NORTHERN B.C. CONNECTIVITY BENEFITS STUDY

PREPARED FOR MINISTRY OF CITIZENS' SERVICES
BY BC STATS

BRITISH COLUMBIA | BCStats

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EXECUTIVE SUMMARY

The Northern B.C. Connectivity Benefits Study examines the economic impact of provincial investment in connectivity for the northern region of British Columbia. This study analyzes the short- and long-term economic impact of provincially funded connectivity infrastructure in the region using economic modelling to estimate the anticipated benefits to the North and province. This study builds on the economic benefits study for the Kootenay region, released in 2022.

Overall results echo the findings from the Kootenay study. Funding to support the expansion of high-speed internet to underserved rural areas can have positive short- and long-term impacts to B.C.'s Gross Domestic Product (GDP) for the northern region and for the province. A breakdown of the investment and economic benefits of high-speed internet expansion for the northern region and the province are as follows:

- The region received **$38.4 million** for connectivity infrastructure between 2017 and 2022 from the Province through the Connecting British Columbia program. This supported 37 connectivity projects (some complete or in progress at report publication) which will benefit over 7,500 households.
- This $38.4 million in provincial funding leveraged approximately $95.2 million from other sources, which equals **$133.6 million** in funding for internet projects in the region.
- This leveraged funding is from private sector internet service providers who build and operate the infrastructure, as well as public sector organizations (for example the federal government). It equates to a funding ratio of **$1** of provincial funds, to **$3.48** of total private and other public sector investment leveraged to support rural connectivity expansion for the region.

[1]Estimated households benefitting is calculated as 95 per cent of pseudo household served by high-speed internet projects in the study area. The Pseudo-Household Demographic Distribution is a geospatial representative distribution of demographic data (population and households) derived from the Canadian Census from Statistics Canada. For more information: https://open.canada.ca/data/en/dataset/b3a1d603-19ca-466c-ae95-b5185e56addf.

RURAL ECONOMIC BENEFITS FOR THE NORTH

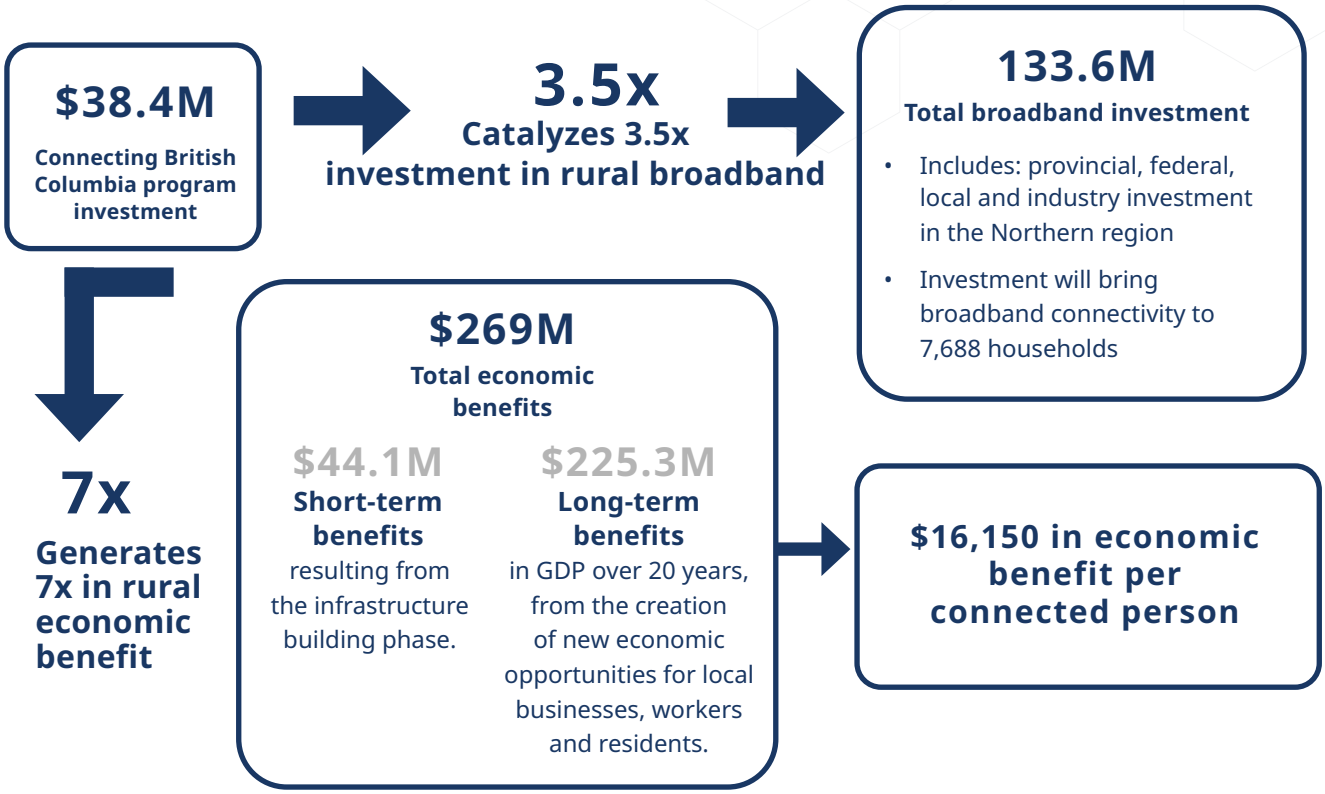


Figure 1: Summary of rural economic benefits of connectivity for the North

- Short-term economic benefits (defined here as the construction phase and the building of the infrastructure) are summarized as:
  - For the North:
    - **$22.2 million** increase in GDP.
    - **195 new jobs**.
    - **$1.3 million** in municipal tax revenue.
  - For B.C. (including the North):
    - **$44.1 million** increase in GDP.
    - **382 jobs**.
    - **$7.3 million** in provincial tax revenue.
- Long-term impacts (defined here as increased GDP because of increased productivity from improved access to high-speed internet services) are estimated at **$225.3 million** in increased GDP over 20 years for B.C.

In total, it is estimated that the initial provincial investment of $38.4 million in connectivity in the northern region will generate **$269.4 million** in short- and long-term economic benefits to the province and the region. This translates into:

- **Seven times** the initial provincial investment; and
- A **$16,150 benefit per connected person** for newly connected households within a 20-year time span (Figure 1).

BACKGROUND

Access to high-speed internet is foundational to economic and social equity and prosperity. However, the cost of bringing these services to isolated rural and remote communities and First Nations in B.C. can be prohibitively high for private sector service providers. The federal and provincial governments have responded with funding programs such as the Universal Broadband Fund and Connecting British Columbia to help support the cost of infrastructure required to deliver high-speed internet services to these areas.

In March 2022, the provincial and federal governments announced a joint investment of up to $830 million to support expanding high-speed internet services to every community in B.C. by 2027. This funding builds on prior investments, and supports the most recent funding program, Connecting Communities BC.

To better understand the economic impact of connectivity projects, a model was needed to estimate the short- and long-term impacts of investments for rural communities. While academic literature provides some frameworks to analyze connectivity benefits, many existing studies take a whole economy approach and aggregate rural and urban results.

In 2021, the Province hired Deloitte to develop an economic framework through which the value of rural broadband connectivity could be measured, understood and included in future evaluation of project benefits. In 2022, BC Stats built on Deloitte's framework with the Kootenay Connectivity Benefits Study examining the short- and long-term economic impacts of rural connectivity infrastructure spending in that region.

This report is the second in a five-part series that examines the economic benefit of provincial connectivity spending in rural areas of B.C.

PROFILE OF THE NORTH

Northern B.C. is unique due to its large land mass and limited population and urban centres. Larger than the state of California, the northern region stretches from Prince George up to the Yukon/Alaska border, and features sweeping valleys and mountainous terrain. As the region lies to the north of the province, the area can experience harsh weather in the winter, compared to the rest of B.C., which makes build seasons shorter for installing infrastructure.

The northern study considers three economic regions including the North Coast, Nechako and Northeast (see Figure 2).

With a total population of over 160,000, and a vast land mass of over 515 square kilometres, the North is quintessentially a rural region with fewer densely populated urban centres, allowing for a study on the economic impacts of connectivity expansion within a rural context. For details on population and land size of the North, see Figure 3.

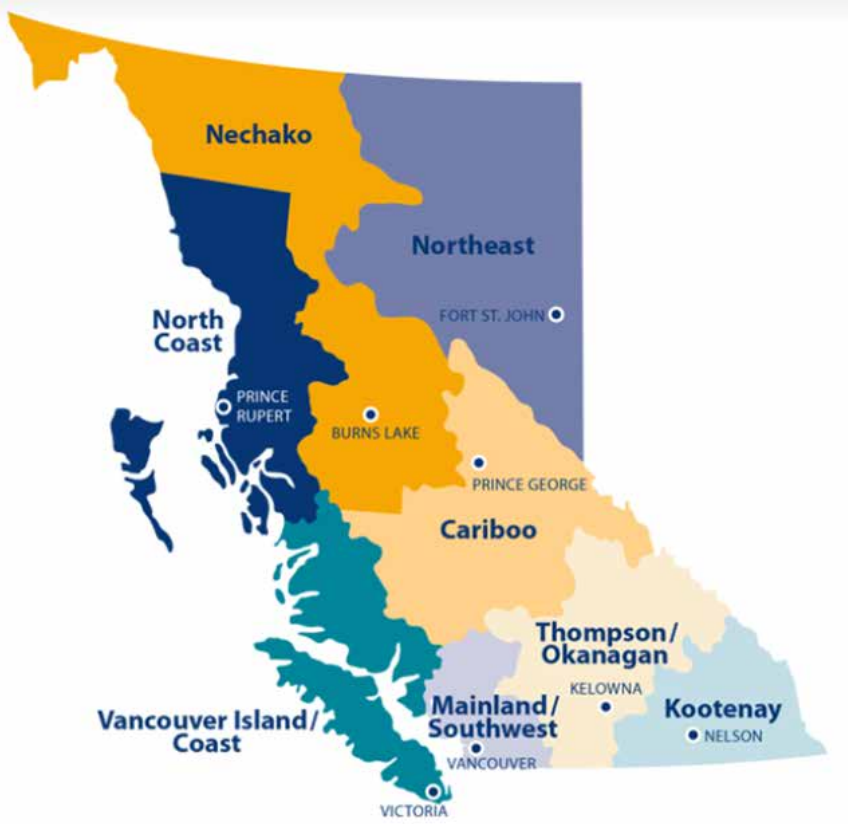


Figure 2: B.C. economic regions

	Total population[2]	Land area in square km[2]	Population density per square km[2]	Total private dwellings per square km[2]
Nechako economic region	**38,420**	**191,612**	**0.2**	**0.1**
North Coast economic region	**55,971**	**124,018**	**0.5**	**0.2**
Northeast economic region	**66,010**	**202,076**	**0.3**	**0.2**
North (combined economic regions)	**160,401**	**517,705**	**0.3**	**0.1**

Source: Statistics Canada Census Profiles[2]

Figure 3: Northern region population density

[2]Statistics Canada 2021 Census

The northern region is incredibly diverse. It comprises six regional districts: North Coast; Kitimat-Stikine; Bulkley-Nechako; Peace River; Stikine Region and Northern Rockies Regional Municipality, as well as 49 First Nation communities. Much of the population resides in the southern portion of the region. A breakdown of population centres, regional districts and First Nation communities in the North is in Figure 4.

	Population centres[3]	Regional districts	First Nation communities[4]
Nechako economic region	Smithers, Burns Lake and Vanderhoof	Bulkley-Nechako and Stikine Region	Binche Whut'en, Cheslatta Carrier Nation, Daylu Dena Council, Dease River, Lake Babine Nation, Nadleh Whut'en, Nak'azdli Whut'en, Nee-Tahi-Buhn, Saik'uz First Nation, Takla Lake First Nation, Taku River Tlingit, Ts'il Kaz Koh (Burns Lake Band), Wet'suwet'en First Nation, and Yekooche First Nation
North Coast economic region	Prince Rupert, Kitimat and Terrace	North Coast and Kitimat-Stikine	Gingolx Village Government, Gitanmaax, Gitanyow, Gitga'at First Nation, Gitlaxt'aamix Village Government (New Aiyansh), Gitsegukla, Gitwangak, Gitwinksihlkw, Glen Vowell, Hagwilget First Nation Government, Haisla Nation, Iskut, Kispiox, Kitasoo, Kitselas, Kitsumkalum, Lax Kw'alaams, Laxgalts'ap Village Government, Metlakatla, Old Massett Village Council, Skidegate, Tahltan Nation, and Witset First Nation
Northeast economic region	Fort St John, Dawson Creek, Fort Nelson	Peace River and Northern Rockies Regional Municipality	Blueberry River First Nations, Doig River, Fort Nelson, Halfway River First Nation, Kwadacha, Prophet River Band, Dene Tsaa Tse K'Nai First Nation, Saulteau First Nations, Tsay Keh Dene Nation, and West Moberly First Nations
North (combined economic regions)	Smithers, Burns Lake, Vanderhoof, Fort St John, Prince Rupert, Kitimat, Terrace, Dawson Creek, Fort Nelson	Bulkley-Nechako, Stikine Region, North Coast, Kitimat-Stikine, Peace River and Northern Rockies Regional Municipality	49 First Nation communities within Nechako, North Coast and Northeast economic regions

Figure 4: Breakdown of northern region by population centre, regional district and First Nation communities

[3]Trade and Invest British Columbia

[4]BC Assembly of First Nations

METHODOLOGY

This study examines the economic impact of high-speed internet projects funded by the Province in the northern region of B.C. between 2017 and 2022. The analysis is based on 37 connectivity projects, which include both transport and last-mile internet projects to the home.[5]

For an accurate analysis, this study narrows its geographical focus to four regional districts in the area with provincial connectivity investments and a higher population density. These are: the North Coast; Kitimat-Stikine; Bulkley-Nechako; and Peace River regional districts. Narrowing the focus of the analysis enables a more accurate measurement of the economic impact of provincial investment in connectivity to a defined region. The area of study is outlined in dark blue in Figure 5.

The analysis on economic impacts was completed using available project spending data, local economic data, and existing empirical relationships between spending and economic impact, to establish measurement frameworks and estimates of short- and long-term impacts.[6]

[5]All projects in the analysis occurred in the four regional districts. Transport (or backbone) infrastructure consists of high-capacity lines (generally fibre optic) that can transmit large amounts of data from Internet Exchange Points in major cities, such as Vancouver, Calgary or Seattle, to community points.
Last-mile infrastructure connects from a service provider's community point of presence to households. Last mile can be achieved using multiple technologies including both wireless and wire methods, such as fibre, digital subscriber lines (DSL), coaxial cable and fixed wireless.

[6]Project spending data includes the commodities and services that will be purchased to complete the project in each year of construction. Local economic data includes labour force, population, tax, immigration, business and other available data. Existing empirical relationships are derived from the BC Input Output Model (BCIOM) and the supply use tables from Statistics Canada.

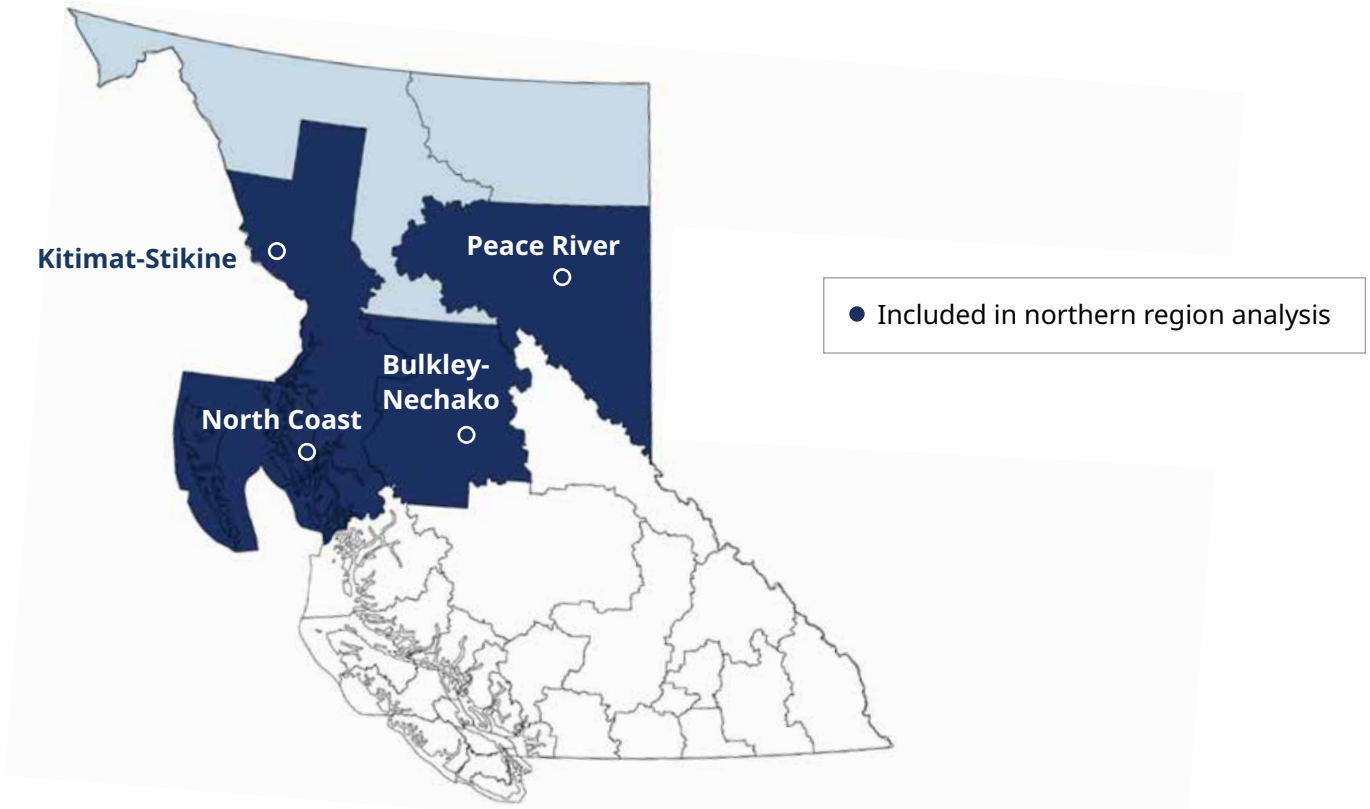


Figure 5: Northern region (with area of study in dark blue)

Assessing short-term impacts

High-speed internet expansion projects, like any infrastructure project, contribute to the local economy in the short term by creating demand for products and services required to deliver the project during the initial build phase. BC Stats worked with the Connectivity Division in the Ministry of Citizens' Services to identify 37 high-speed internet projects in the northern region to use for the analysis.

The projects were selected based on the criteria they:

- received Connecting British Columbia funding between 2017 and 2022; and
- took place in the proposed regional districts in the North.

Some projects span multiple regional districts, including outside the northern region. The Connectivity Division provided ratios to support BC Stats in proportioning the expected amount of spending for each project in the defined study area.

BC Stats used the BC Input-Output Model (BCIOM – see Appendix B) to estimate short-term impacts for the local economy and the province. The BCIOM is designed based on Statistics Canada supply use tables.[7] It is a macroeconomic modeling tool that allows economists to estimate the impacts of increased industry spending on the economy of the region, and province.

The model estimates these impacts at three levels: direct, indirect, and induced as detailed below:

- **Direct impacts** are related to the direct spending on the project. These impacts occur because of purchasing material inputs for the project and paying wages to the employees that are building the infrastructure or doing the engineering design if they are employed directly by the company.
- **Indirect impacts** include money that is spent by contractors on wages and the goods they purchase. This would include an external firm contracted to design or build a piece of infrastructure.
- **Induced impacts** come from the spending of the employees building the project in the local economy. For example, if a construction employee takes a break from laying fibre lines and goes to a local establishment for lunch, the money spent on lunch is an induced impact from the project.

[7]More information about Statistics Canada supply use tables is available at this link: https://www150.statcan.gc.ca/n1/pub/13-607-x/2016001/1067-eng.htm

Assessing long-term impacts

By creating new economic opportunities for local businesses, workers and residents, the provision of new high-speed internet services can contribute to stronger economic growth for years after the construction phase is complete and internet services are live. To describe this impact, BC Stats uses empirical relationships established in economic literature, to develop an approach to estimate the long-term economic impacts of the projects in scope of this study. Four different studies were analyzed to inform the impact on GDP of increased high-speed internet availability (listed in Appendix A).

BC Stats estimates:

- An increase of 10 percentage points in the number of broadband subscriptions would contribute 1.23 per cent to GDP per capita growth.[8] This formula is then applied to the increase in households with access to high-speed internet, resulting from projects funded by the Connecting British Columbia program.
- The calculation is done in terms of net present value of resultant GDP Growth.[9] For this approach, a social discount rate of three per cent was used based on Government of Canada data.[10] The social discount is used to adjust future costs and benefits to values in current terms.

A key assumption for this approach, based on data from the Connectivity Division, is that 95 per cent of the households benefiting from the projects would subscribe to the new service once available. GDP data produced by Statistics Canada for sub-provincial geographies[11] was not available at a detailed enough level to use in this analysis but suggests that GDP growth happens in B.C. at a rate relatively in line with population share. Figure 6 shows the productivity impact of high-speed internet services over a 20-year time frame.

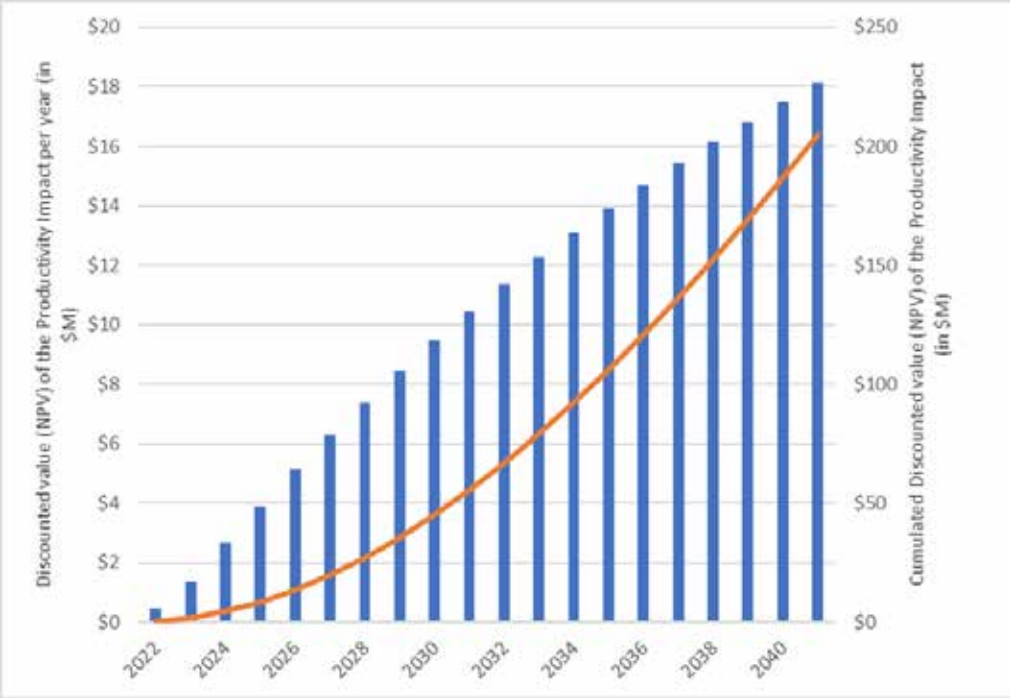


Figure 6: Productivity impact from the increase in access to high-speed internet services

[8]This estimate is developed by BC Stats based on the studies listed in Appendix A.

[9]Net present value is a calculation of the value of future dollars in the current year. This is derived by applying a social discount rate to future productivity increases to reflect the value of those increases as a current value.

[10]Government of Canada. https://www.canada.ca/en/government/system/laws/developing-improving-federal-regulations/requirements-developing-managing-reviewing-regulations/guidelines-tools/cost-benefit-analysis-guide-regulatory-proposals.html

[11]Statistics Canada. Table 36-10-0468-01 Gross domestic product (GDP) at basic prices, by census metropolitan area (CMA) (x 1,000,000)

RESULTS

The study concludes that from an initial provincial investment of **$38.4 million**, a total economic benefit to GDP over a 20-year timespan is estimated at **$269 million**. This initial provincial investment is thus multiplied **seven times** in long-term returns for the rural economy and for B.C.

A breakdown of the investment and economic benefits of high-speed internet expansion for the North and the province is as follows:

- The region received **$38.4 million** for connectivity infrastructure between 2017 and 2022 from the Province through the Connecting British Columbia program. This funded 37 connectivity projects (some complete or still in progress at report publication) which will benefit over 7,500 households.
- This $38.4 million in provincial funding, leveraged approximately $95.2 million from other sources, which totals **$133.6 million** for internet projects in the region.
- This leveraged funding is from private sector internet service providers who build and operate the infrastructure, as well as public sector organizations (for example the federal government). It equates to a funding ratio of **$1** of provincial funds, to **$3.48** of total private and public sector investment leveraged to support rural connectivity expansion for the region.
- In total, it is estimated that the initial provincial investment of $38.4 million in connectivity in the northern region will generate **$269.4 million** in short- and long-term economic benefits to the province and the region.

Short-term economic benefits

As a result of the construction phase of the projects, BC Stats estimates short-term impacts will increase GDP in the province by $44.1 million. These short-term impacts (defined here as benefits during the construction phase and the building of the infrastructure) also increase income earned by workers (labour income), add jobs to the economy, and increase tax revenue both locally and provincially. For the North impacts are estimated to be:

- **$22.2 million** increase in GDP.
- **$12.6 million** increased labour income.
- **195 new jobs**.
- **$1.3 million** in municipal and regional district tax revenue.

For B.C. (including the North) impacts are estimated to be:

- **$44.1 million** increase in GDP.
- **$25.4 million** increase in labour income.
- **382 new jobs**.
- **$7.3 million** in provincial tax revenue.

A further breakdown of short-term economic impacts is in Figure 7.

	Estimated economic contribution in the northern region			Estimated economic contribution in the rest of B.C.		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Business expenditure	**$86.4M**	**$5.1M**	**$12.7M**	**$19.0M**	**$24.5M**	**$147.7M**
GDP	**$15.2M**	**$2.4M**	**$4.6M**	**$8.6M**	**$13.2M**	**$44.1M**
Labour income	**$9.5M**	**$1.4M**	**$1.7M**	**$5.2M**	**$7.6M**	**$25.4M**
Employment – Full Time Equivalent (FTEs)[12]	**117** FTEs	**17** FTEs	**32** FTEs	**63** FTEs	**83** FTEs	**312** FTEs
Employment – number of jobs	**131** Jobs	**21** Jobs	**42** Jobs	**77** Jobs	**111** Jobs	**382** Jobs
Gov't revenues – provincial taxes	**$4.6M**	**$189,000**	**$689,000**	**$695,000**	**$1.2M**	**$7.35M**
Gov't revenues – municipal and regional taxes	**$1.03M**	**$42,000**	**$260,000**	**$167,000**	**$523,000**	**$2.0M**

Figure 7: Short-term economic impacts[13]

[12]Full time equivalent (FTE) is a translation of all part-time and seasonal jobs to a full year, full-time job. The number of jobs above will be total roles that need to be filled, some of which will be part time or seasonal.

[13]Numbers in the table are rounded.

Long-term economic benefits

Long-term economic impacts of new connectivity infrastructure for the North are estimated over a 20-year period using methodology outlined on page 13. Based on new high-speed internet services available in the region, BC Stats estimates that productivity growth over 20 years after project completion will result in a **$225 million total increase in GDP**. This estimate describes a net present value of the impact on GDP growth in the northern region and the province combined.

The short- and long-term economic benefits for the region total **$269 million**. That is **seven times** the return on the initial provincial investment in the region of **$38.4 million** and equates to a **$16,150 benefit per connected person** for newly connected households within a 20-year time span.

Assumptions and limitations to the study

The assumptions and limitations behind this analysis include the following:

- Some budget items such as GST are not included in the expenditure data used for the model.
- This analysis is based on an input-output methodology and therefore estimates "gross" contribution to the economy, which does not account for the opportunity cost of employing capital and labour in alternative ways. It is subject to the standard assumptions and limitations applicable to Statistics Canada's Input-Output multipliers and BC Stats Input-Output model (see Appendix B).
- Given that the expenditures are for infrastructure deployment in the region, all the direct economic contributions are considered to accrue to the region, while the input-output analysis allocates impacts for the indirect and induced contribution estimates to regions across the province as determined by the economic structure of the province.
- The number of households benefitting is calculated as 95 per cent of estimated households served by new internet services. The Province uses a pseudo household model to estimate the number of households served from projects in an area.
- Some under counting may have occurred in indirect and induced impacts attributed to the northern region because of the model limitations related to regional analysis. These impacts will show in the rest of B.C. total.
- Some data availability limitations also exist, such as lack of GDP data at the sub-provincial level. Therefore, the GDP per capita and the GDP per capita growth rates for the northern region is assumed to be the same as at the provincial level.

REGIONAL STUDY COMPARISON

The Northern B.C. Connectivity Benefits Study shows both similarities and divergences from the initial Kootenay Connectivity Benefits Study. This section examines these and explores some reasons why the two studies differ.

A primary similarity between the studies is that the province's connectivity investment in both the Kootenays and the North delivers substantial returns for the regions and the rest of B.C. For the North, this return is **seven times** the initial provincial investment in the long-term, creating significant economic impacts for the local economy and provincial GDP. For the Kootenay region, this return is **14 times** the initial investment in the long term. Some of the key metrics from both studies are outlined in Figure 8. A graphic representation of the findings for both studies is in Figure 9.

Estimate	Northern region	Kootenay region
BC investment ($million)	**38.4**	**19.4**
Total investment ($million)	**133.6**	**105.1**
Investment leveraged per dollar of provincial investment	**3.48**	**5.43**
Total multiplied return on initial investment	**7 x**	**14 x**
Total population	**160,401**	**161,557**
Total land area (km^2)	**527,705**	**57,673**
Population density (per km^2)	**0.3**	**2.8**
Private dwellings (per km^2)	**0.1**	**1.5**
Regional increase in GDP short-term ($million)	**22.2**	**56.2**
Total increase in GDP short-term ($million)	**44.1**	**66.5**
GDP as ratio of investment short-term	**0.33**	**0.63**
GDP as ratio of investment long-term	**1.69**	**2.04**
Total economic benefit from initial investment ($million)	**269**	**281**
Households with new access	**7,688**	**10,574**
Economic benefit per newly connected person ($)	**16,150**	**14,800**

Figure 8: Comparison of Northern and Kootenay regions features and impacts

RURAL ECONOMIC BENEFITS FOR THE NORTH

$38.4M
Connecting British Columbia program investment

3.5x
Catalyzes 3.5x investment in rural broadband

133.6M
Total broadband investment

- Includes: provincial, federal, local and industry investment in the Northern region
- Investment will bring broadband connectivity to 7,688 households

7x
Generates 7x in rural economic benefit

$269M
Total economic benefits

$44.1M
Short-term benefits
resulting from the infrastructure building phase.

$225.3M
Long-term benefits
in GDP over 20 years, from the creation of new economic opportunities for local businesses, workers and residents.

$16,150 in economic benefit per connected person

RURAL ECONOMIC BENEFITS FOR THE KOOTENAYS

$19.4M
Connecting British Columbia program investment

5x
Catalyzes 5x investment in rural broadband

105M
Total broadband investment

- Includes: provincial, federal, local and industry investment in the Kootenay region
- Investment will bring broadband connectivity to 10,574 households

14x
Generates 14x in rural economic benefit

$281M
Total economic benefits

$67M
Short-term benefits
resulting from the infrastructure building phase.

$214M
Long-term benefits
in GDP over 20 years, from the creation of new economic opportunities for local businesses, workers and residents.

$14,800 in economic benefit per connected person

Figure 9: Graphic comparison of Northern and Kootenay economic benefits

Study comparison conclusions

The study finds the overall return on provincial investment in the North is lower than in the Kootenay region. This can be attributed to a variety of factors:

- **Population density** — While the two areas have similar populations, the northern region is geographically larger and has a much lower population density than the Kootenay region. The Kootenay region has eight times the population density and 15 times the number of households per square kilometre than the North (see Figure 8). This means fewer potential customers for internet services per square kilometre in the North, which makes it more expensive per capita for terrestrial builds, including broadband and cellular infrastructure.[14]
- **Land area** — As stated, the northern region is geographically vast and covers over three times the land area than the Kootenay region. This means building internet infrastructure in the North requires more resources, including additional cable, equipment, and personnel hours, to install and maintain the infrastructure.[15] This increases the overall cost of building internet infrastructure in the North.
- **Environmental factors** — The northern region is characterized by more rugged terrain, harsher weather conditions, and other environmental factors that make it more difficult and costly to install and maintain internet infrastructure than other regions of the province. For example, weather conditions, such as extreme cold, can lead to a shorter build season, making terrestrial installations more costly.

[14]Oyana, T. J. (2011). Exploring geographic disparities in broadband access and use in rural southern Illinois: Who's being left behind?. Government Information Quarterly, 28(2), 252-261.
[15]Minamihashi, N. (2012). Natural monopoly and distorted competition: Evidence from unbundling fiber-optic networks.

APPENDIX A: ACADEMIC STUDIES

Ericsson, Arthur D. Little, Chalmers University of Technology. (2013). *Socioeconomic effects of broadband speed*. Retrieved from Arthur Little.

Katz, R., & Jung, J. (2021). *The economic impact of broadband and digitization through the COVID-19 pandemic*. Geneva: International Telecommunications Union.

Minges, M. (2016). *Exploring the relationship between broadband and economic growth*. World Development Report 2016.

Toader, E., Firtescu, B. N., Roman, A., & Anton, S. G. (2018). Impact of information and communication technology infrastructure on economic growth: an empirical Assessment for the EU countries. *Sustainability*, 1-22.

APPENDIX B: B.C. INPUT-OUTPUT MODEL

Overview of the B.C. Input-Output Model

BC Stats maintains an input-output (IO) model based on the structure employed by Statistics Canada. The IO model is updated annually by BC Stats using the most up-to-date data from Statistics Canada. Starting in 1996, Statistics Canada began releasing updated IO information on an annual basis. The most recent release in November 2022 provided preliminary 2019 IO information. This will be incorporated into the BC Stats IO (BCIOM) in summer 2023. Each report in the series uses the most up-to-date BCIOM at time of study, which means there will be slight differences in the model calculations from report to report.

The BCIOM is a structural model of the B.C. economy. The core of the BCIOM is a set of three tables (supply, use and final demand) that present the most detailed accounting of the provincial economy available. The tables together detail the supply and disposition of commodities, industries output delineated by commodity composition, and the complete costs of production of B.C. industries. The tables comprise detailed information obtained from administrative data, and Statistics Canada's surveys of establishments and enterprises. In essence, the supply use tables (SUT) provide a snapshot of the complete economy and all its industrial interconnections at a specific point in time.

SUT are produced at various levels of aggregation: the least detailed set of tables are presented at the "summary level" of aggregation, representing 35 industry groupings and 74 commodity groupings. The most detailed aggregation is the represents 240 industries and 501 commodities. The detailed-level SUT information is shared with the BC Stats by Statistics Canada, and is the information used in the BCIOM.

Purpose and uses

The purpose of a BCIOM is to estimate the total economic impact of a project, or economic shock, by presenting estimates of direct, indirect and induced impacts associated with the project or shock (meaning any change or departure from the status quo). Based on the observed inter-connection between industries in the economy, the multiplying of demand is traced through these industrial linkages to yield a set of aggregate impacts.

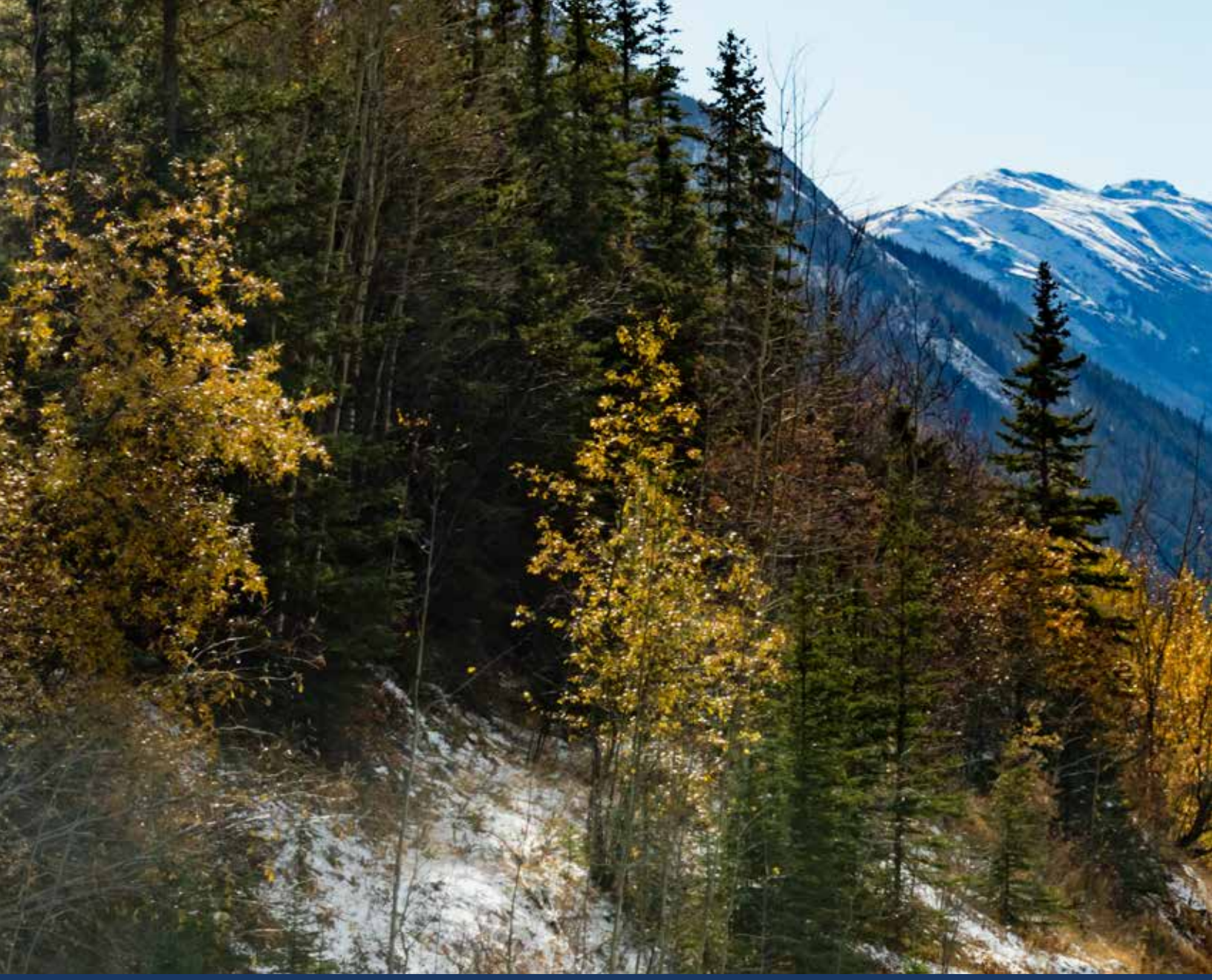
One of the most common uses of the IO model is to simulate the impact of a demand shock on the economy. Any increase in consumption of goods and services will generate direct, indirect and induced economic production.

Limitations of the input-output model

Although the BCIOM can be a very useful tool in the decision-making process, users should be aware of the limitations of input-output analysis. Some of the limitations that should be taken into consideration when using IO models are:

- Technical coefficients are assumed to be fixed. That is, the amount of each input necessary to produce one unit of each output, is constant. The amount of input purchased by a sector is determined solely on the level of output. No consideration is made to price effects, substitution, changing technology or economies of scale.
- It is assumed that there are no constraints on resources - supply is infinite and perfectly elastic.
- It is assumed that all local employment resources are efficiently used and at full capacity, there is no underemployment of resources.
- IO models are flow models. Stocks are not explicitly represented, which implicitly assumes that goods can be produced without additions to capital stock.
- The industrial structure and linkages of the represented economy are based on information that lags the current economy – typically a three to four-year time lag in Canada.

When estimating economic impacts, it is preferable to use economic multipliers to make relative, rather than absolute, comparisons. Economic multiplier analysis is more properly used to determine which of several activities would have the largest economic impact rather than to estimate the absolute level of economic impact for a single activity. Where economic multipliers are used to estimate the impacts of a single activity, the results should be treated as general estimates only, indicating the order of magnitude of the impacts rather than exact levels.



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