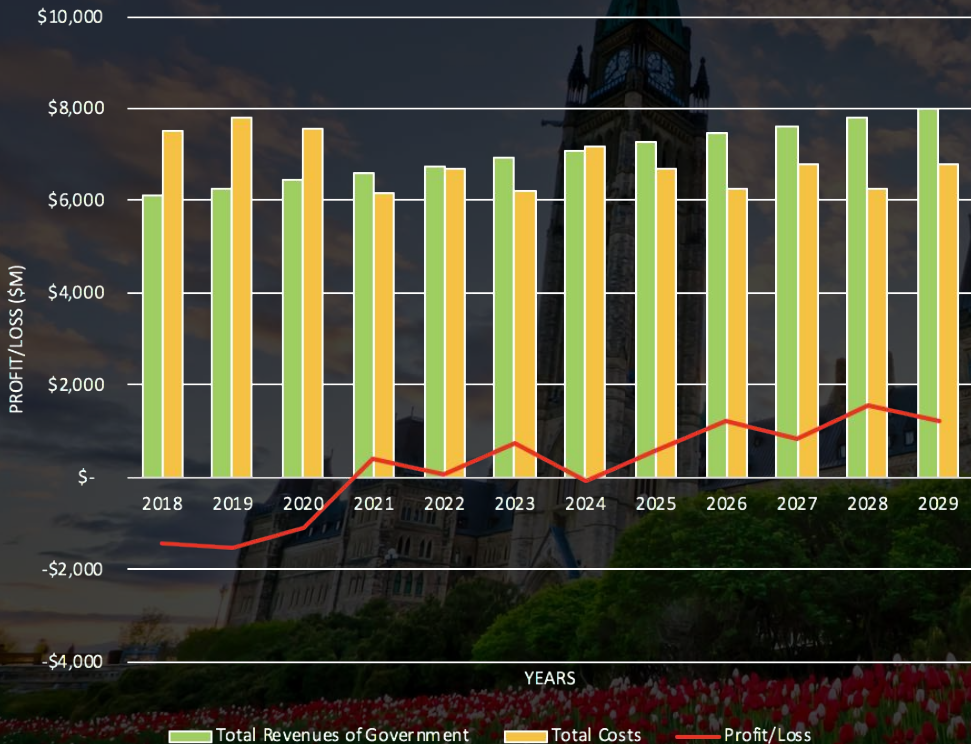
5G Enabled Output For Canada (2016, m\$CAD)



* References and calculations available upon request.

FINANCIAL MODEL

PROFIT/LOSS



Total Revenues
\$ 84.4 B

Total Costs
\$ 82 B

Total Profits
\$ 2.4 B

Profits:

- Losses until 2021 as CANCONNECT makes major investments
- Post 2024, continual profits for the agency.
- 10 year plan recoups all losses and makes a \$2.4 billion profit for Canadians (red line)

Costs:

- Costs include initial set up, R&D, 5G Capex, urban and rural infrastructure, and LEO satellites
- Costs are between \$6-8 billion per year, higher initially, and then lowering (yellow bar)

Revenues:

- Revenues include CRTC internet levy, fixed levy, municipal levy, infrastructure usage levy, and wholesale fees
- Wholesale fees alone will contribute \$4 billion at the beginning, growing each year until 2029 when it reaches \$8 billion (green bar)

KEY PLAYERS AND STAKEHOLDERS

Media

Leverage the use of **traditional and social media** for marketing and support; positive and fact-based advertising of the project, the infrastructure, its progress and benefits to Canadians.

Research and Education

Academia, and private Canadian research facilities to ensure leading edge technology is investigated, designed, tested, suitable and available for **CANCONNECT** to deliver optimal levels of service to Canadians. Leverage global support for potential partnerships and research agreements.

Government and Public Institutions

Federal, Provincial, Territorial, and municipal governments and public institutions that serve Canadians would be key stakeholders for **CANCONNECT**'s success. With government support, **CANCONNECT** would enable Canadians to access the benefits of digital infrastructure through appropriate procurement, bundling and packaging of ISP & 5G services. Hospitals, grade schools, and universities would improve their services. All of **CANCONNECT**'s activities would be overseen by the CRTC.

Communities

Providing **equal levels of internet service** to all communities is a goal of **CANCONNECT**. Working together, with the Government of Canada, **connecting these communities** will help improve quality of life and create new opportunities for everyone, especially our young talents. From local Chambers of Commerce and industry, to hockey clubs, the Royal Canadian Legion, charities and Seniors associations - all will benefit from **CANCONNECT**..

Industry

Industry buy-in is critical. From high-tech and telecom to manufacturing, education, healthcare and transportation - all will benefit from **CANCONNECT** infrastructure. Their inputs regarding the design, delivery, implementation and ongoing improvements are essential to achieve the project's goals.

You and I

With all the fast-paced changes around us, **CANCONNECT** assures all Canadians that **reliable internet and up-to-date information** is still possible, even with more devices. This backbone infrastructure will make Canada the world leader in connectivity for its people.

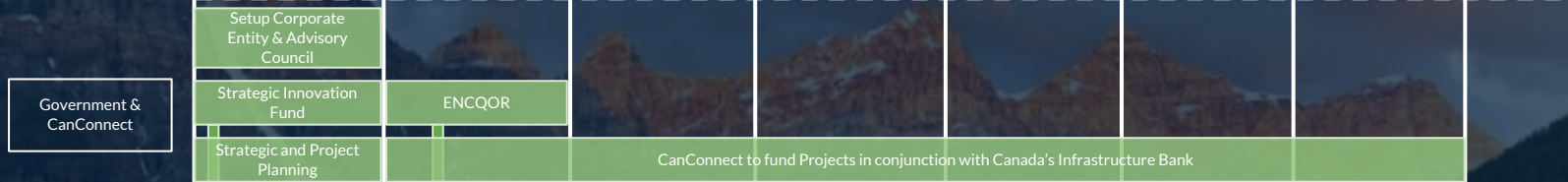


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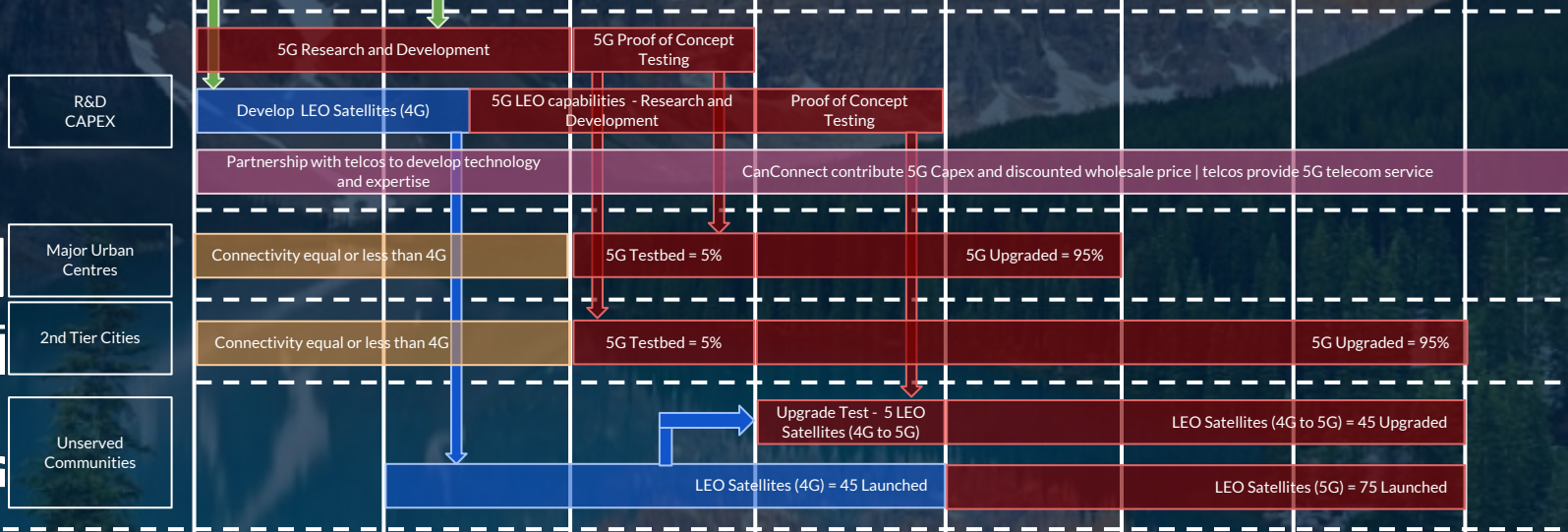
ROADMAP



	2017	2018	2019	2020	2022	2024	2027	2029
Targets								
5G Connectivity	0%	0%	2%	20%	50%	80%	90%	95%
>50 Mbps Coverage	82%	82%	85%	88%	90%	93%	97%	99%



With CANCONNECT



Without CANCONNECT





WHAT WILL CANCONNECT ADD TO OUR LIVES?

Nationwide 5G, what is so awesome about it?

Bruce, remote village in AB, Age: 21



- He can pursue his business degree virtually from UBC
- He has access to business knowledge and support from the online community
- He can virtually see his specialist located 500 km away on a weekly basis

Jordy, Windsor ON, Age: 29



- He will be attending engineering school by using online augmented reality
- He has industry expertise and will open his own company locally.
- His local community will be powered by intelligently managed renewable energy microgrid

Janice, Suburb of Montréal QC, Age: 41



- She can work from home and run her errands from a 5G connected autonomous vehicle
- She can be actively engaged in her virtual classes and will complete her degree.
- She can see her specialist online without leaving her home



Smart Wearables



Entertainment



Smart Mobility



Smart Cities - Connected Houses



Smart Parking



Smart Grids



TeleMedicine



Increased Security and Surveillance



Equality of Reaching to Opportunities



Smart Utility Management