

Broadband: A Vision for Complete Communities

*2017 Alberta Development Officers Association
Annual Conference*

*Westlock, AB
September 28, 2017*

Alberta Economic Development and Trade:

Regional Economic Development Services

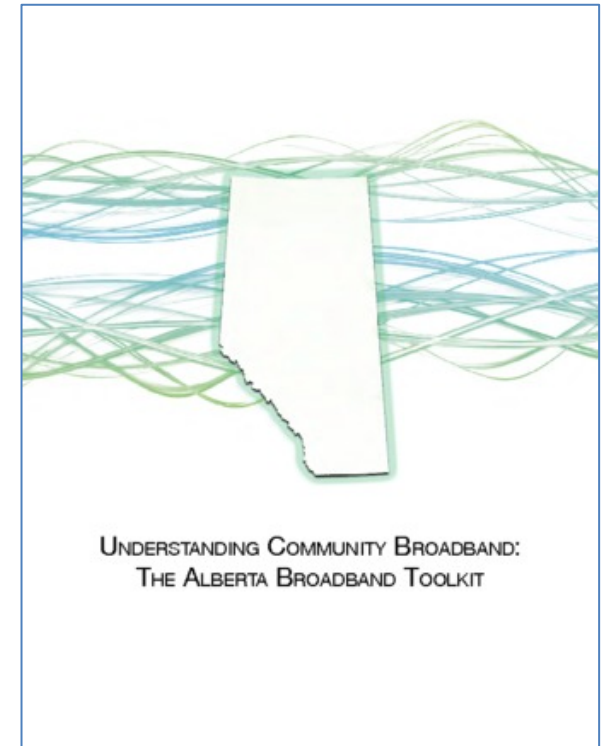
- Help facilitate community and regional economic development
- Encourage stakeholder-driven initiatives that result in investment retention, attraction, and economic diversification.
- Provide tailored services, knowledge and expertise.



Understanding Community Broadband: Toolkit

- This toolkit has been designed for use by Alberta communities to assist in developing broadband solutions.
- The toolkit is organized into three general sections
 - learning about broadband,
 - thinking about broadband, and
 - planning broadband.
- Sections aim to identify key knowledge and actionable steps that a community and its leaders can use to develop and achieve local broadband solutions.

- <https://era.library.ualberta.ca/files/dv13zx070#.WcVsaz6GNtQ>



NADC

The Northern Alberta Development Council (NADC) champions the cause of Alberta's northern economies and communities by exploring opportunities for growth and developing programs and services to facilitate this growth.

www.nadc.ca



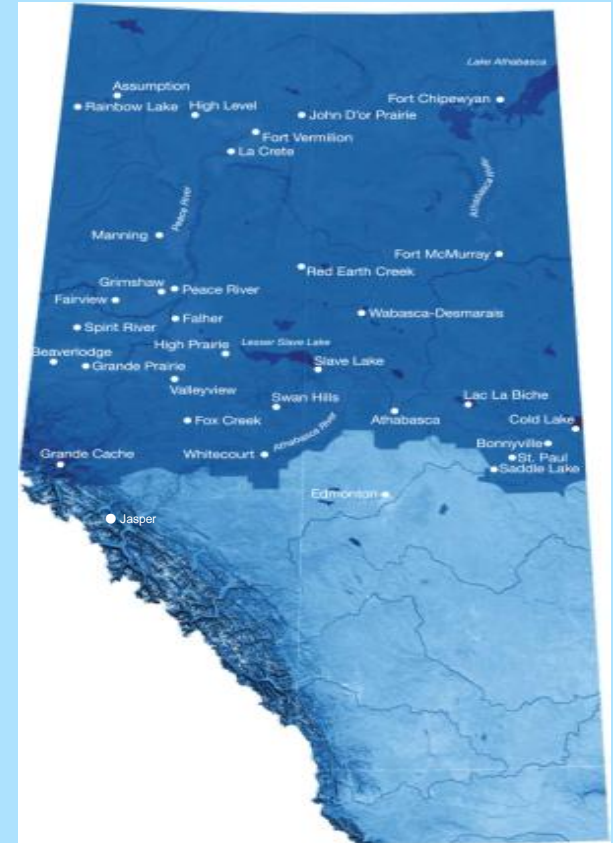
NADC

Region:

- 60% of Alberta's landmass (383,600 km²)
- 10% of Alberta's population (346,000)
- 28% of Alberta's farmland
- 86% of Alberta's forests
- 30% of Alberta's conventional oil and gas

Core Strategies:

- Advise government on issues affecting northern Alberta;
- Outreach and community engagement; and
- Support initiatives to increase northern skill levels.



What REDA's Are



“A collaborative approach by communities and supportive partners to achieve prosperity in a defined geographical area based on a shared economic vision for the future”.

- ✦ **Act as a catalyst for strategic alignment between the Province and Municipal alliance members for shared interests.**
- ✦ **11 REDAs located throughout the province encompassing over 225 member communities including; towns and villages, counties, Municipal Districts, special areas, cities and Indigenous communities.**
- ✦ **A number of non-community members including; industries, post-secondary institutions, Chambers of Commerce, businesses, Community Futures, and school boards.**

What REDA's Do.



COMMUNITY & REGIONAL DRIVEN STRATEGIC ALIGNMENT:

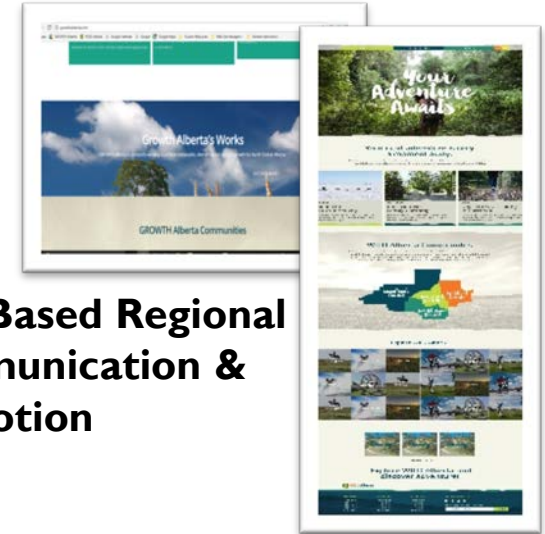
1. **Build Capacity for Regional & Economic Development Success.**
2. **Entice entrepreneurship, investment retention, attraction and expansion.**
3. **Cultivate and foster collaborative partnerships which support the strategic growth and economic sustainability of regions, communities and businesses.**

How **GROWTH Alberta** Does It.

Your Business. Our Future.



**Investment
Readiness &
Industry Attraction**



**Web Based Regional
Communication &
Promotion**

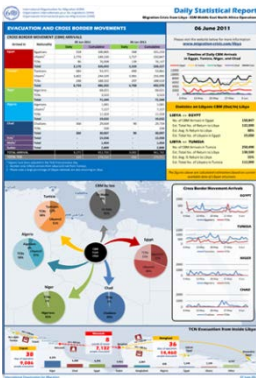
**Regional Economic
& Demographic
Data Analysis**



Digital Connectivity



**Economic
Diversification
Strategies**



Tourism Development



**Youth Retention
Strategies**

Broadband: A Vision for Complete Communities

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- ☑ The World has Changed
- ☑ Northern Alberta Broadband Study
 - ☑ Options / Results
- ☑ A Municipal Responsibility
- ☑ Next Steps
- ☑ Questions & Further Discussion



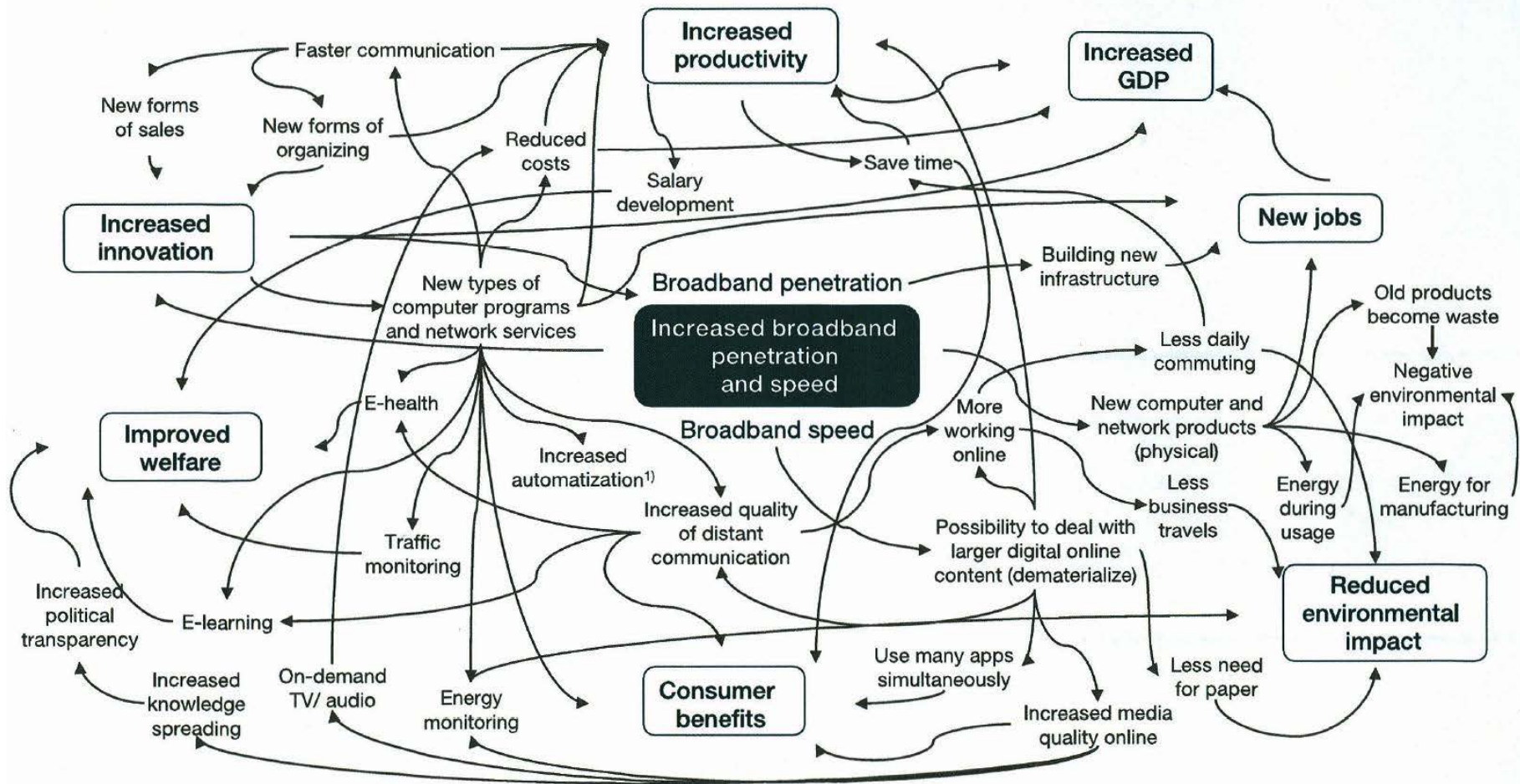
FPSP

The World has Changed

- Work and phone calls just aren't the same...



The Issue is Broadband



... and it complicates everything.

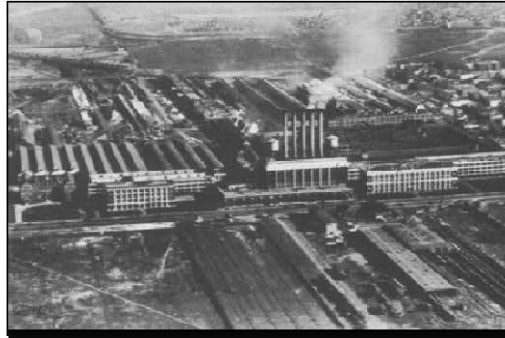
Economic Development

- Broadband networks and digital technologies are fundamentally impacting both industry and society on three levels.
- **ONE:** For only the third time in history, our system of wealth is changing
 - In an intellectual property-based knowledge economy, wealth generation is largely independent of place, local resources, and physical assets – work can be done from anywhere
 - Availability of affordable, true, broadband services are key to economic prosperity amongst all those participating in the modern knowledge-based economic

Agrarian



Industrial

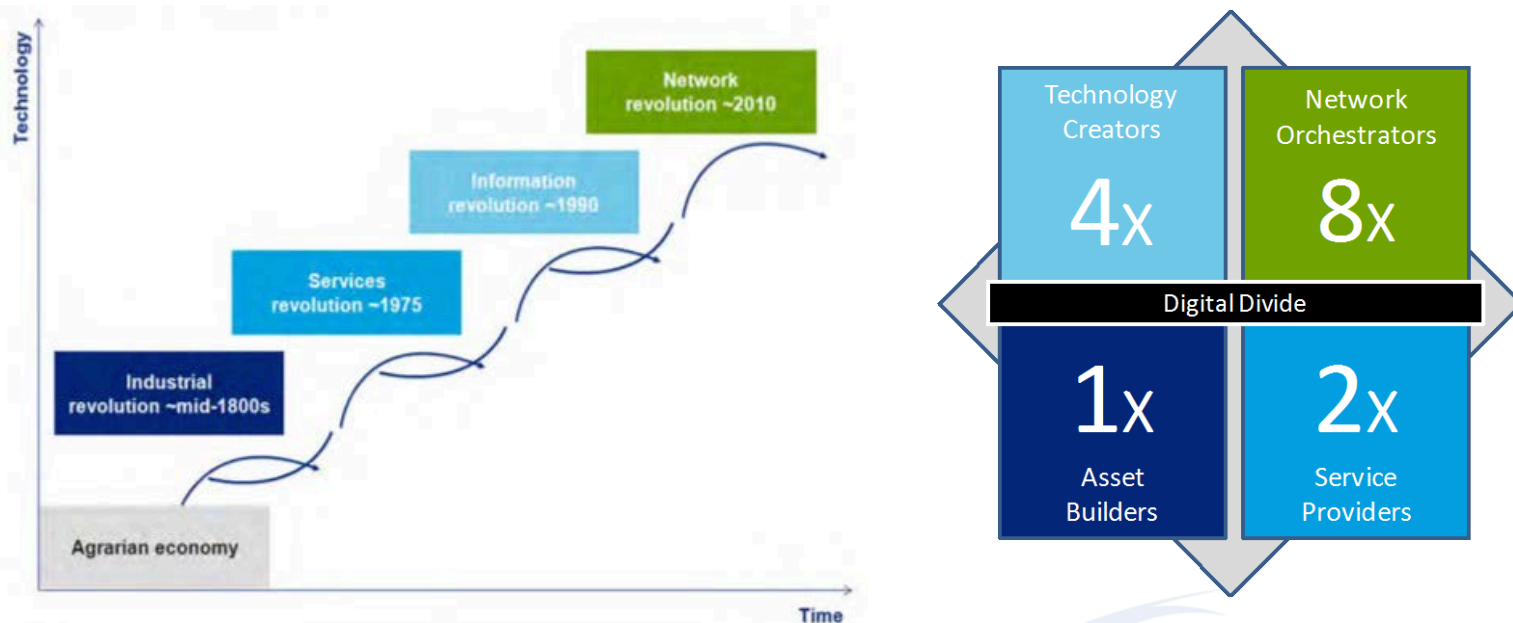


Knowledge



In the old economy, building a billion-dollar fortune required decades of hard work, a powerful host country, thousands of workers, and thousands of storefronts. Today, a kid with a smart idea, a couple of friends, and some luck can make a lot of money... very quickly. – Juan Enriquez

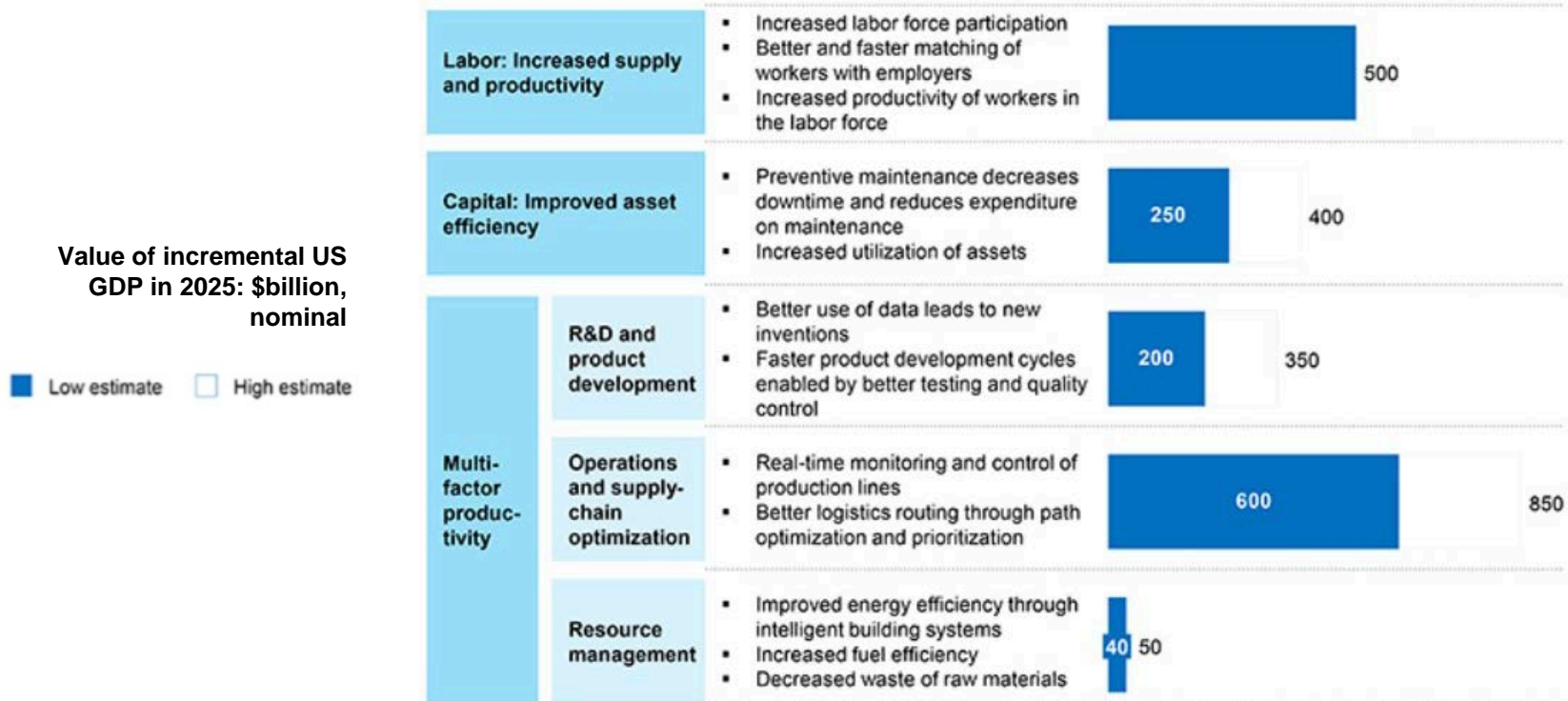
Wall Street Valuations



- **Asset Builders:** use capital to make, market, distribute, and sell physical products (e.g.: manufacturing, hospitals, hotels, retailers)
- **Service providers:** use people who produce billable hours for which they charge clients (e.g.: consulting, financial services)
- **Technology Creators (Information Revolution):** use capital to develop and sell intellectual property (e.g.: software, biotechnology)
- **Network Orchestrators:** use digital networks of businesses or consumers to create, market, and sell goods, services, or information, with the company acting as organizer (e.g.: credit card companies, social networks).

TWO: Improves Business Productivity

- Assuming Canadian impacts to be 10% of those in the US, but 2025, three effects of digitization alone could boost Canadian GDP by \$330 billion



- Arguably the world's most advanced transportation system, the Hyperloop, is being developed by a virtual worldwide team of 600 people in 52 countries
- By 2030, 10% of the largest companies in the US will be virtual; i.e., less than 10% of their employee base be on site at any time.

Agriculture

- In a sample area of SE Alberta, it'll cost about ~\$22,000/farm for fibre.
 - *We run a farming operation in that area, you get us the fibre and we'll pay the \$22,000.* – *Broadband Committee Meeting in Brooks*
- Put a 'FitBit' on your cows and you can tell when they're in heat.
 - Based on timing, you can influence the gender of their offspring.



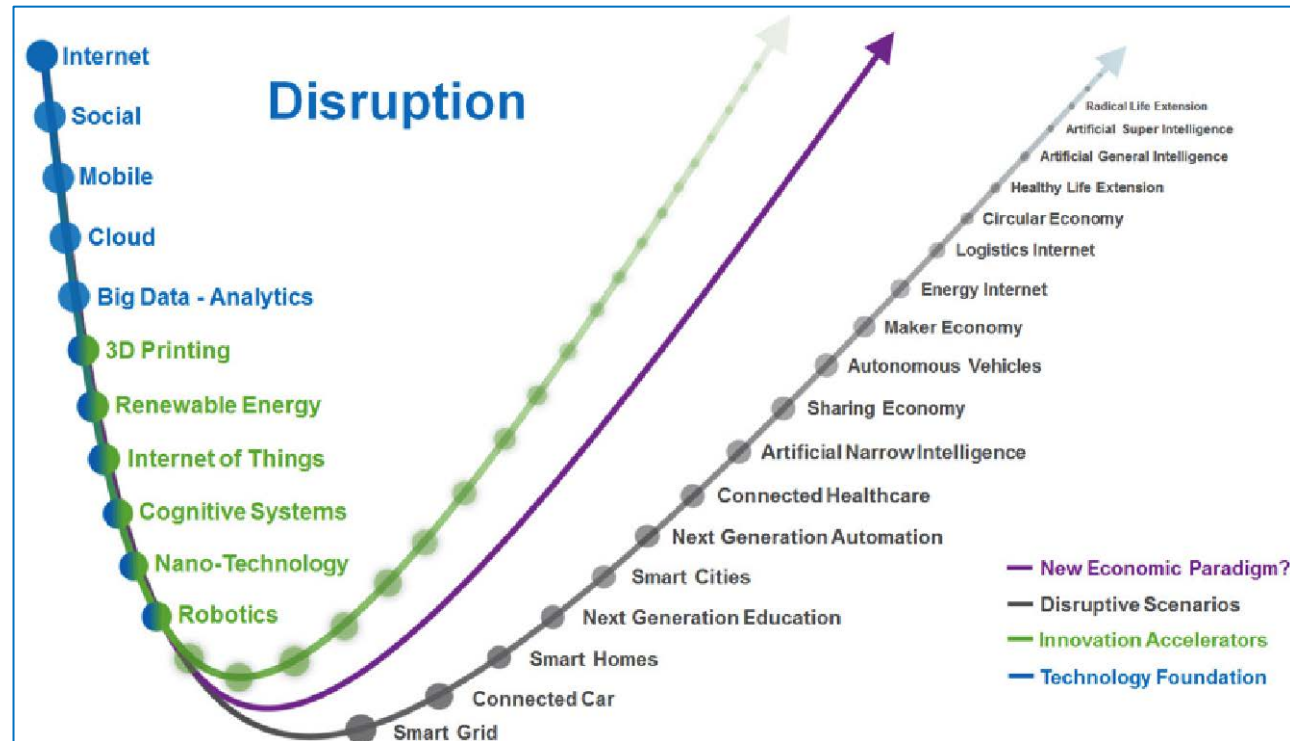
- To harness the full benefits, though, you need access to the cloud and big data analytics.

THREE: Disruption

- **Everything in this chart is exponentially driven and depends on broadband infrastructure. The world is about to change. Participation is not optional.**

Six Key Technologies

- 3D Printing – Additive Manufacturing
- Networks and Sensors – The Internet of Everything
- Infinite Computing
- Artificial Intelligence
- Robotics
- Synthetic Biology

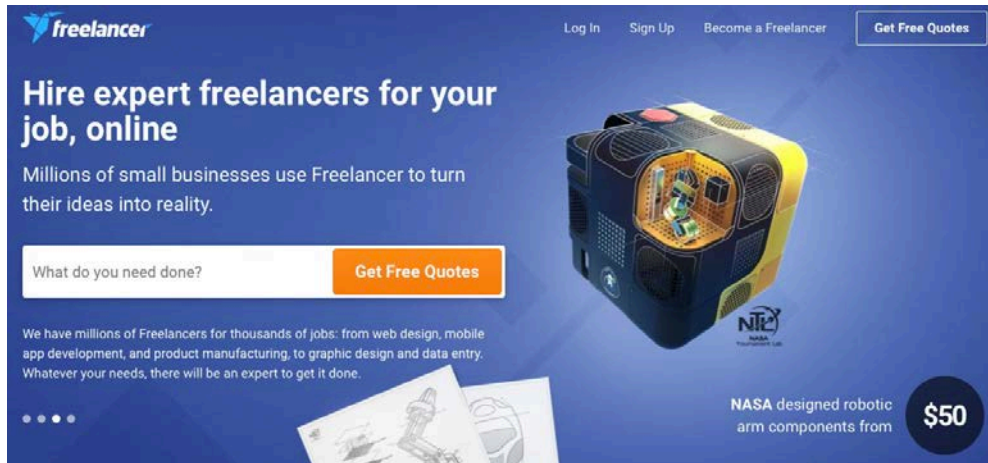


This car was 3D printed at a conference on Sept. 14, 2014. They then took it for a spin. Change the file and you'd have a farm implement or a boat, or whatever.

More interestingly, it was designed by an online network of 30k volunteer car enthusiasts.

Online Resources

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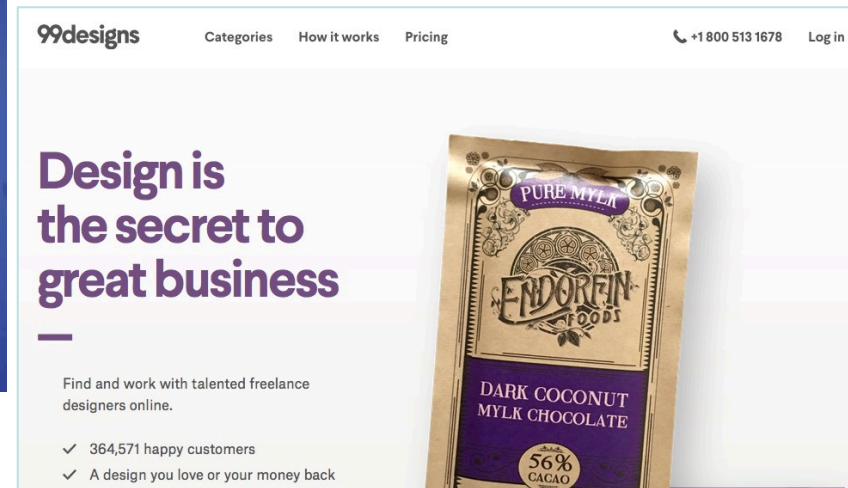
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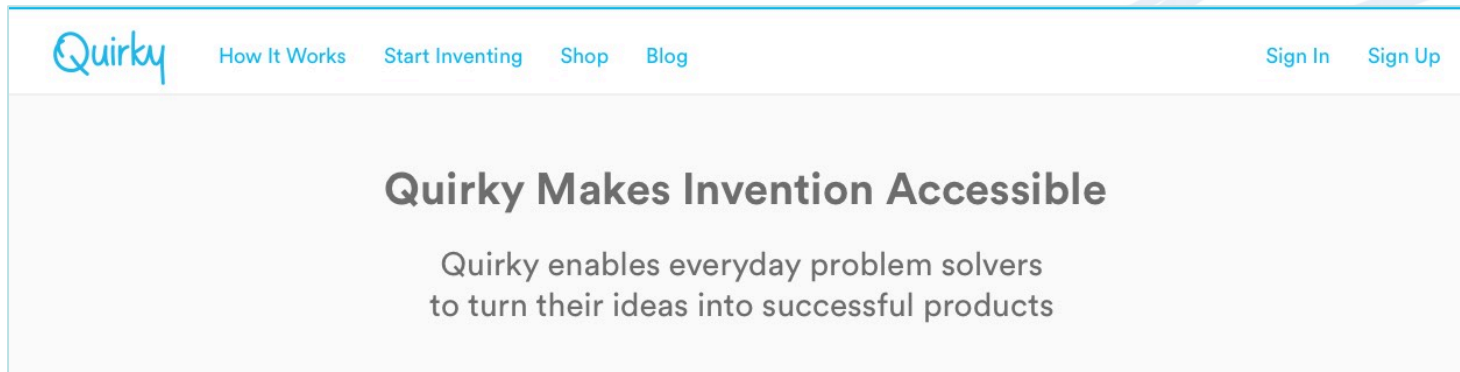
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Product Development – from Invention to Products



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Quirky enables everyday problem solvers to turn their ideas into successful products

Computing Resources

Traditional Computing

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Amazon EC2

Secure and resizable compute capacity in the cloud.
Launch applications when needed without upfront commitments.

Get started with Amazon EC2

Product Details Instance Types Pricing Getting Started

Intelligence on Demand

IBM Marketplace Search

IBM Watson Analytics Analytics Communities Watson Analytics Community Access Watson Analytics

How can we help you?

Getting Started Use Cases Videos News & Events

Quantum Computing

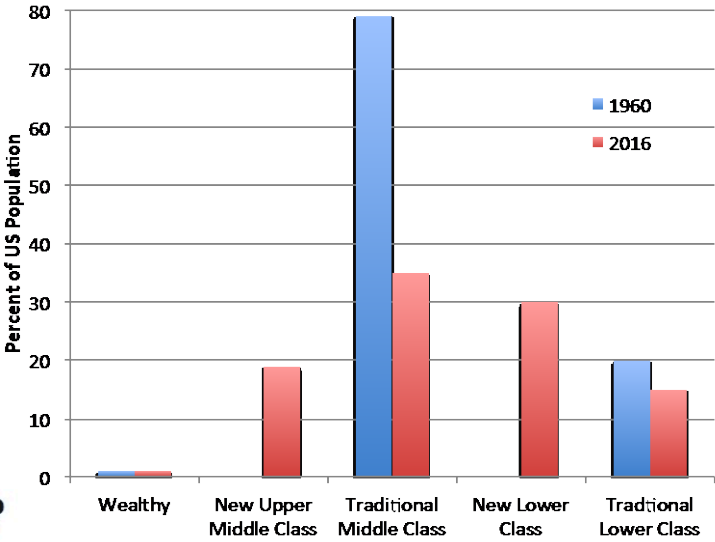
1QBit

REDEFINE INTRACTABLE

1QBit solves industry's most demanding challenges by recasting problems to harness the power of quantum computing.

Employment

- The days of the good, stable, middle-class jobs are over. *Go to college, get married, buy a house, raise kids, and retire on a good pension* doesn't work anymore.
- Of the jobs left, 1 in 3 will be converted to software, robots, and smart machines within 8 years. Half will be susceptible within 20.
- This displacement will affect both high and low skill members of the workforce.



Where Are the Gains and Losses from Automation?

Decline		Growth	
-4,759	Office and Administration	+492	Business and Financial Operations
-1,609	Manufacturing and Production	+416	Management
-497	Construction and Extraction	+405	Computer and Mathematical
-151	Arts, Design, Entertainment, Sports and Media	+339	Architecture and Engineering
-109	Legal	+303	Sales and Related
-40	Installation and Maintenance	+66	Education and Training

Employees, in '000s across major economies

- It's no longer – 'go find a job', it's 'go create a job'.
- From stationary to dynamic stability in which motivation and lifelong learning are key (technology is currently turning over every 5-7 years)
- New growth model will be based on human potential and working synergistically with the intelligent machines.

- ***On the Edge of Radical Change***
 - Our system of wealth is changing
 - In an intellectual property-based knowledge economy, wealth generation is largely independent of place, local resources, and physical assets – work can be done from anywhere
 - Technology drives our economy
 - Whereas traditional industries progress linearly, the technology-driven economy progresses exponentially – change is upon us and moving fast
 - Digital technologies are not only enabling new industries, they are about to fundamentally disrupt traditional industries as well
 - The new economy requires a higher skilled, virtual workforce
 - Everyone could win – this is not a zero-sum game (versus a widening digital divide)
- ***Broadband Infrastructure is Critical Enabling Infrastructure***
 - Too important to miss! – a once a century opportunity
 - Enhancing broadband for everyone is a largely social enterprise
 - Accomplish more together
 - Fibre as a utility
 - Required Internet capacity continues to grow geometrically
 - Wireless has limits; fibre does not

Northern Alberta Broadband Study

- Led by Alberta HUB, the five northern Alberta REDAs together with the NADC, leveraged provincial funding from Alberta Economic Development & Trade (EDT), and, last fall, initiated the study: *Northern Alberta Broadband Preparedness Project*
- The intent was to, at both the municipal and regional level:
 - create a common understanding of both the potential benefits of enhanced broadband availability and the options available to realize it,
 - establish where each community is at and which are interested in pursuing broadband, and
 - for those interested, which options might best meet their needs.
- The work then:
 - undertook a feasibility review of the regional opportunities of most interest, and
 - developed a business case for that which garnered the most support.
- The plan was inclusive of all members, non-members, First Nations & Métis within the area encompassed by the five northern Alberta REDAs and the Northern Alberta Development Council.



- *The study's will be available on the NADC web site shortly.*

Broadband is a Basic Service

CRTC declares broadband internet access a basic service

Today's decision could pave the way for universal access to high-speed service in remote, rural areas

By Matthew Kupfer, CBC News | Posted: Dec 21, 2016 10:17 AM ET | Last Updated: Dec 22, 2016 2:53 PM ET



CRTC rules high-speed Internet a basic service, sets targets

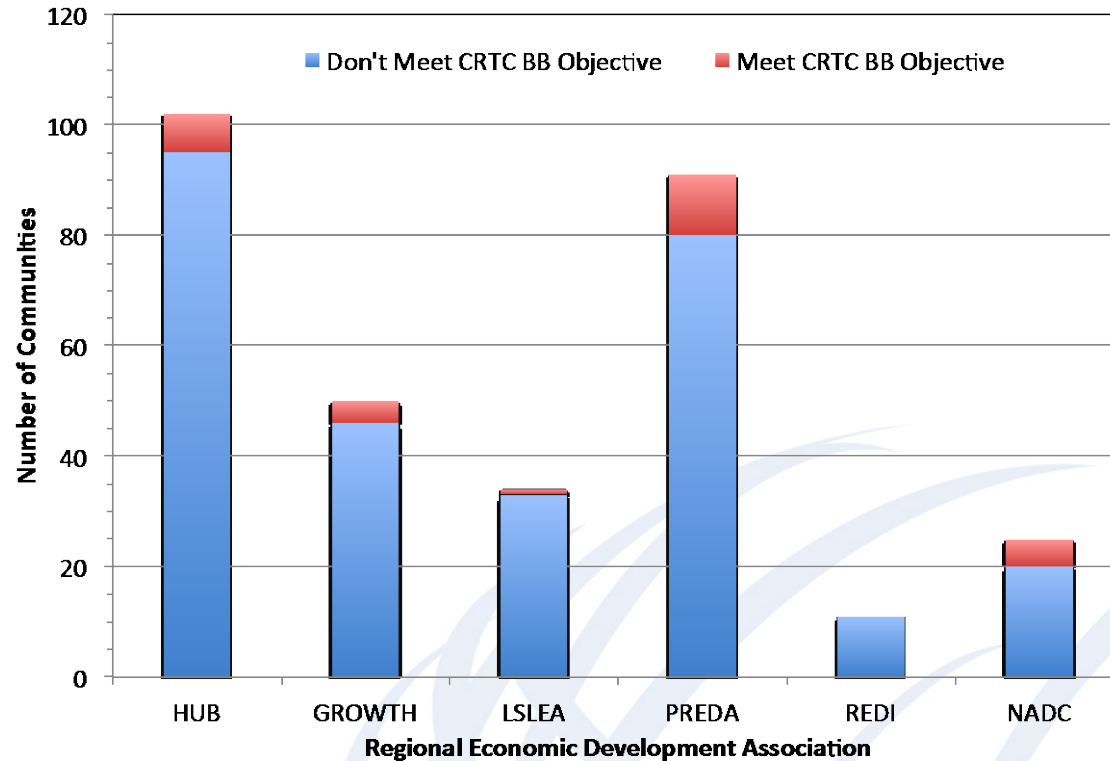
CHRISTINE DOBBY - TELECOM REPORTER
The Globe and Mail

Published Wednesday, Dec. 21, 2016 4:26PM EST
Last updated Wednesday, Dec. 21, 2016 9:11PM EST

- On Dec. 21, 2016, the CRTC declared Broadband Internet a basic telecommunications service. Until now, only voice services were 'basic'.
 - Existing universal service frameworks will now shift from voice to broadband
- The basic universal service objective is 50 Mb/s download and 10 Mb/s upload, with the option of unlimited data
 - Target is to 90% of Canadian households by 2021 and 100% by 2031
- Providers will contribute 0.53% of their voice/broadband revenue into a fund accessible to providers to improve services in areas which do not have the minimum service levels.
 - This fund is expected to grow to \$250M in five years
 - Current voice subsidy will be phased out
 - A further proceeding in 2017 will examine the preliminary fund guidelines established in this ruling
- The ruling also set an objective to have the latest generally deployed mobile wireless technology (currently LTE) deployed not only in homes and businesses but along as many major transportation roads as possible.

Only 9% of Communities Meet the Objective

- Across the study region, the new (minimal) CRTC broadband objective of 50 Mb/s down by 10 Mb/s up is met in only 28 of the 311 northern communities.



- Community refers to counties, MD's, improvement districts, cities, towns, villages, summer villages, hamlets, First Nations, and Métis settlements.*

Options to Enhance Broadband

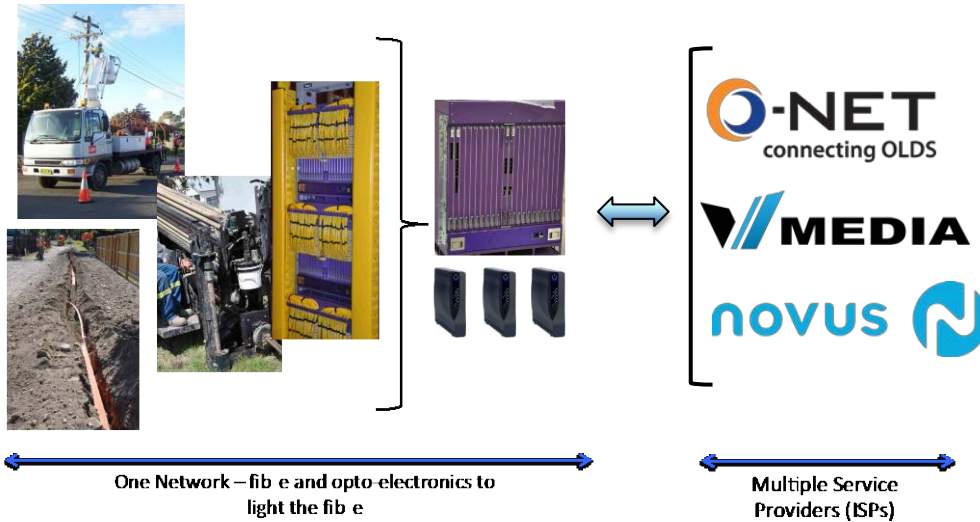
- There are a range of options available to communities interested in helping to facilitate enhancing broadband services. In the northern study, the focus was largely on the more do-it-yourself (DIY) community fibre network approaches. Note that this does not exclude working with private sector partners to make it so.
 - Status Quo
 - Incremental:
 - Work with the CRP...
 - Deal with fires as they occur
 - Embed fibre network requirements in planning processes
 - Accelerate currently planned IT infrastructure deployment
 - Leverage the civil infrastructure projects
 - Develop a Broadband Services Strategic plan
 - Negotiate with current providers
 - Work with the providers – Shaw, TELUS, Axia, CCI, O-Net, ...
 - Subsidize a private partner
 - Develop a utility community fibre network
 - Assume fibre as a utility play and deploy a network as critical civic infrastructure
 - Decisions on governance, business model, financing, services, and operations will be required, but
 - Other than that, you and your council can be as involved, or not, as you wish as
 - Options range from in-sourced to turn-key outsourced deployment of operations and services
 - Together or separate?

Public vs Private: Revisiting the 'Why?'

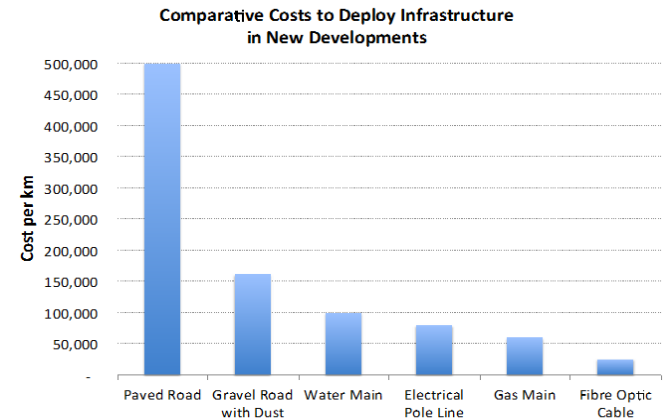
Partial worksheet	Municipally-owned (e.g. Olds and others)	Carrier-provided (Shaw, Telus, Bell, Axia, etc.)	"Do nothing" option
1. Provides local municipal control over: ?			
broadband speeds offered	✓	Depends of provider	X
price to customers	✓	Likely monopoly pricing	X
quality/reliability of service	✓	Depends on provider	X
who gets access	✓	Various approaches	X
timing	✓	Maybe influence?	X
phasing	✓	Depends of provider	X
backhaul options to Calgary	✓	Provider-controlled (e.g. Axia on SuperNet fibre)	X
community wireless (e.g. downtown)	✓	Depends of provider	X
2. Can be provided at little/no cost to municipality ?	Yes, if run on full customer cost-recovery basis	✓	X
3. Would the municipality be eligible for Federal capital grants to develop and operate the networks ?	Likely	Not relevant	X
4. Creates options to support rural neighbours ?	✓	X	X

Broadband as a Utility

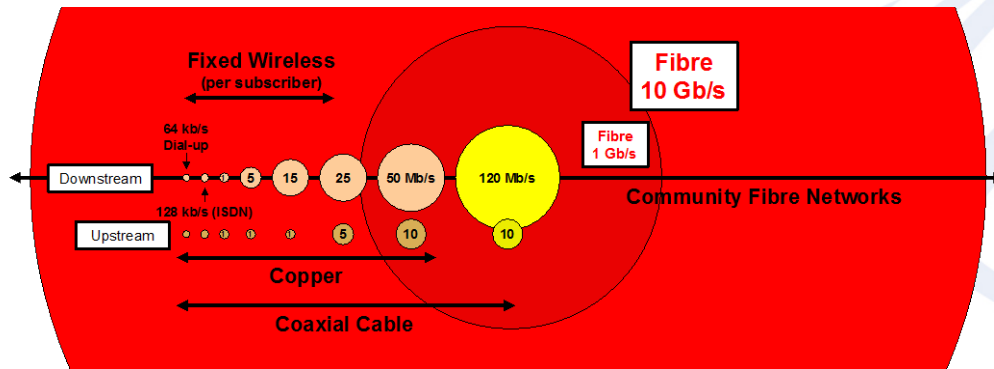
- One network, many service providers



- Least expensive infrastructure



- Unlimited capacity



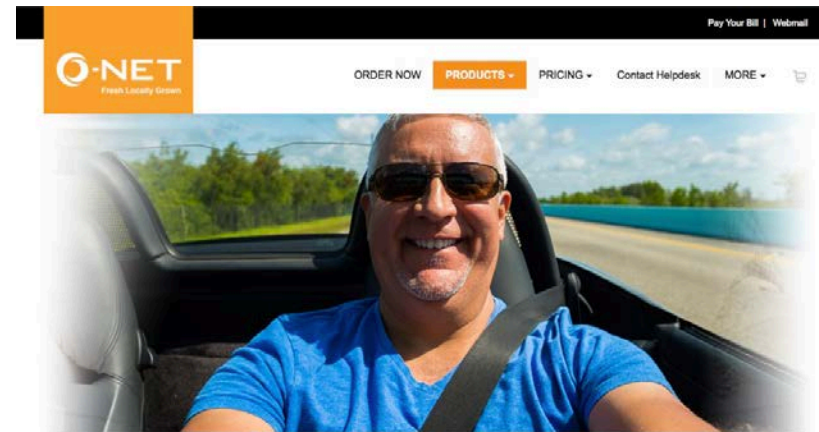
- The Internet of Things



The Fastest Internet in Canada

From the incumbents?? No
In the big city?? No

- From the little town that could: Olds, AB
 - 9,184 people (less when they started)
 - 4,020 premises
- If a small town in rural Alberta can do it, so can you – and if you leverage what Olds has done, you don't even have to do the hard stuff.
- Benefits, well:
 - Since the introduction of Gb/s services, Olds has run out of serviced commercial land.
 - Olds has the highest level of high school graduations in the province.
 - Home service availability at your bedside when you're in hospital
 - Two multi-national companies have re-located to Olds last year.
 - Olds College has moved from text books to iPads and is 'gamifying' their courses



We can stop your wheels from spinning

Get the fastest Internet in Canada

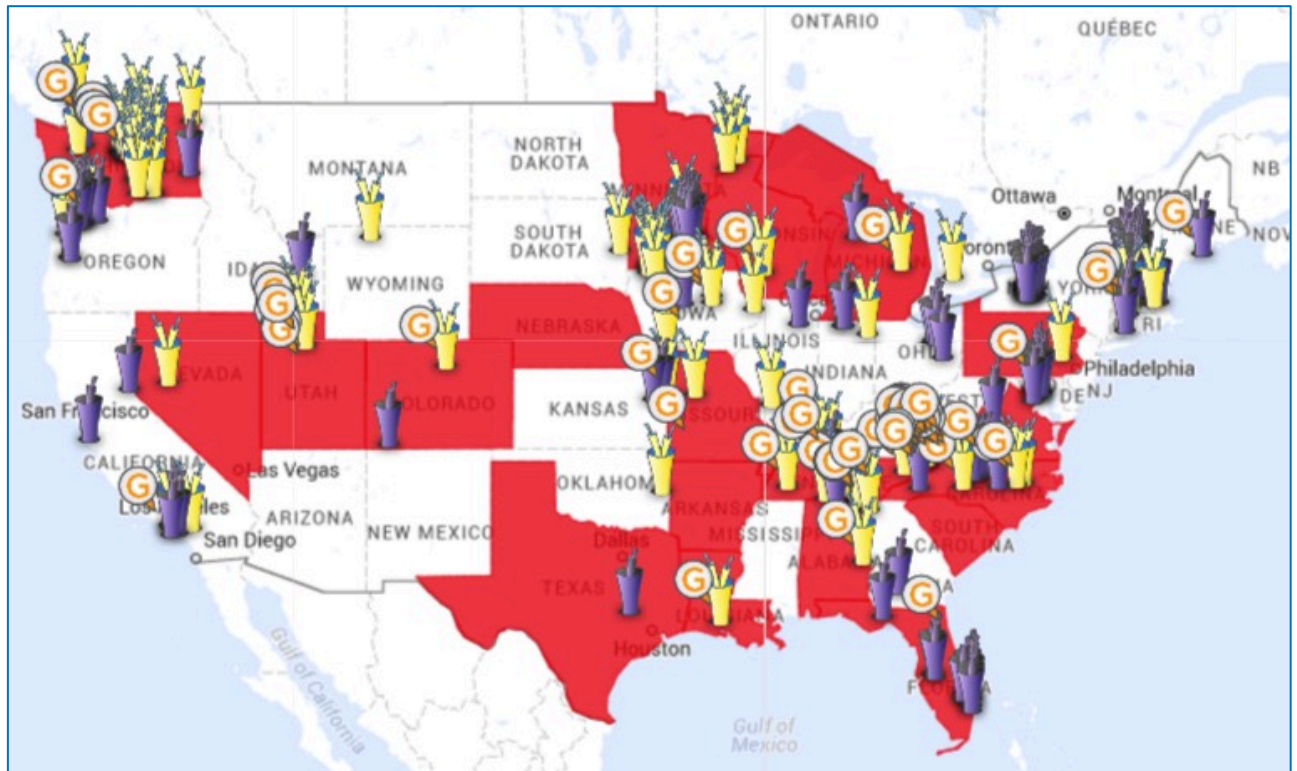
Using our Internet to explore the web is like cruising in a convertible and having the highway all to yourself. No congestion, no slowdowns. Just limitless opportunities at speeds that will make you feel the wind in your hair. We're the best choice for accommodating Netflix, media-rich websites, video chatting and online gaming. O-NET Webmail gives you two secure Microsoft® email accounts that you can access on all of your devices and you'll receive a Wi-Fi router with all of our packaging. We provide Technical Support and Customer Service that's based right here in Olds. We also offer free installations, free equipment rentals and no hidden fees.

Rush	Zoom	Gig
\$90/MO+	\$100/MO+	\$125/MO+
50 Mbps Download†	100Mbps Download†	1000Mbps Download†
50 Mbps Upload†	100Mbps Upload†	1000Mbps Upload†
NO DATA CAPS	NO DATA CAPS	NO DATA CAPS
Wi-Fi	Wi-Fi	Wi-Fi
Local Support	Local Support	Local Support
Order Now	Order Now	Order Now

Community Fibre in the US

- Community fibre networks are a popular option in the US – even in states which actively inhibit such approaches.
- In addition to the over 200 networks shown below, 77 communities have publicly owned cable networks and over 185 serve at least some portions of their community with fibre.
- 25 of the 48 US states reporting have a broadband office – in Canada, none do

	83 Communities with a publicly owned FTTH network reaching most or all of the community.
	Over 115 communities with publicly owned dark fibre available
	Over 50 communities in 19 states with a publicly owned network offering at least 1 Gb/s services
	Nineteen states have barriers in place that discourage or prevent local communities from deciding locally if such an investment is a wise decision.



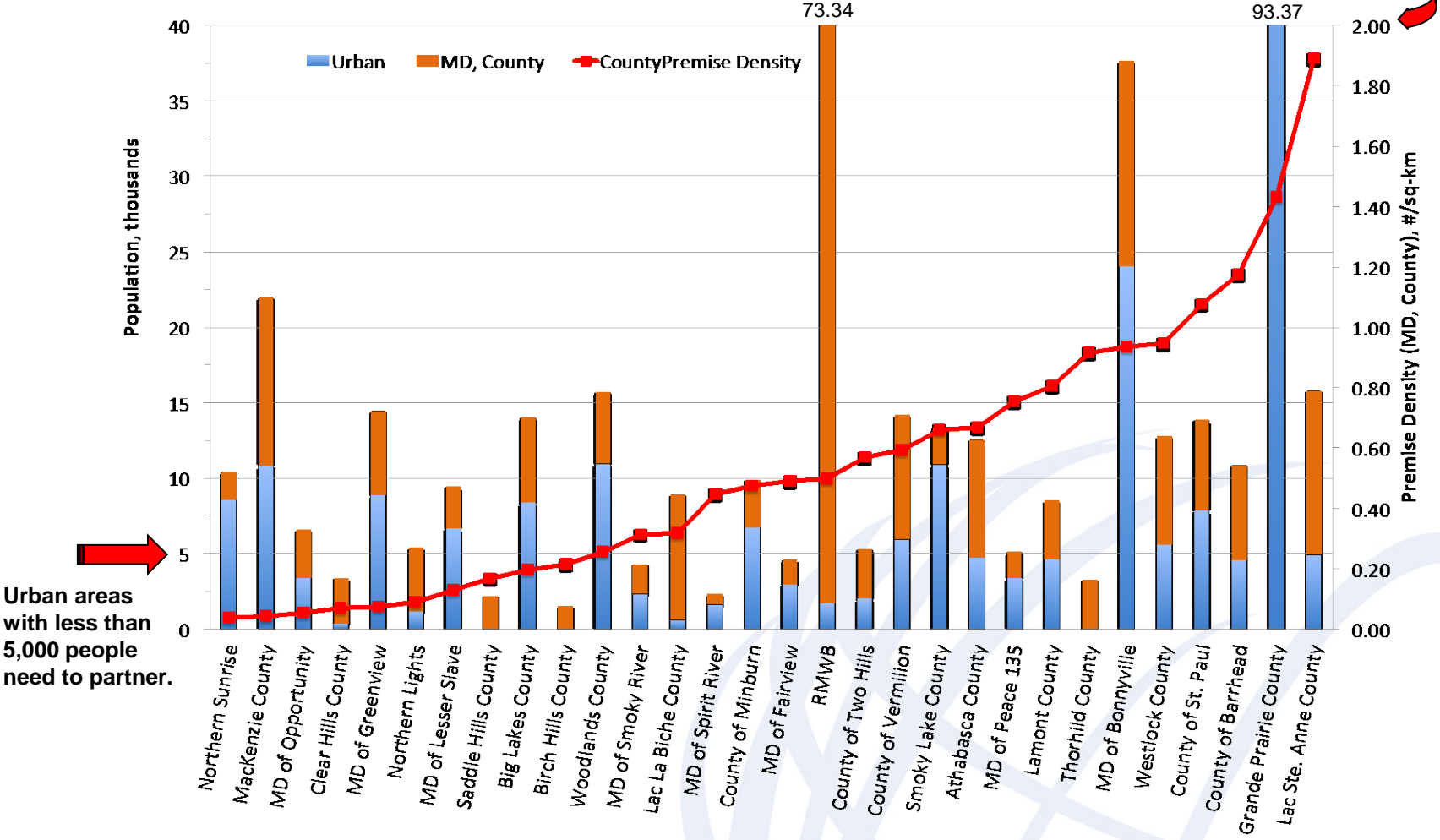
In Canada, there is one community owned FTTH network offering 1 Gb/s services and may be 5 with dark fibre.

Source: <https://muninetworks.org/communitymap>

General Financial Results

- Assumes buried air-blown fibre deployments

Rural areas with densities less than 2 premises/km² require wireless



Urban areas with less than 5,000 people need to partner.

Available Analyses – 1

Report*	Category	County/Community (Premise Counts)	Comments
Alberta HUB	Urban Centres	Bruderheim – 601	High level analysis. To increase operational scale and combined financials with Lamont are also provided.
	MDs, Counties	Lac La Biche	Detailed analysis including capital estimates for the hamlets of Lac La Biche, Plamondon, Beaver Lake, and Rich Lake.
		Vermilion River	Detailed analysis based on the study for the Vermilion River Regional Alliance. In addition to a county network, capital estimates are provided for the town of Vermilion, Dewberry, Kitscoty, Marwayne, Paradise Vallet, and Mannville.
GROWTH Alberta	Urban Centres	Whitecourt – 4,250 Barrhead – 2,000 Swan Hills – 725	Provides an interesting comparative view of the impact of operational scale as community size decreases.
	MDs, Counties	Woodlands	Provides capital estimates to connect several urban centres and ISP towers.
LSLEA	Urban Centres	High Prairie – 1,000	Detailed capital estimate and financials from the Big Lakes Study for the town of High Prairie.

Available Analyses – 2

Report*	Category	County/Community (Premise Counts)	Comments
NADC	Urban Centres	Athabasca – 1341	Detailed capital and financial analysis for the Town of Athabasca.
	MDs, Counties	Athabasca	Including capital estimates for the Town of Athabasca and Boyle as well as for Athabasca County.
		Regional Municipality of Wood Buffalo	In fall, 2013, the now defunct Oil Sands Leadership initiative had Taylor Warwick complete a planning level conceptual review the options available to improve broadband services within Anzac, Conklin, Fort Chipewyan, Fort MacKay, Gregoire Lake Estates, and Janvier. The options included infrastructure to support mesh WiFi, hybrid fibre/WiFi, and full fibre/WiFi. The detailed study ¹ is available on the NADC website.
PREDA	Urban Centres	High Prairie – 1,000	See LSLEA.
	MDs, Counties	Big Lakes	Detailed analysis based on the study for Big Lakes County. As the study is inclusive of the urban centres of High Prairie, Swan Hills, Enilda, Foust, Gift Lake, Grouard, Jousard, Kinuso, and area around Kinuso, capital estimates for each of these centre is provided.
		Smoky River	Detailed study Including capital estimates for Fahler, McLennan, and Donnelly.
REDI	Urban Centres	Mackenzie County	High level analysis Including High Level, Rainbow Lake, La Crete, Fort Vermilion, and Zama City.

Community Perceptions

- Project has promoted conversations, questions, general thinking about broadband community networks and their roles in communities' futures
- The idea of a DIY utility-based approach that leverages the abilities of local ISPs generally comes as a surprise and is well received
- Each community is in a different place facing different sets of issues
- Communities are asking questions such as:
 - *Do residents and businesses in my communities want/need enhanced broadband?*
 - *Who will own the network?*
 - *Will the network build be done in collaboration with the incumbents/ISPs?*
 - *What happens to current ISPs?*
 - *Who pays for the network? What are the benefits/trade offs?*
 - *Will a current MOU with an incumbent telco restrict a community's options in the future?*
 - *Why isn't the provincial government providing incentives for communities to work together?*
 - *How do you predict where technology is going to take us?*

- Community ranking (from most interested in learning about to least) re: community-based broadband network concepts and models
 1. Counties, MDs, First Nations, and Métis Settlements
 - Have the most to gain (incumbents tell them they are too small – density is the issue – no financial incentive for subscriber-based telcos)
 - Concerned about coverage to all residents/businesses as well as improved bandwidth and more capacity
 2. Smaller urban centres (populations of between approx. 1,000 and 5,000)
 - Looking for solutions
 - Expressions from participants
 - Possibly interested in working on a regional plan
 - Too expensive, too much to learn, DIY too challenging
 - Don't have the funding power, skills, and capacity needed for a community fibre initiative
 - On the surface Axia and TELUS offer a compelling solution
 - Seen as least cost and involvement by the community (learning, skills, capacity) in the short-term
 - Long-term not necessarily envisioned at time of decision
 - Some are not convinced that broadband is an essential utility like electricity and water
 3. Larger urban centres (populations greater than 5,000)
 - Some do not see the benefits of a community-fibre initiative to their communities, especially if TELUS has already made fibre investment (broadband is not currently their focus)

A Municipal Responsibility

As a utility, broadband becomes a municipal responsibility:

- The key to Vibrant, Sustainable Communities, similar to safe roads and clean drinking water.
- Essential addition to your community's overall utility plan and vision.
- From young families looking for economically viable opportunities, to your community historians who are in need of basic digital skills to carry out their daily routines, there is a digital gap that today's municipalities are going to need to address.

Some initial considerations:

- Technology – What type of technology works for your community?
- Ownership – Who will own and maintain the infrastructure?
- Service Provision – Who will provide services over the infrastructure?
- Business Model – What will be the revenue/cost model to support your broadband system?

The City of Calgary would recommend the following basic characteristics for a Beneficial-For-All broadband strategy:

- Ownership over the infrastructure by the municipality
- Protection of ROW space and support structures.
- Fair and equitable access for healthy competition.
- Access for ALL citizens to reliable and affordable connectivity
- CHOICE for communities/businesses/citizens.

Basic Need for Municipal Servicing

Broadband is connectivity – and not necessarily Internet

- Municipal connected services such as traffic controls (emergency or routine), communications, disaster resiliency, asset management, law enforcement and more.
- Benefits and efficiencies of real-time information sharing for decision making.
- Individually may be cost prohibitive, but buy-in and collaboration between municipal departments shifts the balance where the need and opportunity far outweighs the costs; and the impact of NOT having a strategy in place begins to grow exponentially.

Which municipal services are a good place to start? All of them!

- Alternative Revenue Opportunities for tax balance
- CRTC decisions on competition and open access
- Captured asset concerns/monopoly providers.
- Capital funding review (MSI, Other GOA grants, Federal Grants)
- Local Business Needs (New attraction, existing retention)
- Country-Style Living, Big City Services = Limit is only your local talent, not your local services
- Live/Work/Play anywhere in AB

Failing to plan is planning to fail.

What Can Your Community Do Today?

Next Steps for Today to mitigate future costs or strategically deploy and develop infrastructure to meet current and future needs.

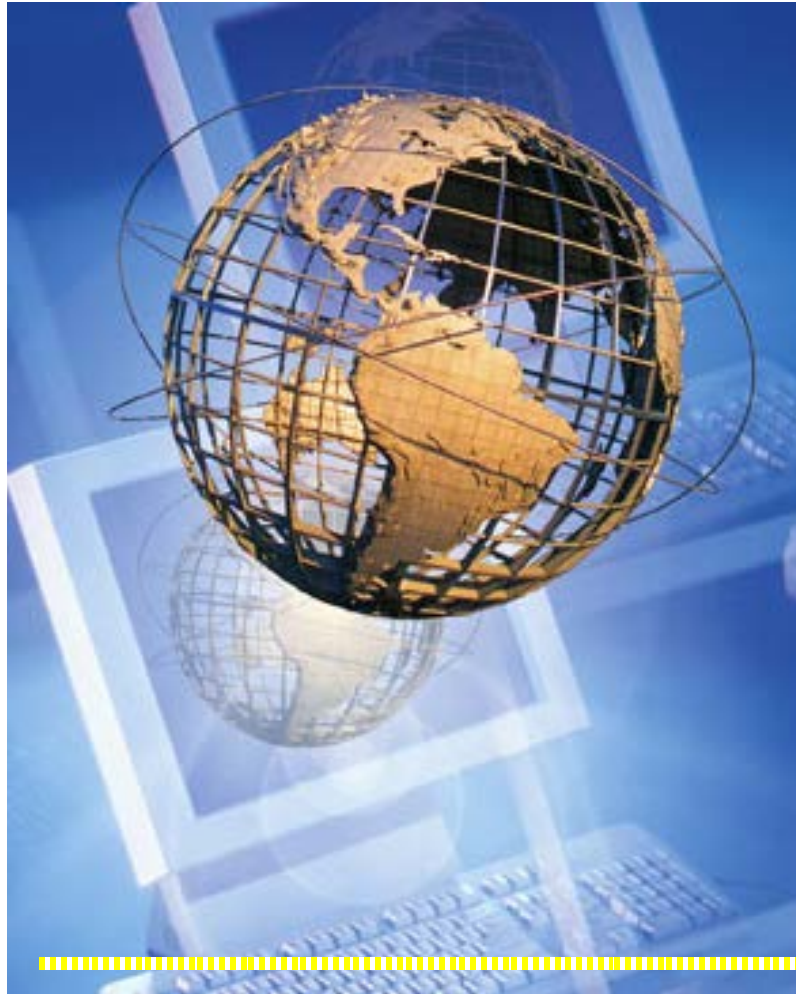
1. Dig Once Policy – Ensure conduit or other infrastructure is placed when civil works are underway, including new development areas.
2. Staged Planning for Implementation – Build the system over a planned period of time.
3. Think and Work Regionally – Working together collaboratively, brings down costs for everyone and speeds up service levels.
4. Advocacy and Awareness for Stakeholders

1. **Collaborative, Regional Plan** – Ideal place to begin
2. Without Step 1 – **Discussion Paper** or **Feasibility Study**
3. **Strategy Development**
 1. Community's Approach (incremental, all-in- partner, or DIY)
 2. Open or Closed, dark or lit, wholesale or retail
 3. Comparative Analysis or Options
4. **Business Case** Development
5. Creation of a **Business Plan**
6. **Regulatory** Licensing and Financing
7. **Deployment** – RFP and Contract Management
8. **Operational Partnerships**
9. **Community Enablement** – Optimally occurs throughout the above steps.

Our Challenges

- First one through the wall. How do we embrace failure?
- How do we address resiliency? Building communities in an ever-changing world.
- Expectations – Global access from your country kitchen table.
- Can we take the most important priorities of our community and adequately communicate them to our major stakeholders? How do we get buy-in?
- Rurals vs Urban – Rurals tend to get it, they know what it is like to live without. Urbans are necessary to access so that we can ALL have affordable, reliable access.

Thank You!



Questions & Further Discussion

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