BUILDING THE FUTURE

CULTIVATING COLLABORATIVE REGIONAL CAPITAL TO BUILD DIGITAL INFRASTRUCTURE IN EASTERN ONTARIO: LESSONS FROM THE EASTERN ONTARIO REGIONAL NETWORK (EORN)

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EXECUTIVE SUMMARY

The Eastern Ontario Regional Network (EORN) leverages funding for broadband infrastructure development through a regional Public-Private Partnership (PPP) model. EORN's success comes from a region-wide market failure analysis through demand and supply mapping, gap analysis, solution modelling, and solution costing.

KEY MESSAGES

- Current funding models create a patchwork network of services across rural regions. Regional programs such as EORN can disperse funding equitably allowing lower capacity municipalities access to funding and access to broadband infrastructure.
- Current broadband minimum service levels set out by the CRTC to do not allow for investments of infrastructure for the economy of the future. EORN provides economic evidence for implementing Gig-Service broadband in rural regions.
- Faster broadband service levels proposed by EORN are required to provide equitable participation in the global economy. A dichotomy of service levels between rural and urban regions threatens to divide communities by opportunity.
- EORN demonstrates that understanding regional broadband market data and service gaps is vital to understanding where funding should be allocated. Management and implementation of funds is just as important as the funding itself.

KEY LESSONS

1) **Regional coordination and understanding of data lead to results:** Coordinated efforts allow for a more wholistic look at the current state of rural broadband infrastructure and enable identification of communities that require the most assistance due to market failure.
2) **Set sights high for the future:** Policy in broadband service levels needs to match the needs of communities setting targets that will accommodate technological change of the future.

RECOMMENDATIONS

- Local policy should implement long-term engagement in broadband development. Broadband infrastructure should be added to capital asset plans, particularly in regions where market failure is likely.
- Broadband can be built into land use planning policies to ensure future development implements broadband infrastructure.
- A collaborative, regionally-led model is required to ensure a region-wide market failure analysis is performed and is informing appropriate funding allocation.

INTRODUCTION:

Broadband development has lagged in rural areas posing challenges to economic development in an ever-increasing digital market. COVID-19 has created a spotlight on this topic as small business owners turn to digital platforms to maintain revenues while physical stores were forced to close temporarily. Rural residents work remotely from home to retain their job positions, participate in online education, and receive medical care and education through virtual platforms (EORN, 2020a). High speed broadband is required to facilitate the way people do business, communicate, educate, and provide healthcare. With an increasing demand on the broadband network, high speed internet will be needed to properly service the demand.

In 2016, broadband was declared a basic telecommunications service by the Canadian Radio-television and Telecommunications Commission (CRTC). This declaration recognized that broadband is an essential service and set minimum speed standards of 50 Megabytes per second download and 10 Megabytes per second upload (50/10 Mbps) (CRTC, 2016). In urban environments telecommunication service providers (TSPs) are already implementing speeds of up to 1000 Megabytes per second (equivalent to 1 Gigabyte per second) otherwise known as a Gig service. Speeds found in some urban areas are twenty times faster than the targets set for Canada, enabling greater capacity for smart technologies which require high bandwidth (EORN, 2020b). These speeds make using broadband reliable and increase the capacity for processes like large file transfers and working from servers which is often a requirement for businesseses and for students and professionals working from home.

In eastern Ontario, approximately 50 percent or 285,000 dwellings cannot access broadband service or fall below the standards set out by the CRTC (Rajabiun, 2020). Barriers to broadband in rural environments include large distances to existing markets, challenging topography and weather to implement services, and low population densities (Hambly & Rajabiun, 2021). Specifically, low population densities result in a greater requirement of resources to service a larger area. This makes capital costs higher and revenue returns on investments lower due to the disperse density of subscribers. With higher capital costs and lower returns, service providers risk the potential of market failure in rural areas. Low financial incentive and high risk for failure has led to a lack of private business investment in technological infrastructure and broadband development in rural Ontario (EORN, 2017).

The Government of Ontario and Government of Canada have recognized the need for public funding towards rural broadband. The Government of Ontario is investing $150 million in reliable broadband and cellular service as part of their $315 million initiative

called "*Up to Speed: Ontario's Broadband and Cellular Action Plan*". The federal government has also developed a strategy called "*High-Speed Access for All: Canada's Connectivity Strategy*" (ISEDC, 2019), and created the *Universal Broadband Fund* providing $1.75 billion in funding supporting high speed internet projects across Canada. Additionally, the CRTC has created their own Broadband Fund through the Telecom Regulatory Policy 2016-496 providing up to $750 million over 5 years towards building infrastructure for fixed and mobile broadband internet access.

The challenge remains in implementing government funding towards projects and providing services to all residents equitably regardless of municipal capacity to apply for funding or complete projects. Rural municipal governments vary in their technical, financial and human resource capacity to access funding and implement projects (Weeden & Kelly, 2020). Municipal governments have been banding together to build regional strategies towards implementing broadband and servicing rural communities. The Eastern Ontario Warden's Caucus (EOWC) have been pioneers forming a regional initiative called the Eastern Ontario Regional Network (EORN) with the goal of increasing broadband coverage in eastern Ontario (EORN, 2017).

ABOUT THE EASTERN ONTARIO REGIONAL NETWORK (EORN)

EORN is a not-for-profit corporation formed by the EOWC. It is supported by 13 County and single tier municipalities which represent approximately 750,000 rural residents and over 1 million rural and urban residents combined. Residents span over 52,000 square kilometres and vary in density across the region (EORN, 2017). EORN aims to use a regional approach as well as public-private partnerships to address the digital divide encountered in rural communities (EORN, 2020b).

EORN has a history of leveraging funding to incorporate federal, provincial, and municipal funds with private funding to solve the issue of market failure (EORN, 2020a). The approach termed the regional public-private partnership (PPP) model is the backbone of the EORN objectives and aims to leverage public and private funds together to produce a regional benefit (EORN, 2020a). EORN aims to leave no municipality behind and intends to fill in the patchwork broadband service that currently exists in Eastern Ontario.

LEARNING FROM EORN'S EXPERIENCES

Interviews with EORN representatives were conducted to gain an understanding of the regional approach and PPP model of financing broadband projects. The regional approach was born out of necessity. When asked why a regional approach to broadband

was taken, interviews revealed that: *"[broadband funding] was of course by application, so there were winners and there were losers, and there were some municipalities in Eastern Ontario that did not apply, and it left large swaths of the region with poor coverage, like a patchwork quilt."* The municipalities across eastern Ontario found that the current funding models were ineffective at supplying equitable coverage to communities. Communities vary in size and capacity to apply for funding, but some also encountered additional barriers including low populations and greater topographical and geographical issues for coverage (Hambly & Rajabiun, 2021). A regional approach enabled municipalities to work together and subsidize areas that lacked a capacity to deal with unique issues. By unifying together, everyone in the region had a fair chance of gaining broadband in their area.

If the regional approach is the preferred solution, the question becomes why have regional entities not taken on the responsibility of managing this type of infrastructure? Participants indicated that: *"the reason … that EORN and other municipal organizations exist is because there was a vacuum nationally and provincially…around broadband and its importance…We form regional projects in the absence of provincial and federal strategies."* Municipalities have recognized the local significance of broadband to their economies and their viability as rural communities. By implementing strategies together, they have been able to accomplish significant advances in implementing broadband infrastructure. EORN's first project [Broadband Phase 1](#) was highly successful in reaching targets for broadband implementation. Funding is important, but the management of the funds and the subsequent projects are equally important for implementation (Breen, 2015). By implementing a regional approach, areas can be identified that require more assistance and funds can be applied appropriately.

THE GIG-PROJECT: LOOKING A STEP AHEAD

The current broadband minimum service levels set out by CRTC are aimed at providing broadband service speeds of 50 Mbps for downloads and 10 Mbps for uploads (CRTC, 2016). Yet, EORN has set their sights on a much higher target. EORN has announced plans for their Gig-Project which aims to get 95 percent of residents access to broadband speeds up to 1,000 Mbps (EORN, 2020a). The rationale for setting this goal high above that of the CRTC standard is to set up Eastern Ontario for the future, adding value to their communities and providing investments for the future economic growth of the Region (EORN, 2020a). Why invest in infrastructure which will be obsolete soon after it is implemented? EORN looks to the future of how life will be lived in rural regions and recognizes that broadband will be a significant factor to their economic growth.

In support of the Gig-Project, EORN has commissioned economic analysis reports by Dr. Tom Phillips and Dr. Reza Rajabiun including: [Economic Impacts of the Gig Project](#);

[Increasing Returns, Productivity, Externalities and Monitoring](#); [Tax Recovery Model](#); and [Economic Benefits of Investing in Basic vs. Gigabit Broadband Infrastructure in Rural Eastern Ontario](#). These reports identify economic benefits of Gig-service broadband some of which include increased property values and municipal property taxes, reduced private costs for telecommuters, reduction in healthcare delivery costs to the region, and the creation and sustainability of jobs (Rajabiun, 2020).

Middleton (2017) has identified that a key strategy in building broadband infrastructure that is "future-proof" is to invest in fibre networks. These networks provide speeds of up to 1 Gbps and have the potential to be upgraded further to provide 10 Gbps and 100 Gbps service using the existing fibre network. EORN is investing their time and resources into a project which provides fibre infrastructure. EORN is building the future of Eastern Ontario by looking past CRTC targets and looking forward towards the infrastructure that communities will need to sustain their growth and development. 1 Gbps service of fibre cable was an identified strategy in 2017, and it is being implemented through EORN's capacities. 50/10 service may provide communities connection, but it will not allow them to grow and build their economies to be competitive.

The CRTC has a history of setting targets and achieving them, but are the targets arguably too low? The CRTC targets for 2015 were reached but were insufficient to keep up with the demand of rural residents (Middleton, 2017). Current CRTC targets and objectives may not be reached till 2030 or 2035 for rural residents. By that time, 10-15 years in the future, 50/10 service might be obsolete, as it is already insufficient for high data usage needs (Wood, 2017).

If services are provided that are consistently a step behind, the rural communities will remain behind on the economic stage and will not be able to participate in a meaningful way. This includes targets, but relates to issues of equity, maintaining livelihoods, and sufficiently running businesses to maintain competitiveness of rural residents in the global market (Pant & Odame, 2017). Additionally, broadband relates to issues of basic rights to education and health care. If our children and adults cannot learn at the same pace as urban centres, we threaten to divide these communities further through lack of opportunity.

BLIND SPOTS IN RURAL DATA

EORN has had the success in the past to garner respect in estimations of financial requirements and outputs for broadband projects (Hambly & Rajabiun, 2021). To produce these estimations, EORN has had to bridge the divide on rural data by completing market and gap analysis to identify areas which need attention (Hambly & Rajabiun, 2021).

Gathering and understanding this data will inform where funding is most needed and will lead to successful and equitable implementation. If funding is consistently applied to those who successfully apply for it, municipalities without the capacity to apply will continue to be left behind.

By gathering and handling the data on a regional scale it can be better understood, and the needs can then be addressed at the local level. This is the success of the regional approach. Investing in projects without sufficient knowledge and data of the market could misappropriate funds away from areas which desperately need them. What EORN has done well is to collect the relevant data and analyze it for establishing a plan of implementation. Consequently, the funding needs can be directly addressed, and the costs can be accurately identified.

A key step in the broadband research by EORN is gathering and analyzing the data informing the local needs for broadband (Wood, 2017). Broadband is clearly needed based on the standards of CRTC and the implementation of funding by various levels of government, but the problem must be understood on a management and implementation level. For each municipality to perform these tasks from the ground up would take individual capacity and understanding of the technical framework. With a regional approach, the problem can be understood on a wider scale and then addressed locally. Additionally, if a regional approach is employed, the human capital and knowledge of the project stays within the region.

A LEADER IN REGIONAL INFRASTRUCTURE MANAGEMENT

EORN has been largely successful at self-evaluation and providing municipalities the resources they need to implement rural broadband. In addition, they have commissioned reports to identify the frameworks and lessons learned from their experience in implementing rural broadband in a large rural region. In the report, Faster, Further: A Best Practices Review of the Eastern Ontario Regional Network Project, Wood (2017) analyzes the expected and actual outcomes of EORN's projects. In many cases EORN met or exceeded their targets for broadband implementation. Notably, they connected business parks, created positive returns on investments at a ratio of 16:1, raised capital funding above budget and came under budget in project costs while exceeding the project deliverables (Wood, 2017).

As EORN embarks on future projects, they have a history of success and knowledge behind them to achieve their objectives (Wood, 2017; EORN, 2020a). Regions across Canada could look towards EORN and the documents they have developed to lead their own initiatives. Further, EORN provides a model to the other forms of government that

might be implemented within other regions. The issues of broadband are continuous as technology advances faster than implementation. Therefore, our sights should be set at a higher target than currently recommended to allow Ontario and Canada to catch up to current technology. Surely, setting the sights low will keep regions consistently behind when it comes to economic development and sustaining businesses in rural regions.

BUILDING THE FUTURE: KEY CHALLENGES AHEAD

LOCAL POLICY SOLUTIONS

The future of broadband infrastructure management lies within policy at the upper and lower governance levels. At the local level participants indicated that: *"municipalities need to start thinking of broadband like regular infrastructure. It is the roads and bridges of the future. If they are able to put funds away into reserve, they need to look at earmarking some of those reserves for broadband or connectivity."* In agreeance with this statement, Wood (2017) argues that long-term engagement in broadband development is essential, and that broadband infrastructure should be added to capital asset plans, particularly in regions where market failure is likely.

Municipalities are beginning to implement broadband sub-committees to address the issue. Ideas for implementation of broadband at the local level are described by participants; *"perhaps when you are looking at a subdivisions…you force the developer to either put fibre in, or conduits when they are building out the subdivision, like you would potentially for water and sewer. Another concept would be when you are doing road work, you usually have a 5-year plan for roadwork. And if you know you are going to have roads ripped up, maybe putting in conduit or working with the [telecommunication companies], say look, this is our roadwork plan for the next 3 years. Is there any interest in going into some of our rights of ways or when we have things dug up? And fostering those types of relationships with the [Private Service Providers], I think municipalities have to start taking some ownership around connectivity, just like they have with roads and bridges for years."* With these ideas, EORN has been developing a strategy and toolkit for municipalities to build broadband into their local polices. As a regional entity, their expertise and knowledge mobilization are building local capacity to implement future policies at the local level.

THE NEED FOR PROVINCIAL POLICY AND DATA

Policy needs to ensure that broadband is no longer implemented in a patchwork approach. Regional entities such as EORN have taken on this responsibility with the support of the local municipalities, however those rural communities that do not fall under these frameworks and lack capacity continually fall behind. There is strong support for the province to take on a leadership role in providing broadband. A role which reaches far past financial support but supplies human and technical capacities for implementation (Middleton, 2017).

EORN's proven model exemplifies the need for regional-wide market failure analysis through demand mapping, supply mapping, gap analysis, solution modelling, and solution costing (EORN, 2020a). Data gaps in understanding the broadband market present a challenge in development of public policies (Hambly & Rajabiun, 2021). Current strategies could be focused on establishing data enabling the identification of market failure areas to rationalize methods for applying provincial funding. Additionally, policy could direct provincially funded construction projects to assess whether broadband infrastructure can be incorporated during construction to reduce capital costs of broadband implementation (Middleton, 2017). Finally, support and guidance need to be provided provincially to municipalities with less capacity to enable broadband infrastructure implementation (Middleton, 2017).

LESSONS LEARNED:

The EORN case study has revealed key lessons for rural infrastructure management. These lessons might be applied to other rural infrastructure challenges

LESSON 1: REGIONAL COORDINATION AND UNDERSTANDING OF DATA LEAD TO RESULTS

Regional collaboration between municipalities enabled coordination of efforts to understand the broadband infrastructure needs across communities. Data was constructed regardless of individual municipal capacity and therefore all communities were included. The regional approach allows municipal capacities to be equalized across the region. Coordinated efforts allow for a more wholistic look at the current state of rural broadband infrastructure and enable identification of communities that require the most assistance due to market failure. Policy could be identified to solve these data gaps to inform funding decisions. Regional entities could be formed at the provincial level to implement, and in EORNs case further support funding models such as the PPP.

LESSON 2: SET SIGHTS HIGH FOR THE FUTURE

The disparity in broadband speeds between rural and urban regions continues to divide communities by opportunity. EORN has supplied substantial economic research arguing for Gigabyte service in eastern Ontario to enable competitiveness in the global market. Policy needs to meet these demands so that regions across Canada are working towards the same goals and implementing infrastructure that will not become obsolete. A united front and a 'look-forward' policy regarding broadband infrastructure will create equity across Canada.

REFERENCES

Breen, S.-P. (2015). Uncertain foundation: Infrastructure in rural Canada. *Report to the Rural Policy Learning Commons.* Retrieved from http://rplc-capr.ca/wp-content/uploads/2015/12/Infrastructure-in-Rural-Canada-Report.pdf

EORN. (2017). Broadband in Eastern Ontario - Introduction to Technology. Eastern Ontario Regional Network, Canada. Retrieved from: https://www.eorn.ca/en/resources/Broadband-in-Eastern-Ontario---May-2018.pdf

EORN. (2020a). Solving the rural broadband problem for a generation: EORN gig project summary. Eastern Ontario Regional Network, Canada.

EORN. (2020b). Improving mobile broadband services in Eastern Ontario: The business case. Eastern Ontario Regional Network, Canada. Retrieved from: https://www.eorn.ca/en/projects/resources/Documents/Improving-Mobile-Broadband---2019-Backgrounder.pdf

CRTC. (2016). Telecom Regulatory Policy CRTC 2016-496. Retrieved from https://crtc.gc.ca/eng/archive/2016/2016-496.htm

Hambly, H. and Rajabiun, R. (2021). Rural broadband: Gaps, maps and challenges. *Telematics and Informatics 60:* 101565. https://doi.org/10.1016/j.tele.2021.101565

Middleton, C. (2017). Broadband infrastructure for the future: Connecting rural Ontario to the digital economy. *Rural Ontario Institute Foresight Paper.* https://www.ruralontarioinstitute.ca/uploads/userfiles/files/Rural%20Ontario%20Foresight%20Papers%202017_Broadband%20Infrastrucure%20and%20Northern%20Perspective.pdf

Pant, L.P and Odame, H. H. (2017). Broadband for a sustainable digital future of rural communities: A reflexive interactive assessment. *Journal of Rural Studies 54:* 435-450

Rajabiun, R. (2020). *Economic benefits of investing in basic vs. gigabit broadband infrastructure in rural eastern Ontario: Summary of policy brief.* Eastern Ontario Regional Network, Ontario, Canada.

Innovation, Science and Economic Development Canada [ISED]. (2019). High-speed access for all: Canada's connectivity strategy. Government of Canada. https://www.canada.ca/high-speed-access-for-all

Government of Ontario. (2020 June). Ontario improving broadband and cell service for rural communities. [News Release].

https://news.ontario.ca/en/release/57104/ontario-improving-broadband-and-cell-service-for-rural-communities

Weeden, S. A. & Kelly, W. (2020, May). Barriers to Broadband deployment in rural Canada. *Submission to CRTC 2019-406 call for comments.* Retrieved from http://crrf.ca/publications/

Wood, K. (2017). *Faster, further: A best practices review of the Eastern Ontario Regional Network project.* Eastern Ontario Regional Network, Canada. Retrieved from https://www.eorn.ca/en/projects/resources/Documents/EORN-Best-Practices_Report2017_FINAL-Dec-22-2017.pdf