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Remote Rural Broadband Systems in Canada

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1. Introduction

Wireless broadband in many remote areas of northern Canada in 2017 can trace its inception to a late addition to a footnote in a report issued in Istanbul, Turkey in 2000. It was there at the World Radiocommunication Conference (WRC) that Canada joined other countries in what was institutionally labelled MOD S5.293; a change in allotment of frequencies to mobile services.

> *Different category of service:* in Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico and Panama and Peru, the allocation of the bands 470–512 MHz and 614–806 MHz to the fixed and mobile services is on a primary basis…. The international in-country footnote S5.293 has allocated the bands 470–512 MHz and 614–746 MHz for fixed and mobile services on a co-primary basis with the broadcasting service. (Industry Canada, June, 2001)

With this change in the spectrum allotment structure for members of region two of the International Telecommunications Union (ITU), Canada began to reconfigure its national frequency allocations to allow for fixed broadband in these bands that had traditionally been reserved for television broadcasting. In the years to follow, Canada embarked upon a unique policy experiment involving the opening of television white spaces for fixed wireless broadband service in the country's vast rural hinterland. Canada has limited over-the-air (OTA) television broadcasting and after the digital television transition of 2011, many broadcasters, including the national public broadcaster, ceased OTA transmissions in all but the major urban centers of the country (Taylor, 2013). "Remote Rural Broadband Systems" (RRBS) is a Canadian wireless policy initiative that holds great promise: it encourages and supports new entrants into the wireless broadband sector; it makes use of spectrum that is by and large idle; it explicitly seeks to expand service into underserved areas; and the signal provided by these frequencies offers strong propagation qualities, with the ability to penetrate a common obstacle in rural Canada: trees.

The stated goal of equality of access to communications services in all regions is a regular refrain in Canadian communications policy. The discrepancies between Canada's metropolitan centres and rural hinterland has been a central feature of the history of Canadian communications, as outlined in the 1950s by Canadian scholar Harold Innis (Innis & Drache, 1995). Broadband is the latest in a line of communications cleavages between urban and rural Canada, from the telephone to broadcasting, which have posed a challenge for national connectivity. Market failure is a consistent feature of communications in rural Canada, prompting government to play an active role to entice development. The Telecommunications Policy Review Panel Final Report 2006 outlined recent efforts by the Canadian government to promote wired broadband access in underserved areas, including the *Broadband for Rural and Northern Development* (BRAND) program which ran from 2002 to 2007 (Canada, 2006, pp. 8–3); this program was in turn superseded by the 2009 announcement of the *Broadband Canada: Connecting Rural Canadians* program, which ran until 2012 (Industry Canada, 2010).

Rural broadband policy announcements have proven a popular pastime for Canadian politicians; however broadband in rural areas remains stubbornly mired in lower speeds and higher prices. Recent data from the national media regulator the Canadian Radio-Television and Telecommunications Commission (CRTC) demonstrates that basic broadband coverage (under 5 megabits per second

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[Mbps]) in Canada is fairly uniform, however rural areas quickly drop in comparison to their urban compatriots when higher broadband speeds are factored in. The following table includes various broadband services: DSL/fibre, cable modem, fixed wireless, and mobile (HSPA+ and LTE bars show the additional effect that inclusion of these technologies would have on the respective categories) (see Fig. 1).

Likewise, low-level wireless packages are similarly priced in urban and rural Canada; however, advanced packages see a strong price differential. A one GB data plan starts at $38 in urban Alberta and Ontario, but the same plan costs $50 in rural Alberta and Ontario. A two GB data plan that sells for $35 in urban Alberta and Ontario is priced at $60 in rural Alberta and Ontario (Canadian Radio-Television and Telecommunications Commission, 2016).

More detailed data on rural Canadian connectivity is frustratingly sparse. A 2014 Nordicity study commissioned by the Federation of Canadian Municipalities, notes

> Impeding an assessment of the state of broadband in Canada is the lack of complete data. Anecdotally, we often hear messages regarding the poor state of Internet access in Canada, particularly in rural and remote areas, while simultaneously being told that network operators are pouring billions of dollars into network improvements. Detailed information is a closely guarded secret and, the information that is publicly available is often not completely representative of the situation (Federation of Canadian Municipalities, 2014, p. 8)

The demand for connectivity in rural Canada is clearly there, which is why politicians have spent a great deal of political and financial capital trying to bridge this element of the digital divide (Federation of Canadian Municipalities, 2014). Politicians are aware that the advantage of broadband access in remote Canada is strongly felt by residents. A 2010 study of the northern town of Chapleau, Ontario found that with the arrival of broadband "Instead of being an isolated island unto itself, Chapleau (became) more like a well-attached island with many Internet bridges to the outside" (Collins & Wellman, 2010, p. 21; see also; Industry Canada, 2004). The RRBS policy was another effort on the part of the government to ease the isolation felt by remote sections of the country using the abundant local resource of vacant 600 MHz television spectrum. This was a plan to further the national goal of rural digital development via new spectrum allocation and licensing procedures. As a case study, RRBS in Canada provides a useful template for countries struggling with their own digital divides.

Despite early signs of promise, in 2017 RRBS is struggling in Canada and may soon find itself jettisoned to the dustbin of ambitious but under-realized communications policy. After an encouraging start, the overwhelming majority of Canadian RRBS providers have either folded their businesses or moved on to other, more established methods of delivering service, such as wired access or utilizing less desirable 3500 MHz spectrum that has lower propagation and penetration properties. The problems encountered with RRBS were not due to a spectrum shortage. Television white space is abundant. This made-in-Canada approach to the problem of broadband access has largely been constrained by regulatory indecisiveness. It has never received the institutional support required to turn a bold initiative into lasting policy. RRBS is a policy approach with potential to reshape the market, albeit a limited section of the market where large providers lack incentive to expand. It offers a case study of how regulatory uncertainty can prove an impediment to digital development. If it officially comes to an end, RRBS will be a victim of Canada's subordinate telecommunications policy structure vis-à-vis its American neighbour, as well as a lack of commitment on behalf of Canada's regulators to offer support for small market entrepreneurs in the

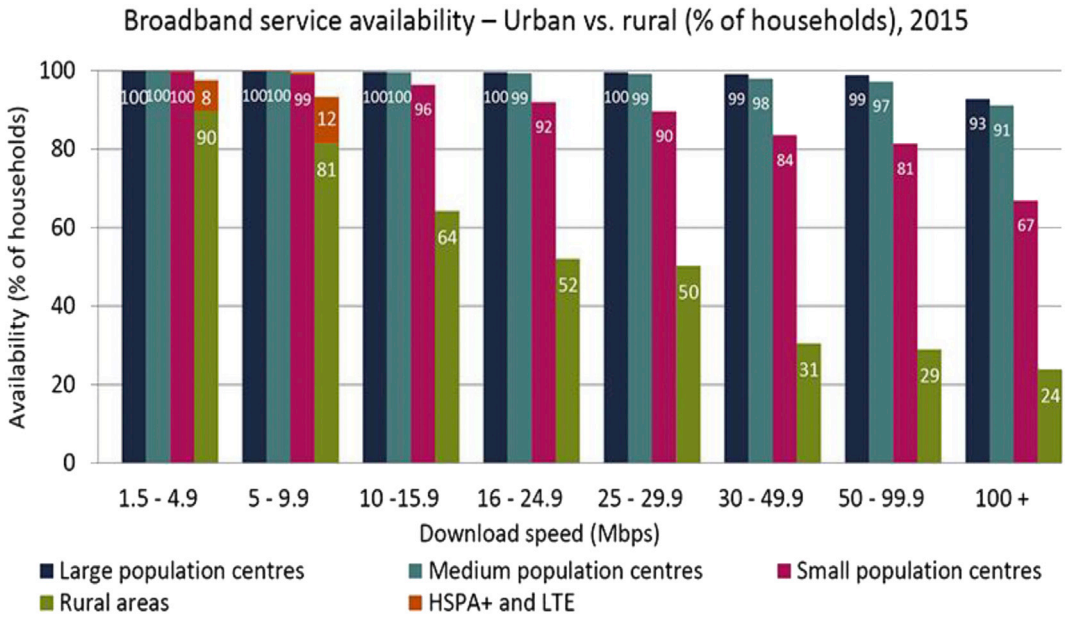

Fig. 1. Canadian Radio-Television and Telecommunications Commission, 2016 5.3.13.