ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

ONTARIO ENERGY BOARD

EB-2013-0234

IN THE MATTER OF the Ontario Energy Board Act, 1998, S.O. 1998, c.15 (Schedule B);

AND IN THE MATTER OF an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998.

Expert Report

Dr. Marc Van Audenrode
Analysis Group

March 14, 2014

This report was prepared at the request of the Ontario Energy Board.

Table of Contents

1 Introduction

1.1 Overview of THESL's Application for Regulatory Forbearance

1. Toronto-Hydro Electric System Limited ("THESL"), a local electric distribution company ("LDC") owned by the City of Toronto, is currently required to provide Canadian telecommunication carriers and cable operators access to its network of utility poles for wireless attachments at a regulated rate.

2. In its decision RP-2003-0249 ("CCTA Decision"), the Ontario Energy Board ("Board") set the regulated rate for a utility pole attachment at $22.35 per year. The Board's decision in EB-2011-0120 ("CANDAS Decision") subsequently confirmed that mandated pole access extends to wireless attachments.[1,2]

3. THESL has applied for regulatory forbearance under Section 29 of the Ontario Energy Board Act ("Act"). It asks for an order "that the Board refrain from regulating the terms, conditions and rates for the attachment of wireless telecommunications devices ("wireless attachments") to THESL's utility poles."[3]

4. Section 29 of the *Act* states that "the Board shall make a determination to refrain, in whole or part, from exercising any power or performing any duty under this Act if it finds as a question of fact that a licensee, person, product, class of products, service or class of services is or will be subject to competition sufficient to protect the public interest."[4]

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[1] *In the Matter of an Application pursuant to section 74 of the Ontario Energy Board Act, 1998 by the Canadian Cable Television Association for an Order or Orders to amend the licenses of electricity distributors*, Decision and Order, RP-2003-0249, March 7, 2005 ("CCTA Decision").

[2] *In the Matter of an Application by Canadian Distributed Antenna Systems Coalition for certain orders under the Ontario Energy Board Act, 1998*. Decision on Preliminary Issue and Order, EB-2011-0120, September 13, 2012 ("CANDAS Decision").

[3] *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, Notice of Application, June 13, 2013. Forbearance refers to "refraining from doing something that one has a legal right to do" (*West's Encyclopedia of American Law*, 2nd Ed., 2004, Vol. 13, p. 93).

[4] To date, there has only been one application or proceeding initiated under Section 29 of the Act. In the NGEIR proceedings (EB-2005-0551), the Board decided to refrain in part from regulating the prices charged for certain natural gas storage services (*In the Matter of a proceeding initiated by the Ontario Energy Board to determine whether it should order new rates for the provision of natural gas, transmission, distribution and storage services to gasfired generators (and other qualified customers) and whether the Board should refrain from regulating the rates for storage of gas*, Decision with Reasons, EB-2005-0551, November 7, 2006 ("NGEIR Decision"), §5.3, p. 74).

1.2 Issues Addressed by this Report

5. Counsel for the Board has asked me to review and comment on the report of Dr. Jeffrey Church ("Church Report")[5], and to evaluate whether the level of competition in the market for wireless attachments is sufficient to protect the public interest if the Board forbears, in whole or part, from regulating the rates, terms and conditions of access to THESL poles for wireless telecommunication attachments.

6. On January 23, 2014, the Board held an Issues Day, heard submission on two disputed issues from the Issues Conference on January 13, 2014, and approved the list of relevant issues ("Issues List") that have to be addressed and answered in this proceeding.[6] This report focuses on issues related to competition and general issues if they relate to the economic analysis of regulation.

7. The issues from the Issues List addressed in this report are:

Competition

4. What is the relevant antitrust market in which THESL supplies pole access for wireless attachments? Specifically:
    (a) What is the relevant product market?
    (b) What is the relevant geographic market?
5. What is the relevant downstream market to which THESL's supply of pole access for wireless attachments is an input?
6. Does THESL have market power in the provision of pole access to wireless service providers?
7. Given the relevant upstream and downstream markets, what effects, if any, would the exercise of market power by THESL in the supply of pole access to wireless service providers have in the downstream market, and what is the significance of those effects?
8. Is the "essential facilities" doctrine applicable in the circumstances of this case, and if so, to what extent?[7]

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[5] *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, Regulatory Forbearance for Toronto-Hydro-Electric System's Provision of Pole Access for Wireless Attachments, Expert Report of Jeffrey Church, EB-2013-0234, June 13, 2013 ("*Church Report*").

[6] *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, EB-2013-0234, Decision on Issues List and Procedural Order No. 4, January 28, 2014.

[7] The term essential facility has a definite interpretation in antitrust, it should not be equated with the familiar use of the word "essential" or "completely necessary".

General

12. What options does the Board have if it determines that it will refrain in part from regulating wireless attachments to THESL's poles?

8. If additional material becomes available subsequent to the issuance of this report, I may update or revise my report, subject to the Board's permission.

1.3 Summary of Conclusions

9. Based on my review of the *Church Report* and other materials, and the analyses I have performed, I have reached the following conclusions regarding the effects of regulatory forbearance of wireless pole attachments on competition:

- The relevant antitrust upstream market comprises THESL's network of utility poles in the City of Toronto. THESL's has substantial market power in the provision of pole access for wireless attachments.
- Regulatory forbearance is likely to substantially increase pole access rates for wireless attachments. It is expected that increased pole access rates get in large part passed through to the downstream market (wireless consumers). The impact on the monthly bill of wireless consumers is expected to be minimal.
- The economic and administrative cost of regulatory oversight of pole access rates should be compared to the size of the market for wireless pole attachment and the possible harm from THESL's exercise of market power in the provision of pole access for wireless attachments.
- If the Board determines to refrain from regulating the *rates* of pole access for wireless attachment (forbear in part), the Board may impose non-price conditions (e.g. non-discriminatory access, timelines for processing pole attachment requests, timely dispute resolution mechanisms should negotiations fail, etc.) as safeguards to ensure functioning competition and to protect the public interest.

1.4 Background and Qualifications

10. I am an economist specializing in microeconomics, labor and public economics, finance, antitrust, and econometrics. I have a Ph.D. in Economics from the University of California at Berkeley. I am a managing principal of Analysis Group, Inc., an economic, strategic and financial consulting firm. I previously was professor and head of the economics department at Laval University in Québec City, and professor at the University of Québec at Montréal. I am currently an adjunct professor at the University of Sherbrooke in Québec. My scientific research has been widely published in peer-reviewed academic journals. I have written articles for trade journals and I am a frequent presenter at industry and academic conferences.

11. As part of my consulting work, I have written numerous expert reports on a broad range of issues, and I have testified in Quebec Superior Court, in front of regulatory bodies and public utility

commissions, on competition cases, and in arbitration proceedings. I have also provided consulting support to government agencies and law firms in several key antitrust cases, both in the U.S. and Canada.

12. My curriculum vitae, which includes a list of my publications, is attached as Appendix A to this report. A list of all materials considered for this report is attached as Appendix B.

2 THESL's Pole Network and Pole Access for Wireless Attachments

2.1 THESL's Network of Utility Poles

13. THESL's distribution network comprises approximately 175,000 utility poles which support primary and secondary distribution functions, and provide for street lighting.[8] Around 68% of these poles can, depending on the circumstances and necessary modifications, accommodate wireless attachments.[9] In addition, Toronto Hydro-Electric Services Inc. ("THESI"), an affiliate of THESL, owns approximately 23,000 street lighting poles that can, if modified or replaced, accommodate wireless attachments.[10]

14. As of February 2014, there are 137 wireless attachments on THESL's poles, 128 of which provide Wi-Fi services and 9 provide cellular services. Furthermore, there are 63 wireless attachments on THESI's poles, 52 of which provide Wi-Fi services and 11 provide cellular services. Combined, there are 200 wireless attachments on THESL's and THESI's network of poles.[11] THESL and THESI poles on which there are wireless attachments, or for which applications for wireless attachments have been made, are all located outside of the Toronto downtown core.[12]

2.2 Wireless Networks and Pole Access

15. The adoption and usage of wireless network services has increased significantly over the last decade as people rely on wireless devices to make calls, communicate, access the internet, increase productivity and interact with their environment (Figure 1 and Figure 2). The growth in demand for wireless services originates in part from the availability and adoption of wireless devices such as

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[8] *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, Pre-Filed Evidence of Toronto Hydro-Electric System Limited, June 13, 2013, ("*THESL Pre-Filed Evidence*"), ¶1, ¶2.

[9] Supra note 8, ¶2, ¶7.

[10] Supra note 8, ¶8.

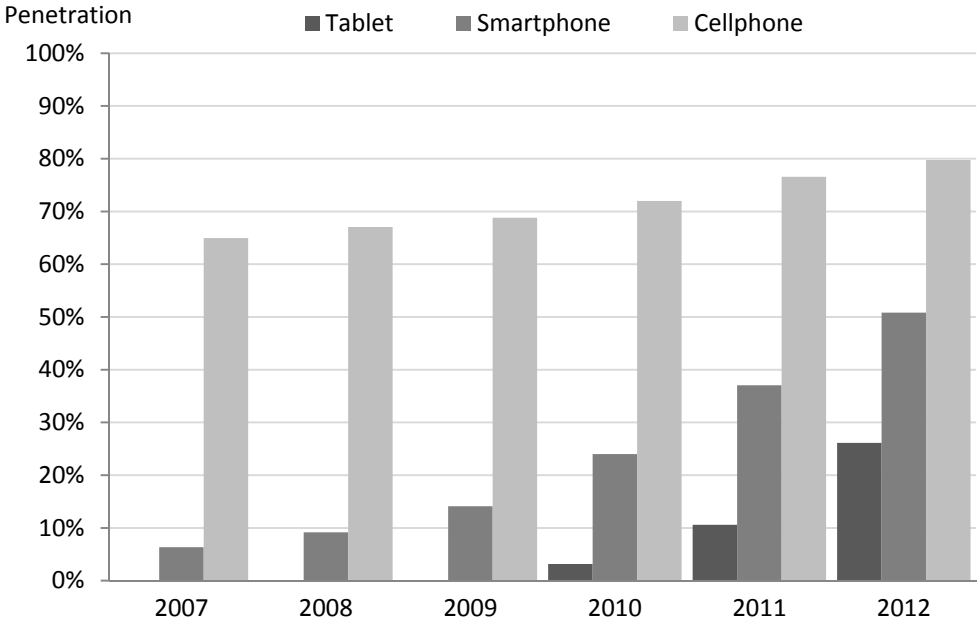
[11] *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, THESL Interrogatory Responses, February 28, 2014, ("THESL Interrogatory Responses"), Tab A, Schedule 2-2. For the purposes of this report, THESL's network of poles includes THESI's network of poles in the absence of a specific reference.

[12] Nineteen applications for wireless attachments on THESL and THESI poles have been made since September 2012, 18 of which are for attachments to THESL poles to provide cellular services. Supra note 11, ¶13.

smartphones and tablets, and in part from the increased availability of application and services that can be used with wireless devices.

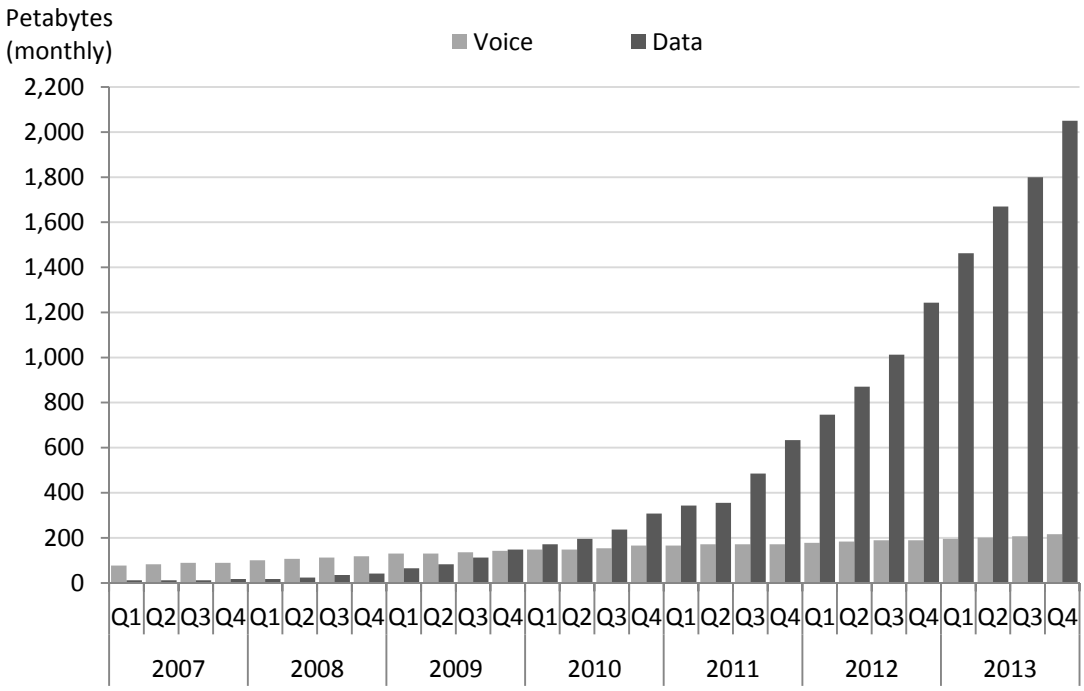
16. The exponential growth of wireless networking is expected to continue. Cisco forecasts mobile data traffic in Canada to grow 9-fold from 2013 to 2018, a compound annual growth rate of 54% (Figure 3). Increased wireless demand places pressure on wireless service providers to build and maintain wireless networks capable of handling the forecasted traffic growth.

Figure 1: Mobile Device Penetration (Canada)



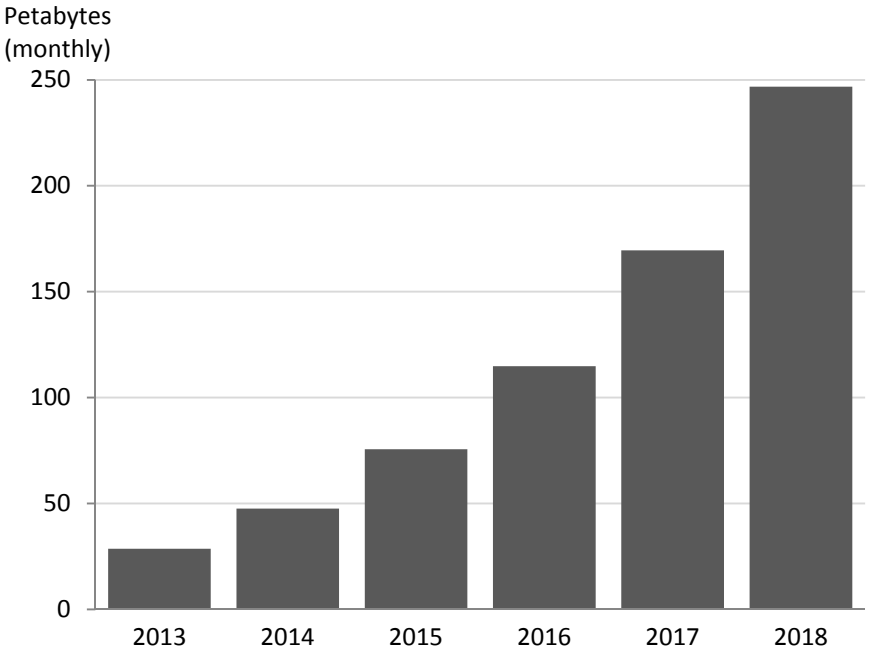
Respondents: Canadians 18 +; Cellphone includes regular cell phones and smartphones.
Source: Media Technology Monitor 2012.

Figure 2: Mobile Traffic Growth 2007 – 2013 (Global)



Monthly total uplink and downlink traffic. One Petabyte (PB) is equivalent to 1000 Terabytes (TB).
Source: Ericsson Mobility Report, February 2014.

Figure 3: Mobile Data Traffic Forecast 2013 - 2018 (Canada)



One Petabyte (PB) is equivalent to 1000 Terabytes (TB).
Source: Cisco VNI Global Mobile Forecast, 2013-2018, February 2014.

17. In the near future, Machine-to-Machine (M2M) communication, sometimes referred to as the 'internet of things', is expected to contribute significantly to traffic on wireless networks.[13] In M2M communication, remote sensors send data wirelessly to a network where it is then routed to a server. Examples of the wide range of mobile M2M applications are smart utility meters, smart parking solutions, home and office security, building automation, surveillance, inventory/fleet management, or remote monitoring in health care.[14] In contrast to consumer mobile traffic, M2M communication is characterized by many sensors, each using a data connection but transmitting only a small amount of data. Since a network cell at any particular time can support only a fixed number of users, the growth in the number of M2M connections can have a dramatic impact on capacity requirements for wireless networks, increasing the need for additional network equipment and smaller cells.[15] The number of mobile connected M2M modules in Canada is forecasted to grow 7.7-fold, the total M2M traffic in Canada is forecasted to grow 66-fold from 2013 to 2018 (Figure C-1).

18. Wireless networks operate on different frequencies of the radio spectrum and may require spectrum licenses.[16] Each frequency range has unique properties: some frequencies can travel long distances, others are better at navigating obstacles and penetrating walls.[17] The laws of physics and Industry Canada regulations limit the radio spectrum wireless service providers can use.[18]

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[13] Cisco Systems, *Cisco Visual Networking Index: Global Mobile Traffic Forecast Update, 2013-2018*, http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.pdf

[14] THESL's smart meters are an example of a growing range of M2M application: They monitor hourly electricity usage for the purpose of implementing time-of-use rates, and then wirelessly transmit this information to nearby collectors (https://www.torontohydro.com/sites/electricsystem/residential/yourmeter/Pages/HowSmartMetersWork.aspx).

[15] For a more extensive discussion of M2M communication, see Nordicity, *Wireless Technology: Expert Report on Wireless Technologies as They Pertain to Deployment and Pole Attachment Considerations*, March 14, 2014, ("*Nordicity Report*"), §3.4, pp. 19-23; ZDNet, *Tapping M2M: The Internet of Things* (http://www.zdnet.com/topic-tapping-m2m-the-internet-of-things/).

[16] Spectrum use and licensing in Canada is overseen by Industry Canada (http://www.ic.gc.ca/spectrum). Spectrum licenses, which can be leased or owned, entitle the license holder to exclusively operate wireless equipment using the specified frequency range in a defined geographic area. In contrast, unlicensed spectrum allows anyone to use wireless equipment in the specified frequency range. Due to interference by other users of unlicensed spectrum, commercial operators tend to favor licensed spectrum to ensure reliable service (*Nordicity Report*, pp. 10-11).

[17] *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, Expert Report of C.L. Jackson, June 11, 2013, §3.6 ("*Jackson Report*"); *Nordicity Report*, p. 10.

[18] From time to time, additional radio spectrum becomes available for wireless network providers as radio frequencies are repurposed. In May 2008, the Advanced Wireless Services (AWS) auction raised 4.25 billion and awarded 282 licenses in the 2 Ghz range to 15 parties (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf08891.html). The 700 MHz spectrum auction which ended on February 13, 2014 awarded 97 licenses in 14 service areas to eight parties and raised $5.27 billion in the process (http://www.ic.gc.ca/eic/site/smt-

19. The types of wireless networks most relevant to this proceeding are cellular networks, Wi-Fi networks, and fixed wireless networks.[19] Cellular networks operate on licensed radio spectrum and provide communication services including voice, text and data to mobile users. Best known and accessed by cellular phones, cellular-capable tablets or laptops, they are operated by telecommunication carriers with subscribers typically paying for access to the network. Wi-Fi networks operate on unlicensed radio spectrum, exist in a variety of settings (e.g. home, cafes, malls), can be public or private, and may be operated by individuals, businesses or even large telecommunication providers. Wi-Fi networks often supplement the coverage of cellular networks as most smartphones and tablets can make use of both cellular and Wi-Fi networks.[20] Fixed wireless networks operate on either licensed or unlicensed spectrum and provide wireless data connectivity between two fixed points. They can be employed for example to provide rural broadband connectivity, or building-to-building connections in an urban environment.

20. Wireless network operators must provide sufficient network coverage and network capacity to meet wireless demand.[21] Since spectrum is a finite good, service providers may have to increase the number of antennas and base stations. These additional sites, covering smaller geographic areas, increase the capacity and coverage of the wireless network.[22] Small cell technologies, and to a lesser extent Distributed Antenna Systems (DAS), are an option to increase network capacity, they 'fill in' coverage of macro cells.[23]

21. Wireless network providers aim for an efficient deployment of wireless equipment to deliver the greatest service quality, to the largest number of networks subscribers, at any point in the day. Network engineers seek to position wireless equipment close to the 'ideal' site, which will vary depending on the surroundings (e.g. buildings, hills, and trees), the nature of traffic and services

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gst.nsf/eng/h_sf10598.html). The next major auction of wireless spectrum licenses (2500 MHz band) is scheduled to begin in April 2015.

[19] There exist other types of wireless networks that are less relevant to the market for utility pole attachments (*Nordicity Report*, pp. 11-13).

[20] Most service providers use Wi-Fi to supplement cellular coverage. Shaw in Western Canada and Cogeco (OneZone) in downtown Toronto focus on operating Wi-Fi networks with broad coverage absent accompanying cellular networks (The Globe and Mail, *In battle for Western Canada, Shaw bets big on WiFi,* March 1, 2014, http://www.theglobeandmail.com/report-on-business/in-battle-with-telus-shaw-bets-big-on-wifi/article17182266; http://www.shaw.ca/wifi; http://www.onezone.ca).

[21] Coverage refers to the availability of an acceptable wireless signal, capacity refers to the ability of multiple users to simultaneously place calls and access the internet (*Jackson Report*, p. 24; *Nordicity Report* p. 15).

[22] *Jackson Report*, pp. 6-8; *Nordicity Report*, pp. 16-18.

[23] Macro cells are the basic building blocks of a mobile wireless network due to their large geographic coverage and high power output. They tend to be installed on cell towers or on building rooftops due to their size, space and power requirements. DAS and small cell deployments provide targeted network coverage and capacity over a smaller area. DAS and small cells serve the same purpose and have similar technical considerations (*Nordicity Report*, pp. 16-18; *Jackson Report*, pp. 26-27). A DAS cell is characterized by several antennas connected by fiber or coaxial cable to a single base station, a small cell in contrast has its own base station. Technology improvements in recent years have made base stations for small cells less expensive (*Jackson Report*, pp. 13, 33).

demanded, the frequency range of the equipment, the ease of access to power and network backhaul, the relative cost, and the difficulty of negotiations with site owners for access and installation.[24]

22. Poles are one of several siting options available to wireless operators in their quest to optimize their network and provide sufficient network capacity and coverage. Small cells, DAS antennas, Wi-Fi equipment or sensors for M2M networks are the most common equipment suitable for pole attachment, but they can also be placed on walls, sides of a building, lamp posts, or deployed indoors.[25] A distinct advantage of wireless attachments to street-lighting poles is the proximity to pedestrians that allows wireless service providers to provide network capacity in an urban environment where people congregate.[26]

23. In certain situations, pole attachments may not be the ideal placement of wireless equipment given the surroundings. Elsewhere, poles may be the 'ideal' location but alternative siting options (or network configurations) may be available that carry minimally higher costs and lead to negligible losses in quality of service. In certain situations however, attachment to poles may be the only technologically and economically reasonable option to ensure adequate network quality. In such situations, pole access is a crucial option for network operators in the design and deployment of wireless networks.[27]

24. There are network configuration alternatives, such as additional spectrum, splitting of macro cells into smaller coverage areas, Wi-Fi offloading, and indoor deployments, that could replace pole attachments, but they have other considerations that may make them less desirable for network engineers or insufficient to handle the growth of wireless demand.[28]

25. In response to the "dramatic increase" in demand for wireless services (e.g. data, video, gaming media) in the City of Toronto, Rogers Communications ("Rogers") has submitted a proposal to the City of Toronto to enhance and augment its wireless network by intensifying and focusing coverage of its existing tower sites (large cell towers and antennas mounted on high-rise rooftops) inward and filling in the coverage gaps with smaller "densification" sites (smaller antennas at less than 15 meters in height). As part of its plan, Rogers is proposing to install around 100 antennas on existing

[24] Newer wireless equipment suitable for pole attachment may be completely self-powered and use wireless links for backhaul connection (*Nordicity Report*, p. 31; *THESL Interrogatory Responses*, Tab B, Schedule 1-10).

[25] Manufacturers of wireless equipment tend to emphasize the flexibility provided by the various placement options (*Nordicity Report*, pp. 30-31).

[26] Ghosh A., N. Mangalvedhe, R Ratasuk, et al. (2012): "Heterogeneous Cellular Networks: From Theory to Practice," *IEEE Communications Magazine*, 50(6), June, at p. 61.

[27] *Jackson Report*, pp. 29, 33.

[28] Wireless offloading of mobile data traffic in Canada is expected to increase from 58% in 2013 to 66% in 2018. However, wireless offloading, even if entirely indoor without the need for utility pole access, pales in comparison to the expected growth of cellular data traffic from mobile and portable devices which is forecasted to grow 275% from 2013 to 2018 (Cisco VNI Global Mobile Forecast, 2013-2018, February 2014); Figure C-2.

utility poles (modified streetlight poles), 40-50 antenna poles on private property, and seeking permission from the City of Toronto to install up to 50 stand-alone antenna poles within the City's public right-of-way.[29] Other wireless service providers could be interested in deploying similar infrastructure in the City of Toronto.

26. The expected growth of wireless demand will require extensive use of small cell technologies and utility poles are one of several siting options where such wireless equipment can be installed.[30] Given the increased need for suitable siting locations, demand for access to poles for wireless attachments may well increase in the future.

2.3 Economic Rationale of Pole Access Regulation

27. A network of utility poles is generally considered a non-rivalrous good and exhibits economies of scope.[31] A pole network jointly used for electricity distribution and telecommunications is characterized by lower costs for *both* uses. Although the installation of new, duplicate poles to attach wireless equipment could perfectly substitute for access to THESL's utility poles, proliferation and wasteful duplication of pole networks is not in the public interest. Pole attachments are a commonly accepted method of installing wireless equipment and its use is encouraged by authorities.[32]

28. Both federal and provincial regulatory authorities have recognized the need to avoid wasteful duplication of pole networks. In its revised regulatory framework, the Canadian Radio-television Telecommunications Commission ("CRTC") determined that support structure facilities, such as

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[29] City of Toronto, *Telecommunications – Authority to Permit the Installation of Stand-Alone Antenna Poles*, Staff Report, October 11, 2013; http://www.toronto.ca/legdocs/mmis/2013/pw/bgrd/backgroundfile-63448.pdf.

[30] *Jackson Report*, §5, p. 26; *THESL Interrogatory Responses*, Tab F, Schedule 5-11.

[31] "[M]ost property is rivalrous – its possession by one party results in a gain that precisely corresponds to the loss endured by the other party. In this case, however, the property that has been taken – space on a pole – may well lack this congruence. It may be, for practical purposes, nonrivalrous. This means that use by one entity does not necessarily diminish the use and enjoyment of others. A common example of a nonrivalrous good is national defense." (*Alabama Power Company v. Federal Communication Commission*, No. 00-14763, November 14, 2002, p. 24, www.ca11.uscourts.gov/opinions/ops/200014763.opn.pdf). "In most cases, there is enough space on the existing utility pole network to accommodate the attaching entity's needs without forcing the utilities to sacrifice anything." (*Georgia Power Company v. Teleport Communications Atlanta and the Federal Communication Commission*, No. 02-15608, September 29, 2003, www.ca11.uscourts.gov/opinions/ops/200215608.pdf). A production process is characterized by *economies of scope* if joint production is less costly than producing the products individually." (Church, J.R. and R. Ware, *Industrial Organization: A Strategic Approach*, (San Francisco: McGraw-Hill-Irwin), 2000, p. 782).

[32] City of Toronto, *Telecommunication Tower and Antenna Protocol*, amended December 18, 2013, www.toronto.ca/legdocs/mmis/2013/cc/bgrd/backgroundfile-65545.pdf; Canadian Wireless Telecommunications Association (CWTA) and Federation of Canadian Municipalities, *Antenna System Siting Protocol Template*, February 2013, http://www.fcm.ca/documents/tools/fcm/Antenna_System_Siting_Protocol_EN.pdf; Industry Canada, *Guide to Assist Land-use Authorities in Developing Antenna Siting Protocols*, January 2008, http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08839.html.

THESL's network of utility poles, provide an important social benefit. It classified them in the public good category, with mandated access.[33]

> "[…] the construction of duplicate support structure facilities would result in an inefficient use of public and private resources and would be an inconvenience to the public. Accordingly, the Commission determines that support structure services are to be classified as public good services."[34]

Furthermore, the CRTC established that "the nature of essential and other mandated services is such that it would not be appropriate to implement a market-based approach based on negotiated agreements."[35]

29. In its *CCTA Decision* on pole access for cable and telecommunication providers, the Board determined that power poles are essential facilities and that LDCs have exercised monopoly power: "The Board agrees that power poles are essential facilities. It is a well-established principle of regulatory law that where a party controls essential facilities, it is important that non-discriminatory access be granted to other parties. Not only must rates be just and reasonable, there must be no preference in favour of the holder of the essential facilities. Duplication of poles is neither viable nor in the public interest."[36]

30. The *CCTA Decision* established a non-discriminatory, technology-neutral right of access to power poles for cable companies and Canadian carriers as defined by the Telecommunications Act and the subsequent *CANDAS Decision* declared the scope of access to be "attachments that are required to conduct the business activities of the company making the attachment – namely

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[33] Canadian Radio-television and Telecommunications Commission, *Revised Regulatory Framework for Wholesale Services and Definition of Essential Service*, Telecom Decision CRTC 2008-17, March 3, 2008, ¶93.

[34] Supra note 33, ¶93. The New Brunswick Public Utility Commission in 2005 similarly found that "[i]t is in the public interest that every enterprise who wishes to provide services to the public which logically require access to electricity poles and telephone poles not have to obtain easements and erect its own poles when there are readily available poles to which the services can be attached with no technical interference with or harm to the owner of the poles. It is in the public interest to avoid proliferation of poles. […] [I]t would be uneconomic and wasteful if all utilities and persons seeking to provide services in New Brunswick were required to acquire their own easements and poles in areas already served by electric power poles. It would be appropriate to allow access to electric power poles to provide services provided it can be done without interference with the distribution system." (Oral Ruling of the New Brunswick Board of Commissioners on the Rogers Jurisdiction Motion in the Disco Rate Application, October 27, 2005). In 2010, the British Columbia Utilities Commission stated: "The Commission Panel notes that the Commission is required to consider the public interest in its regulation of public utilities. […] In the Commission Panel's view, the policy objective against duplication of infrastructure is clear on a reading of the Act as a whole, for the reasons discussed above." (*In the Matter of an Application by Shaw Cablesystems Limited and Shaw Business Solutions Inc. to Continue to Use FortisBC Inc's Transmission Facilities*, Reasons for Decision, April 1, 2010, p.8.). The Court of Appeal for British Columbia similarly stated: "In my view, avoidance of duplication achieves an important policy goal within the scheme." (FortisBC Inc. v. Shaw Cablesystems Limited, 2010 BCCA 552, December 6, 2010, ¶58).

[35] Supra note 33, ¶127.

[36] *CCTA Decision*, p. 3.

telecommunication equipment or cable equipment."[37] The Board left it to the parties to negotiate terms and conditions for wireless attachments (but not the rate). If negotiations fail, then the matter may be brought to the Board for consideration.[38]

3 Analytical Framework

31. THESL's application for regulatory forbearance of pole access for wireless attachments is brought under Section 29(1) of the *Ontario Energy Board Act* of 1998:

> "On an application or in a proceeding, the Board shall make a determination to refrain, in whole or part, from exercising any power or performing any duty under this Act if it finds as a question of fact that a licensee, person, product, class of products, service or class of services is or will be subject to competition sufficient to protect the public interest."

32. Regulatory forbearance refers to the regulatory authority's abstention from applying certain regulatory conditions that fall under its jurisdiction. For example, based on Section 34 of the *Telecommunications Act,* which closely resembles the language in the Ontario Energy Board Act, [39] the CRTC has determined to forbear from regulating the supply of long distance services, telephone equipment, business and residential local telephone services, high-speed Internet services, wireless telephone and data services.[40]

33. The public policy rationale for regulatory forbearance is composed of two strands. First, competition may produce superior outcomes in terms of prices, quantity and quality of goods and services. Second, regulation stifles firms' ability to respond to changing market conditions, lessens innovation, and imposes a financial and administrative burden on firms and regulators, all economic costs ultimately borne by consumers.[41]

34. The assessment of the expected effects of regulatory forbearance typically involves an economic analysis of the state of competition in the regulated market. In this proceeding, Section 29 of the *Act* requires the Board to determine whether there is or will be competition "sufficient to protect

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[37] *CANDAS Decision*, p.10.

[38] *CANDAS Decision*, pp. 14-15.

[39] "Where the Commission finds as a question of fact that a telecommunications service or class of services provided by a Canadian carrier is or will be subject to competition sufficient to protect the interests of users, the Commission shall make a determination to refrain, to the extent that it considers appropriate, conditionally or unconditionally, from the exercise of any power or the performance of any duty under sections 24, 25, 27, 29 and 31 in relation to the service or class of services." *Telecommunications Act*, S.C. 1993, c. 38, s. 34 (2).

[40] Brown, David, Roger Ware, and Howard Wetston (2007): "Forbearance, Regulation, and Market Power in Natural Gas Storage: The Case of Ontario," World Energy Congress 2007, http:/www.worldenergy.org/documents/p000964.pdf.

[41] Janisch H.N., and B.S. Romaniuk (1985): "The Quest for Regulatory Forbearance in Telecommunications, *Ottawa Law Review*, 17(3), pp. 455-489; *NGEIR Decision*, p. 25.

the public interest."[42] Section 29 contains a dynamic component, "is or will be", which will require an assessment of the expected state of competition in the relevant markets in the future and potential barriers to entry.

35. The analytical methodologies followed by various Canadian and US regulatory agencies to assess the level of competition in regulatory forbearance proceedings mirror more or less the Competition Bureau's Merger Enforcement Guidelines ("Merger Enforcement Guidelines").[43] The same methodology used to assess market power implication of mergers can assess whether regulatory forbearance is likely to lead THESL to exercise market power in the provision of pole access for wireless attachments. The key components of the *Merger Enforcement Guidelines* framework of assessing market power are the identification of the relevant product and geographic markets, and the analysis of the competitive effects and potential entry in those markets.[44]

3.1 Market Definition

36. Market definition is an important component of the enforcement of competition laws. It is generally undertaken to identify an appropriate frame of reference for assessing market power, competitive effects, and the potential for market entry. It is a widely applied analytical framework, often the first step, to examine and evaluate which products in which geographic locations significantly constrain the competitive behavior of firms.[45]

37. THESL, and its affiliate THESI, are the sole suppliers of access to utility and street-lighting poles in Toronto for wireless attachments. Whether THESL has any market power depends however on the availability of siting alternatives with reasonable interchangeability characteristics. A market is a set of products and geographic locations defined with the purpose to assess market power, relevant competitors, entry barriers, and competitive effects. Antitrust analysis often relies on a market delineation exercise to identify the relevant market composed of close substitute products. Market definition is a helpful and often critical step to assess market power and competitive constraints faced by firms.[46]

38. Well-established methods of market definition in antitrust identify product and geographic markets based on whether consumers would switch to substitutes if a firm were to exercise market power and increase the price. The hypothetical monopolist test is a commonly used antitrust test to delineate markets. Accordingly, the relevant product (geographic) market is defined as the smallest set of products (area) for which a hypothetical monopolist would impose, and sustain, a small but

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[42] *Ontario Energy Board Act*, 1998, c.15, Schedule B, s.29 (1).

[43] Competition Bureau of Canada, *Merger Enforcement Guidelines*, October 6, 2011 ("*Merger Enforcement Guidelines*").

[44] Supra note 43, §3.1.

[45] Market definition is not an end in itself, it is not a required step in merger reviews, and it may be part of an iterative process rather than the starting point (Supra note 43, §3.1).

[46] Baker, J.B. (2007): "Market Definition: An Analytical Overview", *Antitrust Law Journal*, 74(1), pp. 129-173.

significant, non-transitory increase in price (SSNIP).[47] Candidate markets are enlarged if the price increase would likely lead to a decrease in quantity sufficient to render the price increase unprofitable. This process is continued, next-best substitutes added to the market, until a SSNIP is profitable. The hypothetical monopolist test focuses on competition from *other* products and geographic areas by removing competition *within* a given set of products and geographic area, to then assess in a second stage the market power and competitive constraints faced by suppliers *within* the set of products and geographic area (the relevant market).[48] If the necessary data to perform the hypothetical monopolist test are not available, the test nonetheless provides a coherent conceptual framework to define the relevant product and geographic markets.

39. Market definition based on economic principles is based on substitution and price pressure between products and does not solely rely on product characteristics. The focus is economic substitutability rather than technical or functional substitutability; what matters is whether buyers change their purchase behavior in response to a price change.[49]

3.2 Market Power

40. Market power refers to a firm's ability to profitably cause price, or non-price attributes such as quality, to substantially deviate from competitive levels for a sustainable period of time.[50]

41. It is helpful to distinguish between the existence of market power, the exercise of market power, and the creation, enhancement and preservation of market power. Market power exists when a firm has the ability to raise prices above competitive levels.[51] Profit-maximizing firms generally tend to exercise market power if they possess it.

42. Policy concerns about market inefficiencies arising from the exercise of market power are typically addressed by regulation: market intervention through ex ante regulation is targeted at limiting the exercise of market power. The public policy objectives of competition law differ from those of

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[47] Most competition authorities, including the Competition Bureau, consider a five percent price increase to be significant (*Merger Enforcement Guidelines*).

[48] Niels, G., H. Jenkins and J. Kavanagh, Economics for Competition Lawyers, (Oxford: Oxford University Press), 2011, pp. 25-27.

[49] A (product) market cannot be considered too small solely because a product has numerous substitutes. Minor functional differences between products are likewise not enough to reject a larger (product) market. The key issue for market delineation is the existence of *close* substitutes which would lead buyers to switch their purchases in response to a small, but significant price increase. (Trebilock, M., R.A. Winter, P. Collins and E.M. Iacobucci (2002): *The Law and Economics of Canadian Competition Policy*, (University of Toronto Press, Toronto), pp. 75-77; Competition Bureau, *Merger Enforcement Guidelines*, October 6, 2011, ¶4.10 and ¶4.14).

[50] Niels, G. H. Jenkins and J. Kavanagh, Economics for Competition Lawyers, (Oxford: Oxford University Press), 2011, pp. 116-123; *Merger Enforcement Guidelines*, ¶2.3; Musgrove, James (2010): *Fundamentals of Canadian Competition Law*, 2nd Ed (Toronto: Thomson Carswell), p. 28.

[51] "[I]t is the *ability* to raise prices, not whether a price increase is likely, that is determinative [of market power]", *Merger Enforcement Guidelines*, ¶2.3.

regulation. Ex post enforcement through the *Competition Act* addresses the creation, preservation, and extension of market power, the mere exercise of market power is generally not reachable under the Competition Act.[52]

43. Regulation and antitrust policy are two alternate forms of public policy addressing firm's market power. Nothing in the *Act* will limit challenges of anticompetitive conduct in the provision of access to THESL's network of poles under the Competition Act should the Board make a determination to forbear in whole or in part.[53]

44. Any concerns about a firm exercising its market power and unilaterally raising its price can only be addressed by constraining the exercise of market power through regulatory intervention of prices and business practices. If the Board makes the determination to forbear in whole from regulation the rates for pole access of wireless attachments, THESL's pricing of pole access is fully flexible unless it is part of a practice determined to be anticompetitive conduct under the *Competition Act*.[54]

45. Economic textbooks contain stylized models of competition, ranging from the monopolist with extensive market power, to models of oligopolistic competition in which firms have some market power, to a model of perfect competition in which no seller has market power and can influence the market price.[55] Market power is a matter of degree, there is no bright-line test at which a firm goes from no market power to having market power. For market power to be a regulatory or antitrust concern, there must exist an appreciable effect on price, quantity, choice or quality.[56] The statutory test in Section 29 of the *Act* is whether there is or will be competition sufficient to protect the public interest.[57] A perfectly competitive market is not a necessary condition to meet the statutory test.[58]

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[52] Church Report, ¶46; Church, J.R. and R. Ware, Industrial Organization: A Strategic Approach, (San Francisco: McGraw-Hill-Irwin), 2000, p. 40.

[53] "For greater certainty, where the Board makes a determination to refrain in whole or in part from the exercise of any power or the performance of any duty under this Act, and does so refrain, nothing in this Act limits the application of the Competition Act (Canada) to those matters with respect to which the Board refrains." *Ontario Energy Act*, 1998, c. 15, Sched. B, s. 29 (3).

[54] THESL proposes to charge a "competitive rate" for wireless attachments to its poles to recover direct and indirect cost and provide a benefit to its ratepayers and shareholders (*THESL Pre-Filed Evidence*, ¶17).

[55] Perloff J.M., *Microeconomics*, 5th Ed., (Boston: Addison Wesley), 2008, Ch. 8-13.

[56] Niels, G. H. Jenkins and J. Kavanagh, Economics for Competition Lawyers, (Oxford: Oxford University Press), 2011, pp. 116-123. The *Merger Enforcement Guidelines* define prevention and lessening of competition to be substantial "if the price of the relevant product(s) would likely be materially higher in the relevant market." (*Merger Enforcement Guidelines*, ¶2.13, p. 8).

[57] Supra note 42.

[58] *NGEIR Decision*, p. 26. The Board stated that "[t]he public interest can incorporate many aspects including customers, investors, utilities, the market, and the environment" and did not subscribe to the view that

46. Besides assessing current market power, the potential for market entry is a key component in the assessment of the persistence of THESL's market power. If entry is easy, THESL's market power is thwarted if sufficient alternative siting options become available that constrain a material price increase of THESL in the relevant market.[59] Barriers to entry are market characteristics that protect the market power of firms by making entry unlikely or unprofitable. Local planning laws, city regulation and other types of constraints may prevent alternative siting options for wireless attachments from constraining THESL's exercise of market power. [60]

3.3 The Essential Facilities Doctrine

47. In its *CCTA Decision*, the Board determined that power poles are essential facilities and that LDCs have exercised monopoly power.[61] The term essential facility has a definite interpretation in antitrust, it should not be equated with the familiar use of the word "essential" or "completely necessary". An essential facility is a "unique input to the production process that cannot be cheaply duplicated."[62] The essential facility doctrine, a legal doctrine coming from competition laws, states that a vertically integrated owner of an essential upstream facility may have an incentive to monopolize complementary or downstream market segments.[63]

48. The Competition Bureau considers a facility to be essential if all of the following conditions are satisfied: [64]

    i. The firm controlling the facility (input of production) is vertically integrated and dominant in the upstream market for the facility and in the downstream market in which the facility is an input. A necessary condition for dominance in the upstream market is that it is not practical or feasible for competitors to duplicate the facility in question;

    ii. withdrawing access to the facility is likely to result in competitors exiting from, or contracting in, the downstream market; and

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competition in itself protects the public interest. Rather, the Board considered the applicable legislative objectives in determining the public interest factors (NGEIR Decision, p. 42).

[59] Supra note 43.

[60] Supra note 48, pp. 132-142.

[61] *CCTA Decision*, p. 3.

[62] Laffont, J.J. and J. Tirole, *Competition in Telecommunications*, (Cambridge, Massachusetts: MIT Press), 2000, p. 282.

[63] The essential facility doctrine was first discussed in *United States v. Terminal Railroad Association of St. Louis, 224 U.S. 383 (1912),* in which a joint venture of railroads owning a key bridge across the Mississippi River excluded competitors. (Rey, P. and J. Tirole (2007): "A Primer on Foreclosure," in *Handbook of Industrial Organization*, Ed. M. Armstrong and R.H. Porter, Volume 3, Chapter 33 (Amsterdam: North-Holland), pp. 2145-2220).

[64] Supra note 33, ¶11.

iii. such exit or contraction is likely to result in a substantial lessening of competition in the downstream market.

49. The CRTC's definition of essential facility is similar, but for the omission of the downstream market dominance requirement.[65] Both the CRTC and the Competition Bureau agree on the need to establish the link between the essentiality of the input of production and its withdrawal on competition in the downstream market for a facility to be considered essential.

50. Possessing market power in the upstream market is not a sufficient condition for an essential facility. The second condition requires that the withdrawal of access to the facility or input has negative competitive effects in the downstream market. The third condition requires that the effect on downstream competition is substantial in order to avoid erroneously classifying a facility to be essential if the impact on downstream competition is likely to be immaterial.

51. The essential facilities doctrine is not applicable to the analysis of THESL's application for regulatory forbearance. THESL does not operate in the downstream market of providing wireless telecommunications services, that is, THESL is not vertically integrated.[66] Consequently, the first condition of the essential facilities doctrine is not satisfied, THESL's network of utility poles cannot be considered an essential facility for wireless telecommunication carriers.[67] Without a vertically integrated facility owner, the key element, the incentive of the facility owner to enhance market power in downstream markets is absent.[68]

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[65] Supra note 33, ¶22. In the United States, *MCI Communications Corp. v. AT&T, Co. 708 F.2d 1081 (1982)* outlined the four basic elements under the essential facilities doctrine as i) control of the essential facility by a monopolist; ii) a competitor's inability practically or reasonably to duplicate the essential facility; iii) the denial of the use of the facility to a competitor; and iv) the feasibility of providing the facility to competitors. The US Supreme Court has never recognized the essential facilities doctrine and declined to rule on it in *Verizon v. Trinko, 540 U.S. 398 (2004).*

[66] It is not THESL's current intention that THESI or any other THC subsidiary would become involved a line of business that includes providing wireless services. This application is predicated on engagement exclusively with arms-length counterparties." (*THESL Interrogatory Responses*, Tab F, Schedule 5-13). THESL's smart meters wirelessly transmit hourly electricity usage to nearby collectors, an example an M2M communication application. (https://www.torontohydro.com/sites/electricsystem/residential/yourmeter/Pages/HowSmartMetersWork.aspx). THESL would become vertically integrated if it were to extend the use of its network capable of receiving wireless signals from smart meter to other M2M applications such as smart parking or home security solutions for example.

[67] THESL's application for regulatory forbearance does conform to neither the CRTC nor the Competition Bureau's definition of essential facilities.

[68] The inapplicability of the essential facilities doctrine resulting from THESL's lack of vertical integration does not imply that regulatory concerns about THESL's potential exercise of market power may not exist.

4 Relevant Market Containing Pole Access for Wireless Attachments

52. The market definition exercise to assess the relevant upstream and downstream markets has both a product and geographic dimension: The product market is defined by a set of close substitute products; the geographic market is defined by the geographic area in which suppliers of the relevant products compete.

4.1 Product Market Definition

53. The relevant product market is a set of close substitute products, such that buyers will respond to a price increase of those products by switching in significant numbers to substitute products.[69] The hypothetical monopolist test defines the relevant product market as the smallest set of products for which a hypothetical monopolist would impose, and sustain, a small but significant, non-transitory increase in price (SSNIP).

54. The hypothetical monopolist test is implemented starting with the products of the firm under consideration, then adding close substitutes until a (hypothetical) single supplier of all products included so far would impose, and sustain, a SSNIP. Hence, the relevant product market comprises access to THESL's network of utility power and the smallest set of siting alternatives such that a hypothetical monopolist of THESL's network of utility poles and the set of siting alternatives would impose, and sustain, a SSNIP. The set of products is not expanded any further than necessary to meet the SSNIP condition. If THESL on its own would find it profitable to impose a SSNIP on wireless attachments to its network of poles, including no siting alternatives, then the relevant product market is narrow, restricted to THESL network of poles.[70]

4.1.1 Demand for Pole Access

55. Since 2006, 305 wireless attachments have been made to THESL and THESI poles.[71] As of February 2014, there are 200 wireless attachments installed on THESL's and THESI's network of poles and THESL has applications pending for pole attachments from a wireless service provider.[72]

56. Since the *CANDAS Decision*, there have been 41 permit applications for wireless attachments from two providers, 21 of which have been issued. Of the 41 applications, 40 are attachments for

[69] *Merger Enforcement Guidelines*, ¶4.10.

[70] "In particular, if a single supplier of the entire supply of the firm's product could profitably raise its price by a small but significant amount, the product market definition should not extend beyond that product." (Trebilock, M., R.A. Winter, P. Collins and E.M. Iacobucci (2002): *The Law and Economics of Canadian Competition Policy*, (University of Toronto Press, Toronto), p. 71).

[71] *THESL Interrogatory Responses*, Tab A, Schedule 2-5.

[72] *THESL Interrogatory Responses*, Tab A, Schedule 2-2 and 2-3. There are 137 wireless attachments on THESL's poles, 128 of which provide Wi-Fi services and 9 provide cellular services. Furthermore, there are 63 wireless attachments on THESI's poles, 52 of which provide Wi-Fi services and 11 provide cellular services.

cellular services (20 on THESL and 20 on THESI poles) and one application contemplates Wi-Fi attachments on two THESL poles.[73]

57. Current and future demand for access to THESL poles for wireless attachments is lower relative to wireline attachments. While wireline attachments require a continuous network of poles to suspend wires, wireless attachments tend to require fewer access points and depend less on a continuous pole network.

58. There are multiple parties currently attaching wireless equipment to THESL poles, including the Toronto Transit Commission (TTC), Cogeco which provides a Wi-Fi network in Toronto's downtown core, and at least one wireless service provider who has 4G wireless antennas attached to THESL/THESI poles. THESL anticipates facilitating additional wireless attachments by a wireless service provider.[74]

59. No major impediments to pole access for wireless attachments appear to exist: neither has a substantial number of permit applications been declined, nor do there appear to exist significant time delays until permits are granted. THESL has not granted or declined four permits (out of 41) covering five pole attachments for cellular services since the *CANDAS Decision*, and the average timeframe for THESL/THESI to respond to pole requests was 12 days.[75]

60. The expected strong growth of wireless networking, including new applications such as M2M communications, will require wireless networks capable of handling the forecasted traffic growth. Wireless service providers will make extensive use of small cell technologies for which utility poles are one of several siting options.[76]

61. Industry Canada has recently modified its cell tower regulations in response to sensitivity by local communities to constructing new cell towers (and the deployment of macro cells mounted to them). The policy changes are intended to minimize the proliferation of cell towers. Regulations require wireless service providers to use existing towers or infrastructure such as utility poles and to consult communities on all commercial tower installations, regardless of height.[77] THESL's

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[73] *THESL Interrogatory Responses*, February 28, 2014, Tab F, Schedule 3-14. THESL has not granted or declined four permits covering five pole attachments for cellular services (*THESL Interrogatory Responses*, February 28, 2014, Tab A, Schedule 1-1).

[74] *THESL Interrogatory Responses*, Tab A, Schedules 2-2, 2-3 and 2-5.

[75] *THESL Interrogatory Responses*, February 28, 2014, Tab A, Schedule 1-1, Tab E, Schedule 1-16, and Tab F, Schedule 3-14.

[76] *Jackson Report*, §5, p. 26; *THESL Interrogatory Responses*, Tab F, Schedule 5-11; AT&T has announced that over the next three years it will deploy more than 40,000 small cells across its network (http://www.att.com/gen/press-room?pid=23971).

[77] Under previous cell tower siting policy, a wireless service provider was only required to consult the community for structures exceeding 15 meters. (http://news.gc.ca/web/article-en.do?nid=813809). It may not always be possible to use existing structures due to technical constraints such as achieving coverage, frequency re-use and

network of utility poles is an existing network of suitable support structures for wireless attachments for which access and construction rights do not have to be acquired through hundreds of individual transactions with building owners and municipal authorities.[78]

62. The strong directive to use existing structures for wireless telecommunication equipment is also expressed in the City of Toronto's Telecommunication Tower and Antenna Protocol, which explicitly states that existing structures such as a hydro transmission tower or utility poles be explored before any proposal to construct a new telecommunication structure is made. Any proposal will only be accepted when all other options to accommodate antennas are not viable.[79]

63. Given the increased need for suitable siting locations, public opposition to new structures, and a general policy directive favoring placement on existing structures such as utility poles, demand for access to THESL's network of poles for wireless attachments is likely to increase in the future.

64. Relevant evidence of the increase in demand for access to THESL's network of utility poles is Rogers' proposal to the City of Toronto to install around 100 antennas on existing utility poles (modified streetlight poles), build 40-50 antenna poles on private property, and seek permission from the city to install up to 50 stand-alone antenna poles within the city's public right-of-way.[80] Besides Rogers, other wireless service providers have contacted the City with interest in installing antenna systems on city-owned properties.[81,82]

4.1.2 Siting Alternatives

65. THESL's utility poles are one of several siting options available to wireless operators in their quest to provide sufficient network capacity and coverage. Wireless equipment can also be placed on

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equipment isolation issues (Industry Canada, *Guide to Assist Land-use Authorities in Developing Antenna Siting Protocols*, January 2008, http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08839.html).

[78] The ability to negotiate with a single entity rather than numerous site owners results in lower administrative costs and possible faster deployment, which may be particularly important for new wireless service providers.

[79] City of Toronto, *Telecommunication Tower and Antenna Protocol*, amended December 18, 2013, www.toronto.ca/legdocs/mmis/2013/cc/bgrd/backgroundfile-65545.pdf. "Before submitting a proposal for an Antenna System on a new site, the Proponent must […] locate, analyze and attempt to use any feasible existing infrastructure, including (but not limited to) rooftops, water towers, utility poles or light standards." (Canadian Wireless Telecommunications Association (CWTA) and Federation of Canadian Municipalities, Antenna System Siting Protocol Template, February 2013, p. 15, http://www.fcm.ca/documents/tools/fcm/Antenna_System_Siting_Protocol_EN.pdf).

[80] Supra note 29.

[81] City of Toronto, *Telecommunications Towers and Antennae Agreements between Rogers Communication Inc. and the City of Toronto*, October 31, 2013, p. 4, http://www.toronto.ca/legdocs/mmis/2013/gm/bgrd/backgroundfile-63539.pdf.

[82] THESL has received applications for pole attachments from a wireless service provider and anticipates facilitating these pole attachments (*THESL Interrogatory Responses*, Tab A, Schedules 2-3).

walls, sides of a building, lamp posts, or deployed indoors, and there are network configuration alternatives that could replace the need for wireless pole attachments.[83]

66. Pole access for wireless attachments is an input of production for wireless service providers. Optimal network design requires wireless service providers to choose from a set of production inputs. They will rationally choose their relative mix of inputs, including the reliance on access to THESL's utility pole network, based on their relative technological characteristics, the cost of deploying the equipment, and the price.

67. In any particular real-world situation, attachment to THESL's utility poles may be the ideal placement of wireless equipment. Alternative siting options (or network configurations) may be available that carry minimally higher costs and lead to negligible network quality losses. Or, attachment to utility poles may be the only technologically and economically reasonable option to ensure adequate network quality.[84] The demand for access to THESL's utility pole network will depend on the availability and characteristics of these alternative inputs of production.

68. The mere existence and number of alternative siting locations (or network configurations) to THESL's utility poles is insufficient to conclude that a competitive siting market exists and that THESL lacks market power.[85] Substitution is not all or nothing, it is a matter of degree. Siting alternatives to THESL utility poles may be of inferior quality and/or more costly. Rooftop access to tall buildings and macro-cell towers may not be perfect technological substitutes for street-level attachments to utility poles, may have substantially different costs, and access may not be granted or only after substantial delays.

69. Market definition relies on economic substitutability and is based on the existence of close substitutes that would lead buyers to switch to alternative siting options (or network configurations) if THESL raised the pole access rate by a small but significant amount. Hence, the key to the delineation of the relevant (product) market definition is the willingness of wireless service providers to substitute to other inputs in response to an increase in the price of pole access.

4.1.3 Economic Substitutability and the Hypothetical Monopolist Test

70. The hypothetical monopolist test to delineate markets provides a coherent conceptual framework for analysis. Accordingly, the relevant product market is defined as the smallest set of products for which a hypothetical monopolist would impose, and sustain, a small but significant, non-transitory increase in price (SSNIP).

71. In a competitive environment, firms are expected to charge a price that covers long-run average cost which allows them to break even. The *CCTA Decision*, after reviewing costs of providing pole

[83] *Jackson Report*, p. 30, Table 1; *Nordicity Report*, §5.2, pp. 35-38.

[84] *Jackson Report*, pp. 29, 33.

[85] "The second common failing of market definition is to argue simply that 'there are substitutes for X, therefore the producer of X does not have market power.'" (Supra note 70, pp. 75-76).

access, set the regulated rate for a utility pole attachment at $22.35 per year per attachment.[86] THESL states that their direct and indirect costs for pole attachments exceed the regulated rate.[87] Other Canadian jurisdictions had applications to review regulated pole rental rates brought before public utility boards, among those are Nova Scotia, British Columbia, Newfoundland, and New Brunswick. The methodology used to calculate the pole attachment rates varies across jurisdictions: annual rates per pole are typically based on a pole space allocation factor, direct costs such as administration and loss in productivity (various weighing schemes), and indirect costs such as the pole maintenance, depreciation, and capital carrying costs.[88]

72. Table C-1 summarizes regulated pole attachment rates in Canada. Annual pole attachment rates are typically set around $20.[89] It is reasonable to assume that the regulated cost-based pole access rate is an appropriate proxy for the pole access rate that would allow firms to recover their long-run average cost of providing access.[90]

73. Starting from the smallest set of products, THESL's network of utility poles with no siting alternatives included, the hypothetical monopolist test then evaluates whether THESL would find it profitable to impose, and sustain, a small but significant, non-transitory increase in pole access rate of 5% (SSNIP).[91]

74. Often, the strategies and behavior of buyers are reliable indicators of the extent of economic substitutability among products and whether buyers would likely switch to other products in response to a SSNIP.[92] Despite the limited evidence due to the confidentiality of non-regulated pole access agreements, it is instructive to consider pole access rates in Toronto and elsewhere to evaluate whether wireless service providers will respond to a 5% price increase of pole access rates

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[86] THESL has the option to apply to the Board for a different (regulated) rate if the costs of wireless attachments are not adequately covered by the regulated rate of $22.35. "[I]f the nature of the attachment is such that it results in costs not adequately covered by the $22.35, then it is open to an LDC to apply for a different rate." (*CANDAS Decision*, p. 13.)

[87] *THESL Pre-Filed Evidence*, ¶16; *THESL Interrogatory Responses,* Tab J, Schedule 2-16.

[88] *CCTA Decision*, pp. 4-12; Nordicity, *Pole Attachment Regulation: Canada, U.S., U.K., and Other Jurisdictions*, March 14, 2014.

[89] In 2001, the application by Newfoundland Power Inc. to the Board of Commissioners of Public Utilities in Newfoundland included a survey of Canadian pole attachment rates. Adjusted for general inflation from 2001 to 2013, the average pole attachment rate is $19.60 with a range from $8.00 to $45.20 (Newfoundland Power Inc. (2001), *Direct Evidence and Exhibits of Newfoundland Power Inc.*, May 8, 2001, http://www.pub.nf.ca/applications/NP2011SupportStructures/files/consent/consent2/NP-Evidence.pdf). Pole attachment rates in the United States are broadly within the same range (Nordicity, *Pole Attachment Regulation: Canada, U.S., U.K., and Other Jurisdictions*, March 14, 2014).

[90] "The relevant question for market definition is the set of products that are close substitutes for the focal product at its competitive price." (Supra note 70, p. 75).

[91] 'Small but significant' is typically interpreted as 5% and 'non-transitory' means for at least one year (*Merger Enforcement Guidelines*, ¶4.3).

[92] *Merger Enforcement Guidelines*, ¶4.13.

by switching in significant numbers to siting alternatives or other network configurations which do not rely on pole access:

- DASCom negotiated an agreement with the City of Montreal that stipulates an annual pole rental rate of $100 per pole for the use of 259 poles, subject to an annual inflation factor of 3%.[93]
- Rogers submitted a proposal to replace two street lights in the Coquitlam, BC, with two new dual purpose (street lighting, wireless communication) poles to accommodate wireless facilities. The annual lease rate for each pole is $7,000 per year, adjusted for inflation and with Rogers responsible for all construction and operating costs.[94]
- An agreement between Bell Mobility and the City of Mississauga, ON, to locate fourteen telecommunications antennae on city-owned street-light poles for a one-time pole attachment permit fee of $1,250 and an annual fee of $2,000 per pole per year.[95]
- Rogers has submitted a proposal to the City of Toronto to install up to 50 stand-alone utility poles within the public right-of-way to enable the deployment of smaller antennas at lower heights (less than 15 meters).[96] The City of Toronto has issued a licence fee schedule as part of its agreement with Rogers (and any other carriers): The annual license fee for 2014 for a pole with height less than 15 meters ranges from $8,000 to $15,000, depending on city zone and proximity to major highways. [97]
- See confidential Appendix D.

75. These agreements indicate that wireless service providers are willing to pay pole access rates and license fees an order of magnitude higher than the current regulated rate of $22.35 per wireless

[93] *THESL Interrogatory Responses*, Tab F, Schedule 3-24.

[94] "This and future sites utilizing micro-cellular technology could be a significant source of non-tax revenue for the City which has been identified as an "A" priority by Council." (City of Coquitlam, *Rogers' Street Light Wireless Communications Facility: Mariner & Como Lake*, January 6, 2014, http://www.coquitlam.ca/Libraries/Council_Agenda_Documents/CITYDOCS-_1625300-v1-regularcouncilmeeting1_13_2014_item15.sflb).

[95] Bell Mobility indicated that in addition to the fourteen wireless attachments to street light poles, it has identified 36 locations for small cell placement on Bell owned assets or private property. The City of Mississauga has similarly been approached by Rogers for the use of wireless attachments to three City street light poles. The City expects that Bell, Rogers and other providers will continue to request the use of City owned street light poles for small cell technology deployment. (City of Mississauga, *Telecommunication Antenna Attachments on City Owned Street Light Poles and Request by Bell Mobility for Limited Project*, Corporate Report, June 14, 2012, http://www.mississauga.ca/file/COM/2012CouncilAgenda_4July.pdf).

[96] In addition to the 50 poles within the City's public right-of-way, Rogers proposal also includes the installation of 100 antennas on modified streetlight poles and 40 antennas on private property. City staff has encouraged Rogers to negotiate support structure agreements with Toronto Hydro and other utilities to accommodate proposed antennas (Supra note 29).

[97] City of Toronto, *License Fee Schedule and Associated Zone Maps*, made public on December 24, 2013, http://www.toronto.ca/legdocs/mmis/2013/cc/bgrd/backgroundfile-65547.pdf.

pole attachment.[98] If demand for wireless pole attachments were highly elastic and service providers could easily – virtually without incurring extra costs - attach the equipment on the outside walls of buildings, substitute to network coverage from macro cells, or use indoor deployments and wireless offloading to enhance capacity, one would not observe wireless service carriers paying multiples of the regulated rate for the right to build poles at their own expense. The available evidence is inconsistent with economic substitutability as described by Dr. Church and THESL.[99]

76. Rather, the evidence strongly suggests that THESL would find it highly profitable to impose a 5% increase in the rate of wireless pole attachments to its poles. Since entry into the market (new poles) is restricted due to regulatory constraints, THESL would be able to sustain the price increase long-term.

77. For the hypothetical monopolist test, the set of products is not expanded any further than necessary to meet the SSNIP condition. The relevant upstream market containing pole access for wireless attachments is narrow, restricted to THESL/THESI's network of poles.[100] THESL is the monopoly supplier of access to its network of poles for wireless attachments.

4.2 Geographic Market Definition

78. The crucial element for geographic market definition is the ability and willingness of wireless service providers to switch from pole access in one location to pole access or siting alternatives in other locations in response to changes in relative prices. The relevant geographic market includes all locations that would have to be included for a SSNIP to be profitable.[101]

79. Access to utility poles for wireless attachments is a highly localized input of production. The radius of service coverage of a wireless attachment, a DAS antenna or a small cell for example, is relatively small. Consequently, wireless service providers cannot substitute pole access at location A for pole access or siting alternatives at location B kilometers away, no matter the respective pole access rate.

80. It would be incorrect to conclude though that there exist thousands of localized geographic markets, roughly the coverage area of a typical small cell. Localized markets may be aggregated if wireless service providers face sufficiently homogeneous competitive conditions across locations,

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[98] See confidential Appendix D. These annual rental/license rates often exceed the net embedded cost per pole on which the pole attachment rate calculation in the *CCTA Decision* is based on (CCTA Decision, pp. 12-13).

[99] *Church Report*, §5.3.3 and §5.3.4; *THESL Interrogatory Responses*, Tab B, Schedule 1-8, pp. 2-3. Market size itself, in the absence of price variation, is uninformative to the extent of economic substitutability (Church Report, ¶24).

[100] "In particular, if a single supplier of the entire supply of the firm's product could profitably raise its price by a small but significant amount, the product market definition should not extend beyond that product." (Supra note 70, p. 71).

[101] *Merger Enforcement Guidelines*, ¶4.17.

that is, similar sets of alternative siting options.[102] The assessment of the level of competition and market power in this aggregated geographic market is likely to be almost identical, even if wireless service providers do not substitute pole access between location A and B. Given the difficulty for THESL to identify particular locations where there are few good economic substitutes to access to THESL poles from locations with plenty of reasonable siting alternatives for wireless carriers, it is appropriate to define the upstream geographic market to be THESL's service territory, the City of Toronto.[103]

4.3 THESL's Market Power in the Provision of Pole Access

81. Given the identified product and geographic markets comprising THESL's network of utility poles in the City of Toronto, it remains to be determined whether THESL has market power. Market power refers to a firm's ability to profitably cause price, or non-price attributes such as quality, to substantially deviate from competitive levels for a sustainable period of time.[104]

82. The empirical evidence presented to delineate the product market in the context of the hypothetical monopolist test indicates that THESL would find it profitable to impose a 5% increase in the pole access rate for wireless attachments. For the exercise of market power to raise regulatory concerns, market power must be durable. Entry into the market is highly restricted due to regulatory constraints, THESL would be able to sustain the price increase long-term. In essence, THESL has market power in the supply of pole access for wireless attachments.

83. It is instructive to diagnose the underlying source(s) of THESL's market power. Its market power derives much less from the characteristics of the pole than from its specific location. There are locational advantages of certain sites simply for reasons of wireless network deployment. Wireless service providers may be willing to pay a premium to place network equipment at certain sites if these sites avail to improved coverage, capacity and network quality. Furthermore, there are government created barriers to entry arising from public policy objectives to avoid duplication of utility poles, to minimize the need for new poles by requiring service providers to primarily locate wireless equipment on existing support structures, and to reduce visual clutter in neighborhoods.[105]

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[102] "When merging firms compete across several markets and face the same competitors in each, the Bureau may use an aggregate description of these markets simply as a matter of convenience." (*Merger Enforcement Guidelines*, footnote 27; *Church Report*, ¶70).

[103] The upstream geographic market definition coincides with Dr. Church (*Church Report*, ¶19). Dr. Church states in his report that "[…] these localized circumstances are not likely to be known by THESL. Hence it is unlikely that THESL can exercise market power in those locations: if it cannot distinguish which locations where it has market power from those that it does not, then the relevant geographic area is no smaller than the footprint of its entire pole network. THESL does not know the value of pole access at a given location to a wireless service provider and hence cannot discriminate if rates were forborne." (*Church Report*, ¶164, *THESL Pre-File Evidence* ¶4).

[104] Supra note 50.

[105] Street-lighting poles, a common location for the placement of small cell equipment to provide cellular services, are often owned by the municipality. Hence, the decision and rates for street pole attachment and license fees for new support structure in the public right-of-way are overseen by a single entity. Toronto Hydro Street

The locational advantage, coupled with government-created barriers to entry, confer THESL with market power in the supply of pole access for wireless attachments.

5 Regulatory Forbearance

5.1 The Effects of Regulatory Forbearance

84. Market power raises regulatory or antitrust concern if an appreciable impact on price, quantity, choice or quality is expected to occur.[106] If the Board were to refrain from regulating the rates of wireless pole attachments, THESL is likely to exercise its market power and materially raise the pole access rate for wireless attachments. Considering the evidence of pole access rates for wireless attachments in Toronto and other Canadian municipalities outlined in ¶74, it is not unreasonable to expect THESL's pole access rate for wireless attachments providing cellular service to significantly increase should the Board forbear from rate regulation.[107] Competition in the market for wireless pole attachments is insufficient to limit THESL from exercising its market power and raise the price of pole access for wireless attachments.

85. Although pole attachment rates are expected to increase substantially, the aggregate size of the potential market of wireless pole attachments to THESL poles is likely to remain limited.[108]

5.2 Relevance of Competition in the Downstream Market

86. There is insufficient competition in the relevant market (wireless pole attachments) to limit THESL from exercising its market power. [109] This primary finding of insufficient competition should, from

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Lighting Inc. purchased the street lighting and expressway lighting assets from the City of Toronto in 2006 (see http://www.torontohydro.com/sites/corporate/Newsroom/Pages/LightingAssetsPurchased.aspx). New support structures are subject to license fees imposed by the City of Toronto, while attachments to existing street-lighting poles (owned by THESL) are subject to the regulated pole attachment rate.

[106] Supra note 48, pp. 118-120. The *Merger Enforcement Guidelines* define prevention and lessening of competition to be substantial "if the price of the relevant product(s) would likely be materially higher in the relevant market." (*Merger Enforcement Guidelines*, ¶2.13, p. 8.)

[107] It is unlikely that THESL could raise attachment rates for One Zone's Wi-Fi attachments or TTC's attachments to the same extent as wireless attachments used to provide cellular service.

[108] Demand for access to THESL poles for wireless attachments is substantially lower relative to wireline attachments which require a continuous network of poles to suspend. Wireless attachments such as small cells, DAS antennas , Wi-Fi equipment or sensors for M2M networks tend to require fewer access points.

[109] In the CANDAS proceedings, THESL's motion seeking regulatory forbearance and the affidavit of A. Yatchew in support of the motion argued that the relevant question is whether competition in the market for siting of wireless attachments, the upstream market, is sufficient to protect the public interest (*In the Matter of an Application by Canadian Distributed Antenna Systems Coalition for certain orders under the Ontario Energy Board Act, 1998*, Motion, Toronto Hydro-Electric Systems Limited, EB-2011-0120, September 2, 2011, p. 2.; *In the Matter of an Application by Canadian Distributed Antenna Systems Coalition for certain orders under the Ontario Energy Board Act, 1998*, Motion, Affidavit of A. Yatchew, EB-2011-0120, September 2011, p. 26).

an economist's perspective, be balanced against the cost of regulation.[110] An increase in the pole access rate from the THESL's exercise of market power will harm wireless service providers and consumers who purchase wireless services in the downstream market, through higher prices and/or lower service quality. The level of competition in the downstream market will affect whether the harm from higher wireless pole attachment rates falls entirely on consumers or is partially borne (absorbed) by wireless service provides.[111]

5.2.1 The Canadian Wireless Telecommunications Market

87. Under regulatory forbearance, wireless service providers will face increased cost for wireless pole attachments in the City of Toronto. Distortion in the input market arising from THESL's exercise of market power, i.e., pole attachment rates exceeding the competitive level, lead to inefficiencies: First, wireless service providers switch to alternate, second-best inputs of production (or network configurations) that cost more and/or are technologically inferior resulting in lower quality of service. Furthermore, they will pass on their increased input costs to wireless consumers, the extent of pass-on determined by the level of competition in the downstream market.

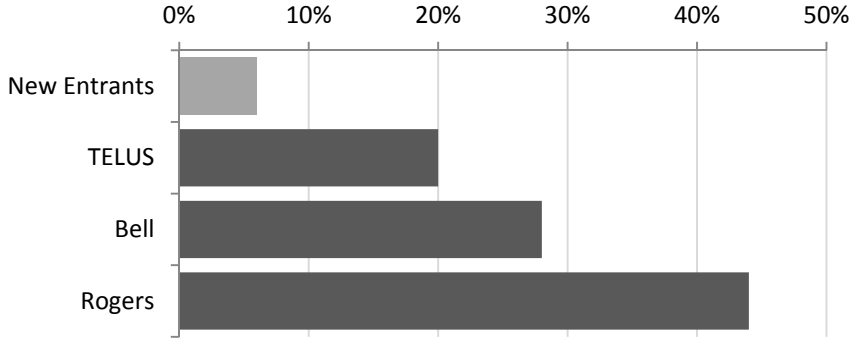
88. The wireless telecommunications market in Ontario is dominated by the three large incumbent service providers, Rogers, TELUS and Bell, the new entrants jointly have only 6 percent market share (Figure 4).[112]

[110] *THESL Interrogatory Reponses*, Tab D, Schedule 1-11 and 1-15. The Board in its NGEIR decision has identified regulatory costs as a rationale for forbearance (*NGEIR Decision*, pp. 25-26). The economic costs of regulation include not only the financial and administrative burden on firms and regulators, but also the restraints on innovation (e.g. incentive to replace poles, accommodate wireless attachments) and the firms' ability to respond to changing market conditions.

[111] The partition of harm between (final) consumers and wireless service providers will be relevant if the public interest determination includes distributional considerations

[112] New entrants are the wireless service providers that first acquired license spectrum in Industry Canada's 2008 AWS spectrum auction: Mobilicity, WIND Mobile and Public Mobile. New entrants have struggled to gain a foothold in the market. Public Mobile has been acquired by TELUS and the Canadian Competition Bureau cleared the transaction on November 28, 2013 (http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03633.html). On September 30th, Mobilicity (Data and Audio-Visual Enterprises Wireless) filed for bankruptcy and is currently conducting a court-sanctioned sale process (http://mobilicity.ca/newsroom/mobilicity-pursues-additional-restructuring-alternatives-context-ccaa-protection; http://mobilicity.ca/newsroom/mobilicity-announces-court-sanctioned-sale-process). WIND Mobile did not bid in the recent 700MHz spectrum auction and is reportedly looking for a buyer or partner (http://www.theglobeandmail.com/report-on-business/wind-mobile-pulls-out-of-spectrum-auction/article16313945). The CRTC does not break out data by metropolitan area, but the market shares are likely to be similar (safe for possibly a minor shift towards new entrants). All three new entrants and the wireless incumbent service providers currently provide wireless service in Toronto.

Figure 4: Wireless Subscriber Market Share 2012 (Ontario)



MTS Allstream, SaskTel, and smaller wireless service providers are omitted.
Source: CRTC Communications Monitoring Report 2013, Table 5.5.5, p. 162.

89. It is reasonable to expect that wireless service providers will pass-through a large portion of the input price increase to wireless customers. If the downstream market is competitive, any industry-wide increases in production costs (such as increased rates for wireless pole attachments) get fully passed on to consumers. If the downstream market is imperfectly competitive, wireless service carriers will only partially pass-on increased costs to consumers, partially absorbing the cost increase themselves. Dr. Church concludes, based on an analysis of the internal rate of return on investment and an international comparison of market structure, that incumbent wireless service providers do not exercise inefficient market power, that is, they do not price above long-run average cost.[113]

90. The Competition Bureau recently assessed the Canadian wireless telecommunication market in response to the CRTC's investigation into wholesale roaming agreements and concluded that incumbent wireless service providers have market power.[114] More specifically, the Bureau did not find a comparison of concentration-based measures to claim that Canadian mobile wireless markets are competitive (or at least comparable to certain international jurisdictions) persuasive.[115] Besides, the Bureau found significant limitations to an internal rate of return calculation almost identical to the one advanced in the *Church Report* (¶194).[116]

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[113] *Church Report*, §6.2.1.

[114] Competition Bureau, *Submission by the Commissioner of Competition Before the Canadian Radio-Television and Telecommunications Commission*, CRTC 2013-685, January 29, 2014, ¶9.

[115] Supra note 114, ¶12. The international comparison, an updated version of *Church Report*, ¶197-198, Table 4, is contained in Church, Jeffrey and Andrew Wilkins (2013): "Wireless Competition in Canada: An Assessment," *University of Calgary School of Public Policy SPP Research Paper*, September 2013, ("*Church-Wilkins Report*") http://www.policyschool.ucalgary.ca/?q=content/wireless-competition-canada-assessment.

[116] The almost identical internal rate of return calculation for Rogers is contained in the *Church-Wilkins Report*. The Bureau submitted that the internal rate of return calculation examines only one service provider, does not actually measure the provider's cost of capital, and when properly interpreted, does not support the conclusions (Supra note 114, ¶11).

91. A comprehensive analysis of competition in the Canadian wireless telecommunication market is not required to conclude that the expected impact on the monthly bill of downstream wireless consumers from increased pole attachment rates is expected to be minimal:[117] First, the increased cost for wireless pole attachments in the City of Toronto are a tiny share of the cost of building, operating and maintaining a modern-day, wireless network capable of handling the expected level and growth of mobile traffic.[118] Second, there are millions of wireless service subscribers residing in the City of Toronto. Third, wireless service providers tend to price their service at the provincial or metropolitan level which spreads increased network costs over a larger set of customers. If the market is imperfectly competitive, the extent of pass-through, and consequently the impact on wireless consumers is even smaller than in a competitive market.[119]

5.3 Regulatory Forbearance and the Public Interest

92. It would be incorrect to conclude that regulatory concerns do not exist simply because the harm is spread over many consumers and, at an individual level, is minimal. What matters is the overall size of the harm arising from higher pole access rates for wireless service providers, higher consumer prices as service providers (partially) pass-on increased production costs, and lower quality of service from second-best network configurations. Total harm may warrant intervention, but regulation cannot address all occurrences of market power; some cases may be too insignificant economically to warrant regulatory intervention.

93. The economic and administrative cost of regulatory oversight of pole access rates should be compared to the size of the market for wireless pole attachment and the possible harm from

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[117] Market definition is a tool to facilitate the analysis of competitive effects. It is not necessary to reach a conclusion on the precise bounds of the relevant market if the implications of a competitive analysis are unaltered under any plausible market definition (*Merger Enforcement Guidelines*, §3.3). Dr. Church defines the relevant downstream market as consisting of wireless voice and data services and includes at least the City of Toronto (*Church Report*, §5.4.4 and §5.5.1). The Federal Communications Commission (FCC)'s product market approach in recent wireless transactions used a combined mobile telephony/broadband services market comprised of mobile voice and data services, including mobile voice and data services over advanced broadband networks (Federal Communications Commission, WT Docket No. 11-65, Staff Analysis and Findings, November 29, 2011, ¶31, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-11-1955A2.pdf). The US Department of Justice in challenging the AT&T - T-Mobile merger defined the relevant market as mobile wireless telecommunications services including both voice and data services provided over a radio network (United States of America v. AT&T, T-Mobile and Deutsche Telekom, Complaint, August 31, 2011, ¶11, http://www.justice.gov/atr/cases/f274600/274613.pdf).

[118] Rogers' wireless division had annual equipment costs of $1,535 million in 2013 (Rogers, 2013 Annual Report, http://www.rogers.com/cms/investor_relations/pdfs/2013_Annual-Report.pdf), TELUS' wireless segment reported capital expenditures of $711 million in 2012 (TELUS, 2012 Annual Report, http://about.telus.com/investors/annualreport2012/files/pdf/en/ar.pdf).

[119] For reference, in the *NGEIR Decision*, the Board concluded that regulatory forbearance for natural gas storage in Ontario has a small effect, a likely increase of 1% on residential consumers' bills (*NGEIR Decision*, pp. 118-119). The expected impact on the monthly bill of wireless consumers in Toronto is expected to be significantly less than 1%.

THESL's exercise of market power in the provision of pole access for wireless attachments. Although Section 29(1) of the *Act* mentions explicitly only the competition rationale for regulatory forbearance, "competition sufficient to protect the public interest," the regulatory cost rationale for forbearance should, from the perspective of an economist, be considered in THESL's application before the Board.[120] The Board may consider exercising its discretion to forbear if the continued regulatory burden exceeds the benefits to the public even if THESL has market power in the provision of pole access for wireless attachments.[121]

94. Rate regulation can be highly detailed, contentious, time-consuming and expensive for all parties involved. In addition to these direct administrative costs of regulation, a regulated pole attachment rate is inflexible and unresponsive to a changing market environment (costs of providing pole access, technological change). Market-based pole access rates provide efficient investment incentives and generate additional revenues in excess of the cost of providing pole access, revenue that could be shared to the benefit of ratepayers and/or THESL shareholders.[122]

5.4 Alternatives to Rate Regulation

95. Section 29 of the *Act* grants the Board the power to forbear "in whole or in part."[123] Partial regulatory forbearance may involve the substitution to a form of regulation with a lower regulatory cost burden.[124] As a principle of regulation, it is understood that burdensome regulation should be avoided if possible. Where THESL and parties requesting access to THESL's network of poles are able to agree on rates, terms and conditions of pole access through negotiation, it is generally appropriate to defer to such bilateral negotiations.

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[120] *NGEIR Decision*, pp. 25-26.

[121] For example, the Federal Communications Commission states that "[t]he lack of market power is, in our view clearly sufficient ground upon which to exercise such discretion. We also find that other entities, with only limited, transitional market power, need not be regulated where a further cost/benefit analysis compels the conclusion that regulation will harm consumer welfare (Further Notice of Proposed Rulemaking, 84 F.C.C. 2d 445, 1981, p. 472). Similarly, the U.S. Federal Energy Regulatory Commission (FERC) may permit market-based rates for natural gas storage even where applicants cannot establish the lack of market power if it is determined to be in the public interest (U.S. Federal Energy Regulatory Commission, Rate Regulation of Certain Natural Gas Storage Facilities, 18 CFR Part 284, Order No. 678, June 19, 2006, ¶7)

[122] It is unlikely that THESL substantially expands its network of utility poles in response to higher market-based pole attachment rates. Higher rates however can provide an incentive to enlarge the set of utility poles compatible with (multiple) wireless attachments.

[123] In the *NGEIR Decision*, the Board indicated the belief that the wording "in whole or part" allows for considerable flexibility for forbearance (*NGEIR Decision*, p. 44). The Board decided to partially forbear, continuing regulation for some natural gas storage services, while ceasing regulation for other storage services and imposing selected phase-out mechanisms for the sharing of premium margins over cost-based rates (*NGEIR Decision*, p. 74, p. 104).

[124] An example of partial regulatory forbearance substituting the form of regulation is the CRTC's discretion in modifying, but not eliminating, the reporting requirements of regulated common carriers who participate in the enhanced services market (Canadian Radio-Television and Telecommunications Commission, *Enhanced Services*, Telecom Decision CRTC 84-18, July 12, 1984).

96. From an economic perspective, it is unclear whether THESL should be granted the same discretion in negotiations as private property owners. There are two market elements that enhance THESL's ability to raise the price for locating wireless equipment relative to private property owners: First, regulations by Industry Canada and policy directives by the City of Toronto require wireless service providers extensively consult communities and use existing support structures such as a hydro transmission towers, utility and streetlight poles first, before any new structures are considered.[125] Second, the ability to negotiate site access and installation with a single entity rather than numerous private site owners is associated with lower administrative costs and faster deployment.[126] Both elements provide THESL with an advantage that it may exploit in access rate negotiations.

97. There are "soft" price and non-price regulations that could be imposed by the Board to ensure that (partial) regulatory forbearance of wireless pole attachment rates preserves competition and protects the public interest. Examples of such regulatory conditions are provisions for non-discriminatory access or expedient processing and dispute-resolution guidelines.[127]

5.4.1 Non-Discriminatory Access

98. The *CCTA Decision* established a non-discriminatory right of access to utility poles.[128] If the Board decides to forbear in part, it may decide to preserve a non-discriminatory access regime for wireless pole attachments.[129] Discriminatory or exclusive access for some wireless telecommunications providers has the potential to distort downstream competition for wireless services. Competitive neutrality requires that negotiated access agreements do not lead to

[125] The City of Toronto requires service providers to attempt to use any feasible existing infrastructure, including rooftops, water towers, utility poles or light standards before an application to build poles within the public right-of-way is considered (City of Toronto, *Telecommunication Tower and Antenna Protocol*, amended December 18, 2013, www.toronto.ca/legdocs/mmis/2013/cc/bgrd/backgroundfile-65545.pdf). Industry Canada regulations require a company to "investigate sharing or using existing infrastructure before proposing new antenna-supporting structures" (http://www.ic.gc.ca/eic/site/icgc.nsf/eng/07422.html#ic-subnav-2).

[126] The ability for faster deployment of wireless network infrastructure may be particularly valuable to new market entrants.

[127] This section of the report highlights a non-comprehensive list on regulatory options if the Board decides to forbear in part, it does not evaluate their relative merits and feasibility.

[128] *CCTA Decision*, p. 3.

[129] If rates for wireless attachments are forborne, the regime is not technology neutral since wireline attachments continue to be regulated. Non-discriminatory access rates should apply to all carriers, including (potential) affiliates of THESL. Attaching parties may be in different bargaining situations relative to THESL if pole access rates were forborne. The incumbent local exchange carrier (ILEC) in Toronto, or other companies that provide wireless services in Toronto and own their own distribution poles may be able to negotiate favorable rates, terms and conditions for wireless attachments to THESL poles due to their ability to grant THESL reciprocal access to their network of poles. Wireless telecommunication carriers that also own poles may have historically obtained access to THESL's network of poles through joint-use or other agreements.

excluding wireless competitors, do not impede carriers' ability to compete in the market, and do not grant a material advantage to some competitors over others.

99. A non-vertically integrated supplier of an essential input of production could raise foreclosure concerns similar to the ones addressed by the essential facilities doctrine if it grants exclusivity to a firm, de-facto excluding its rivals.[130] Moreover, discriminatory or exclusive access is contrary to the stated policy objective of Industry Canada that encourages sharing of existing infrastructure and antenna sites.[131]

5.4.2 Dispute Resolution and the Sign-and-Sue Rule

100. Concerns about THESL's potential abuse of market power under regulatory forbearance could be addressed with a dispute resolution framework that may also include a *Sign and Sue* rule. In the *CCTA Decision*, the Board left it to the parties to negotiate terms and conditions for wireless attachments, but not the pole attachment rate. If negotiations over terms and conditions of access fail, then the matter may be brought to the Board for consideration.[132]

101. If the Board decides to forbear from rate regulation, it may decide to fold rate negotiations into the existing framework for negotiation of terms and conditions of access. In essence, parties would be left to negotiate pole attachment rates, but can bring the matter to the Board if they cannot agree on rates, terms and condition for pole attachment. The regulatory burden of this alternate framework may (or may not) be lower than the current rate regulation regime.

102. The dispute resolution mechanism could also include a *Sign and Sue* rule. Such a rule would allow a party requesting pole access for wireless attachments to challenge the terms of an executed agreement it claims it was coerced to accept in order to gain access to the network of utility poles. Under a *Sign and Sue* rule, attaching parties and THESL would have a duty to negotiate the rates, terms, and conditions of pole access for wireless attachment in good faith, and make good faith efforts to resolve any disputes prior to seeking relief from the Board. The rule recognizes that in some situations, despite good faith efforts from both parties, a negotiated agreement cannot be reached and the attaching party may be forced - in order to gain timely access for network deployment - to execute an agreement containing what it believes to be unjust and unreasonable terms in order to gain timely access to the THESL's network of utility poles.[133] A *Sign and Sue* rule

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[130] Exclusive dealing may be able to substitute for vertical integration (Supra note 63, pp. 2150 and 2176-2178).

[131] Industry Canada, *Improvements to our Antenna Tower Siting Policy*, http://www.ic.gc.ca/eic/site/icgc.nsf/eng/07422.html#ic-subnav-2.

[132] *CANDAS Decision*, pp. 14-15.

[133] A *Sign and Sue* rule is contained in the pole attachment regulation of the Federal Communications Commission (FCC) in the United States (47 CFR §1.1404). The FCC has received few complaints challenging the terms of pole attachment agreements as it appears that the parties tend to reach negotiated agreements acceptable to both sides. (*Reply Comments of Time Warner Cable Inc.*, WC Docket No. 07-245, GN Docket No. 09-51, October 4, 2010; *Comments of the National Cable & Telecommunications Association*, WC Docket No. 07-245, GN Docket No. 09-51, August 16, 2010).

would allow a wireless provider to swiftly deploy network infrastructure even in the presence of unreasonable pole attachment rates. A well-functioning dispute resolution framework can increase the speed and efficiency of all aspects of the pole attachment process.

5.5 Conclusions

103. Competition in the market for wireless attachments is insufficient to limit THESL from exercising market power and substantially raise rates for wireless pole attachments. The Board must make a determination whether the public interest is protected if it forbore from regulating the rates, terms, and conditions of wireless pole attachments. It may exercise its discretion to forbear (in part) if it concludes that the continued regulatory burden exceeds the benefits to the public given the size of the market for wireless pole attachment and the possible harm from THESL's exercise of market power in the provision of pole access for wireless attachments.

104. The evidentiary record upon which this economic analysis of regulatory forbearance has been conducted limits its application to the current proceeding, THESL's application for regulatory forbearance in the City of Toronto. The availability and substitution of siting alternatives for access to utility poles, and competition in the wireless telecommunications market in other parts of Canada may be sufficiently similar for the Board's decision in the current proceeding to be considered a precedent for other regulatory forbearance proceedings.

Appendix A Curriculum Vitae of Dr. Marc Van Audenrode

MARC A. VAN AUDENRODE, PH.D.

PERSONAL INFORMATION

BUSINESS ADDRESS

Groupe d'analyse, ltée.

1000 De La Gauchetière Ouest, Bureau 1200

Montréal, QC, H3B 4W5, Canada

Phone: (514) 394-4477

Fax: (514) 394-4461

E-mail: mvanaudenrode@analysisgroup.com

PRIVATE ADDRESS

39 Hickson

Saint-Lambert, Québec, J4R 2N4, Canada

Phone: (450) 671-3864

Fax: (450) 671-7069

E-mail: mvanaudenrode@gmail.com

CITIZENSHIP

Dual Belgian and Canadian citizenship

LANGUAGES

French (Native), English (Fluent), Spanish and Dutch (Knowledge).

EDUCATION

1991 Ph.D. in Economics, University of California, Berkeley.

Areas of specialization: Labor, Industrial Relations, Econometrics.

1988 M.A. in Economics, University of California, Los Angeles.

1984 Licencié et Maître en sciences économiques, Université Catholique de Louvain, Belgique.

1983 Candidat en droit, Université Catholique de Louvain, Belgique.

PROFESSIONAL EXPERIENCE

2007 - present	Managing Principal, Analysis Group (Groupe d'analyse).
2003 - 2006	Vice President, Analysis Group (Groupe d'analyse).
2005 - present	Professeur associé, Département d'économique, Université de Sherbrooke.
1998 - 2005	Professeur titulaire, Département d'économique, Université Laval.
1998 - 2002	Directeur, Département d'économique, Université Laval.
1995 - 1998	Professeur agrégé, Département d'économique, Université Laval.
1991 - 1995	Professeur adjoint, Département des Sciences Economiques, Université du Québec à Montréal.
1989 - 1991	Research Assistant, Institute of Industrial Relations, University of California, Berkeley.
1988 - 1990	Teaching Assistant, Department of Economics, University of California, Berkeley.
1986	Economist, Research Department, Banque Nationale de Belgique.
1984 - 1985	Teaching Assistant, Département des Sciences Economiques, Facultés Universitaires Catholiques de Mons, Belgium.

OTHER PROFESSIONAL ACTIVITIES

President. Société canadienne de sciences économiques, 2001-2002.

President elect Société canadienne de sciences économiques, 2000-2001.

Rae Prize Committee of the Canadian Economic Association, Chair, 2000.

Canadian Employment Research Forum, Board of Directors, Member. 1997- 2003.

Canadian Economic Association, Board of Directors, Member. 1997-2000.

Canadian International Labour Network, Research Associate. 1996-2002.

Undergraduate advisor, Department of Economics, Laval University, 1996-1998.

Member (95-96 and 97-98) and chair (98-99) SSHRC regular grants committee (economics).

Chercheur régulier. Centre de Recherche en économie et finance appliquée, 1996-2002.

Professeur Invité, Université des Antilles Guyane, Faculté de droit et d'économie, (96-97) and (98-99).

Chercheur régulier, Centre Interuniversitaire sur le risque, les politiques économiques et l'emploi, Montreal and Quebec.

ACADEMIC PUBLICATIONS

"Is backdating executive stock options always harmful to shareholders?" With Philippe Grégoire, Glenn Hubbard, Mike Koehn, and Jimmy Royer. *Accounting and Finance*. Published Online 2012.

"Avec l'accès à un médecin de famille: une hausse significative de l'espérance de vie en bonne santé." With Pierre Fortin, Luc Godbout and Philip Merrigan. In « *Le Québec économique 2011* » Godbout, Joanis and De Marcellis- Warin, eds. Presses de l'université Laval. 2012.

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"Le conflit de l'OSM : comme celui de la LNH" With Pierre Fortin. *Le Devoir.* August 2005.

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"Les dépassements de coûts directs de main d'ouvre sur le chantier de la Gaspésia." With Pierre Fortin and Erick Moyneur. Report presented to the *Commission d'enquête sur les dépassements de coûts à la société papiers Gaspésia*. February 2005.

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"Employment, Income Supplement and Mental Health: A Controlled Experiment." With Ronald Kessler, Pierre Crémieux, Paul Greenberg and Phil Merrigan. Report presented to *Social Research and Demonstration Corporation*. January 2003

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"The Determinants of Search Behaviour." With Pierre Crémieux, Jimmy Royer and Phil Merrigan. Report presented to *Social Research and Demonstration Corporation*. May 2001.

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"An Assessment of Various Components of C-12 on the Duration of Unemployment Spells." With Guy Lacroix. Contribution to the program of evaluation of the Canadian employment insurance system. Report presented to *Human Resources Development Canada*. 2001.

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"The Impact of Bill C-17 on Benefit Eligibility, Take Up of Benefits and the Financial Liability of the UI Account" With Paul Storer. Contribution to the program of evaluation of the Canadian unemployment insurance system. Report presented to *Human Resources Development Canada*. July 1997.

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"The Productivity of UI Job Search" With Paul Storer, Pierre-Yves Cremieux and Pierre Fortin. Contribution to the program of evaluation of the Canadian unemployment insurance system. Report presented to *Employment and Immigration Canada*. April 1994.

SELECTED CASEWORK

Supreme Court of the State of New York.

Denver Employees Retirement Plan v. JPMorgan Chase Bank N.A.

Wrote a report and was deposed in a dispute involving the management of a collateral investment pool.

United States District Court, Eastern District of Wisconsin.

Edwin L. Reso et al. V. Artisan Partners Limited Partnership

Wrote a report and was deposed in a dispute involving fees charged to mutual fund investors.

Queen's Bench for Saskatchewan

Saskatchewan Federation of Labour et al v. Her Majesty the Queen

Wrote a report on the impact of the changes in Saskatchewan union certification laws on the success of union certification.

Volvo Canada v. Travailleurs Canadiens de l'automobile

Contract dispute arbitration

Write report and testify in front of Arbitrator on the nature of the financial crises of 2008.

Québec Commission des lésions professionnelles

Association des pompiers de Montréal v. Service de sécurité incendie de Montréal

Write a report and testify to comment and evaluate a statistical study presented by the Montreal Firefighter Union linking firefighter's safety and the nature of their equipment.

Manitoba Public Utilities Commission

Natural Gas Competitive Landscape review

Wrote an expert report and testified on issues related market structure and competition in the natural gas retail market.

Cour Supérieure du Québec

Lefèvre Frères Limitée et al. C. Procureur general du Québec, *500-17-025960-058*
Wrote an expert report on issues related to unfair competition practices.

Commission de l'équité salariale du Québec

Wrote an expert report and testified on issues related the impact of pay equity on the Government of Quebec's finances.

Régie des marchés agricoles et alimentaires du Québec

Audition dans le cadre du renouvellement de la convention de mise en marché du porc

Wrote an expert report and testified on issues related market structure and incentives in the Hog industry.

Goodyear Canada inc. – Le Syndicat canadien des communications, de l'énergie et du papier – local 143

Wrote an expert report and testified in arbitration proceeding between Goodyear Canada and its union.

Cour Supérieure du Québec

Première Nation de Betsiamites et al. C. Le Procureur Général du Canada et al. (500-17-022878-048)

Wrote an expert report on economic impact of ending logging on the Nation's territory.

Commission d'enquête sur la société papiers Gaspésia

Wrote an expert report and testified on the sources of low productivity on the construction site.

Assemblée Nationale du Québec

Testified in front of the immigration committee on the value of the immigrant-investor program.

Régie des marchés agricoles et alimentaires du Québec

Fédération des producteurs bovins du Québec v. Produits de viande Levinoff No. 270-09-04-01
Testified on issues related to market definition.

Cour Supérieure du Québec

Conférence des juges du Québec & al. c. Procureur général du Québec No. 500-05-070351-026 et Morton S. Minc & al. c. Procureur général du Québec No. 500-05-070457-021

Wrote an expert report and testified on issues related to Quebec Courts Judges' compensation.

Canada House of Commons

Testified in front of the House Committee on Finance on employment insurance reform issues.

WORK IN PROGRESS

"The economics of 401K plans" With Mike Koehn and Jimmy Royer.

"A Comment on the Titanic Option: Valuation of the Guaranteed Minimum Death Benefit in Variable Annuities and Mutual Funds." With Mike Koehn and Jimmy Royer.

"Potential Competition and the Prices of Network Goods: Desktop Software" With Robert E. Hall and Jimmy Royer.

SELECTED PRESENTATIONS

"Le dollar, la politique monétaire, et la relance du secteur manufacturier." Presented at the MEQ-FTQ Conference. Montreal. December 2009.

"Les besoins (quasi) illimités des familles." Presented at the Conference « Québec, un paradis pour les familles? ».Montreal. November 2008.

"Politiques d'intégration des immigrés au marché du travail au Québec." Presented at the ASDEQ Conference. Gatineau. May 2008.

"Efficiencies in Competition Policy." Presented to the *Competition Review Panel*. Montreal. February 2008.

"Do Mutual Funds Investors Care about Fees?" Presented at the CEA Conference. Halifax. June 2007.

"Les salaires et la productivité au Québec: les 25 prochaines années." Presented at the conférence de la Régie des rentes du Québec sur l'avenir du Québec. Octobre 2006.

"L'impact d'un relâchement des règles limitant la sous-traitance." UQAM Economics Department Seminars. May 2005.

"Potential Competition and the Prices of Network Goods: Desktop Software." Presented at the conférence de la société canadienne de sciences économiques. Québec, May 2004.

"Potential Competition and the Prices of Network Goods: Desktop Software." Presented at the International Applied Industrial Organization Conference.. Chicago. April 2004.

"Évaluation du bien-fondé d'un relâchement des restrictions aux mouvements des travailleurs entre le Canada et les Etats-Unis." Presented at the Conference on Social and Labour Market Aspects of North American Linkages, Montreal, December 2002.

"Where Does the Canadian Debt Come From? A Comment." Presented at the conference "Is the Debt War Over?" Montreal. November 2002.

"Downward Nominal Wage Rigidities: Evidence from Employer-Employee Data." Presented at the IZA conference on wage rigidities. Bonn. Novembre 2002.

"Asymetric Information in the Labor Market. " Presented at the McGill Economic's departement Seminar series. November 2002.

"La monnaie unique Nord Américaine." Presented at the congrès de l'AQUINAQ. Charlevoix, Quebec. June 2002.

"Conséquences économiques du vieillissement de la population du Québec." Presidential address. 42ème conférence de la société canadienne de sciences économiques. Aylmer. May 2002.

"Downward Nominal Wage Rigidities: Evidence from Employer-Employee Data." Présenté à la conférence de la Banque centrale européenne sur les rigidités des salaires. Francfort. November 2001.

"Le marché du travail au Québec à l'horizon 2020." Presented at the workshop organized by the Régie des rentes du Québec. Québec. December 2000.

"Les enjeux économiques de la démographie." Presented at the Colloque Démographie et Famille, organized by the Conseil de la Famille et de l'enfance. Montreal. November 2000.

"Job Protection and Job Losses in Belgium. " Presented at the 14ème congrès des economistes belges de langue Française, Liège, Belgium, November 2000.

"Unemployment Insurance Take-Up and Reemployment." Presented at the third CILN conference, Hamilton, September 2000.

"Limited Liability and Moral Hazard. " Presented at the eight world conference of the Econometrics Society, Seattle, Washington, August 2000.

"Unemployment Insurance Take-Up and Reemployment." Presented at the first world meetings of the Society of Labor Economists, Milan (Italy), June 2000.

"Unemployment Insurance Take-Up and Reemployment." With Jean-François Bertrand and Jean-Yves Duclos. Presented at the Journées de Microéconomie appliquée, Québec, June 2000.

"Unemployment Insurance Take-Up and Reemployment." With Jean-François Bertrand and Jean-Yves Duclos. Presented at the Canadian Economic Association meetings, Vancouver, June 2000.

"Job Protection laws and Jobs: Evidence from a Natural Experiment." Presented at CEREGMIA, Université des Antilles-Guyane, French West Indies, March 2000.

"L'union monétaire nord-américaine." Presented at 'Les petits déjeuners de l'ASDEQ' Quebec, March 2000.

"Wage and Asymmetric Information in the Labor Market. " Presented at the CERF-IRPP conference on Canada in the Information Age, Ottawa, March 2000.

"Worker Displacement in Belgium and Denmark." Presented at ECARES, University of Brussels, Belgium, November 1999.

"Evaluation of the Employment Insurance Reform." Presented at the Canadian Economic Association meetings, Toronto, June 1999.

"The North-American Monetary Union." Presented at the Canadian Economic Association meetings, Toronto, June 1999.

"A Difference of Degree: Unemployment Despite Turnover in the Belgian Labor Market." Presented at the conference 'Understanding Labor Markets,' Venice (Italy) January 1999.

"Compensations Policies and Firm Productivity." Presented at the North American Winter Meetings of the Econometric Society. New York. January 1999.

"Job Protection Laws and Jobs: Evidence from a Natural Experiment." Presented at the second international CILN conference, Hamilton (Ontario), September 1998

"Job Protection Laws and Jobs: Evidence from a Natural Experiment." Presented at the North American Summer Meetings of the Econometric Society. Montreal. June 1998.

"The Impact of Bill C-17 on Benefit Eligibility, Take Up of Benefits and the Financial Liability of the UI Account" Presented at the CERF conference. Ottawa. May 1998.

"Unemployment Insurance Take-Up and Reemployment." With Jean-François Bertrand and Jean-Yves Duclos. Presented at the CERF conference. Ottawa. May 1998.

"Wages and Asymmetric Information in the Labor Market. " Presented at the Annual Conference of the Society of Labor economists. San Francisco. May 1998.

"Compensations Policies and Firm Productivity." Presented at the International Conference on Linked Employer Employee Data. Washington DC. May 1998.

"Trade and the Economics of Winners and Losers," presented at the second conference on income and productivity (Commission for Labor Cooperation), Dallas (USA), February 1998.

"The Dynamics of Wages and Employment" presented at the North American Meetings of the Econometric Society, Chicago (USA), January 1998.

"Wages and Asymmetric Information in the Labor Market." Presented at the European Meeting of the Econometric Society, Toulouse (France), August 1997.

"The Uncertainty of Displacement." Presented at the CEA conference. St John (Newfoundland), June 1997.

"Wages and Asymmetric Information in the Labor Market. " Presented at the first CILN conference, Hamilton (Ontario), September 1996.

"Persistence of Firm and Individual Wage Components." Presented at the North American Econometric Association Meetings, Iowa City. June 1996.

"Exploring the Links Between Wage Inequality and Unemployment: A Comparison of Canada and the US." Presented at the CSLS/CERF conference on the Canada/US Unemployment Rate Gap, Ottawa, February 1996.

"Persistence of Firm and Individual Wage Components." Presented at the American Economic Association Meetings, San Francisco, January 1996.

"A Difference of Degree: Unemployment Despite Turnover in the Belgian Labor Market." Presented at the International Workshop on Employment Security and Employment Protection, McMaster University, November 1995.

"Optimal Contract, Imperfect Output Observation and Limited Liability." Presented at the World Congress of the Econometric Society. Tokyo. August 1995.

"UI, Recall Biases, Spikes, and the Wake-up Call Theory." Presented at the CIRANO workshop. Montréal. July 1995.

"The Exit and Entry of Firms and Worker Turnover." Presented at the Conference on Labor Market Imperfections in Europe. Berlin. June 1995.

"UI, Recall Biases, Spikes, and the Wake-up Call Theory." Presented at the congrès de l'association canadienne d'économique. Montréal. June 1995.

"Is The U.S./Canada Unemployment Gap Truly Large? A Labor Flow Analysis." Presented at the Congrès de la société canadienne de sciences économiques. Québec. May 1995.

"The Duration of Unemployment and the Persistence of Wages." Presented at the Conference on Imperfections in the European Labor Markets. Madrid. February 1995.

"Turnover and Efficiency Wage Theory." Presented at the 1994 ADRES conference. Paris. December 1994.

"Unemployment Insurance and Job Search Productivity: Measurement of the Duration-Wage Gain Relationship." Presented at the CERF Conference on the Evaluation of Unemployment Insurance. Ottawa. October 1994.

"Cycles in Insured and Uninsured Unemployment." Presented at the NBER summer meetings. Cambridge. July 1994.

"The Productivity of UI Job Search." Presented at the meetings of the Canadian Economic Association. Calgary. June 1994.

"Une vérification empirique des implications de la théorie Insider-Outsider." Presented at the Congrès de l'association canadienne de science économique. Ottawa. May 1994.

"A Test of the Insider-Outsider Theory Using Firm Level Data." Presented at the XLII International Conference of the Applied Econometric Association. Aix en Provence (France). April 1994.

"Displaced Workers and the U.S. Canada Unemployment Differential." Presented at the Meetings of the American Economic Association, Boston, January 1994.

"Optimal Contract, Imperfect Output Observation and Limited Liability." Congrès de la Société Canadienne et Sciences Economiques, Ottawa, June 1993, and Congrès de l'Association Canadienne et Sciences Economiques, Montréal, May 1993.

"Corporatism Run Amok: Job Stability and Industrial Policy in Belgium and the United States." 17th Economic Policy panel, Copenhagen, April 1993.

"Corporatism Run Amok: Job Stability and Industrial Policy in Belgium and the United States." NBER University Conference on Labor Markets in International Perspective, Cambridge, April 1992.

Appendix B Documents Considered

Legal Decisions and Regulatory Proceedings

1. Alabama Power Company v. Federal Communication Commission, No. 00-14763, November 14, 2002, www.ca11.uscourts.gov/opinions/ops/200014763.opn.pdf, accessed on March 14, 2014.
2. Alberta Energy and Utilities Board, TransAlta Utilities Corporation, Decision 2000-86, December 27, 2000, www.auc.ab.ca/applications/decisions/Decisions/2000/2000-86.pdf, accessed March 14, 2014.
3. British Columbia Utilities Commission, *In the Matter of an Application by Shaw Cablesystems Limited and Shaw Business Solutions Inc. to Continue to Use FortisBC Inc's Transmission Facilities*, Reasons for Decision, April 1, 2010.
4. Canadian Radio-Television and Telecommunications Commission (CRTC), *Enhanced Services*, Telecom Decision CRTC 84-18, July 12, 1984.
5. Canadian Radio-television and Telecommunications Commission (CRTC), *Revised Regulatory Framework for Wholesale Services and Definition of Essential Service*, Telecom Decision CRTC 2008-17, March 3, 2008.
6. Church, J., *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998,* Regulatory Forbearance for Toronto-Hydro-Electric System's Provision of Pole Access for Wireless Attachments, EB-2013-0234, June 13, 2013 ("Church Report").
7. Competition Bureau of Canada, *Merger Enforcement Guidelines*, October 6, 2011, ("*Merger Enforcement Guidelines*"), http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/vwapj/cb-meg-2011-e.pdf/$FILE/cb-meg-2011-e.pdf, accessed March 14, 2014.
8. Competition Bureau, *Submission by the Commissioner of Competition Before the Canadian Radio-Television and Telecommunications Commission*, CRTC 2013-685, January 29, 2014, http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03648.html, accessed March 14, 2014.
9. Federal Communications Commission (FCC), *Further Notice of Proposed Rulemaking*, 84 F.C.C. 2d 445, 1981.
10. Federal Communications Commission (FCC), 47 CFR §1.1404.
11. Federal Communications Commission, Staff Analysis and Findings, WT Docket No. 11-65, November 29, 2011, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-11-1955A2.pdf, accessed on March 14, 2014.
12. *FortisBC Inc. v. Shaw Cablesystems Limited*, 2010 BCCA 552, December 6, 2010.

13. *Georgia Power Company v. Teleport Communications Atlanta and the Federal Communication Commission*, No. 02-15608, September 29, 2003, www.ca11.uscourts.gov/opinions/ops/200215608.pdf, accessed on March 14, 2014.

14. Jackson, C.L., *In the Matter of an Application by Toronto Hydro-Electric System Limited for Orders Pursuant to Section 29 of the Ontario Energy Board Act, 1998,* Expert Report, EB-2013-0234, June 11, 2013 ("Jackson Report").

15. *MCI Communications Corp. v. AT&T*, Co. 708 F.2d 1081 (1982).

16. National Cable & Telecommunications Association (NCTA), *Comments of the National Cable & Telecommunications Association*, WC Docket No. 07-245, GN Docket No. 09-51, August 16, 2010.

17. New Brunswick Public Utility Commission, Oral Ruling of the New Brunswick Board of Commissioners on the Rogers Jurisdiction Motion in the Disco Rate Application, October 27, 2005.

18. Newfoundland Power Inc., Direct Evidence and Exhibits of Newfoundland Power Inc., May 8, 2001, http://www.pub.nf.ca/applications/NP2011SupportStructures/files/consent/consent2/NP-Evidence.pdf, accessed on March 14, 2014.

19. Nordicity, *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998,* Wireless Technology: Expert Report on Wireless Technologies as They Pertain to Deployment and Pole Attachment Considerations, EB-2013-0234, March 14, 2014, (the "Nordicity Report").

20. Nordicity, *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998,* Pole Attachment Regulation: Canada, U.S., U.K., and Other Jurisdictions, EB-2013-0234, March 14, 2014.

21. Nova Scotia Utility and Review Board, *In the matter of the Public Utilities Act and in the matter of an application by Nova Scotia Power Incorporated for Approval of an increase in its Pole Attachment Charge,* 2002, http://www.regie-energie.qc.ca/audiences/3653-07/Audi3653/C-6-15_TCE_NovaScotiaPower_3653_12mars08.pdf, accessed on March 14, 2014.

22. *Ontario Energy Board Act, 1998*, c.15, Schedule B, s.29 (1).

23. Ontario Energy Board, In the Matter of an Application pursuant to section 74 of the Ontario Energy Board Act, 1998 by the Canadian Cable Television Association for an Order or Orders to amend the licenses of electricity distributors, Decision and Order, RP-2003-0249, March 7, 2005 ("CCTA Decision").

24. Ontario Energy Board, *In the Matter of a proceeding initiated by the Ontario Energy Board to determine whether it should order new rates for the provision of natural gas, transmission, distribution and storage services to gasfired generators (and other qualified customers) and whether the Board should refrain from regulating the rates for storage of gas*, Decision with Reasons, EB-2005-0551, November 7, 2006 ("NGEIR Decision").

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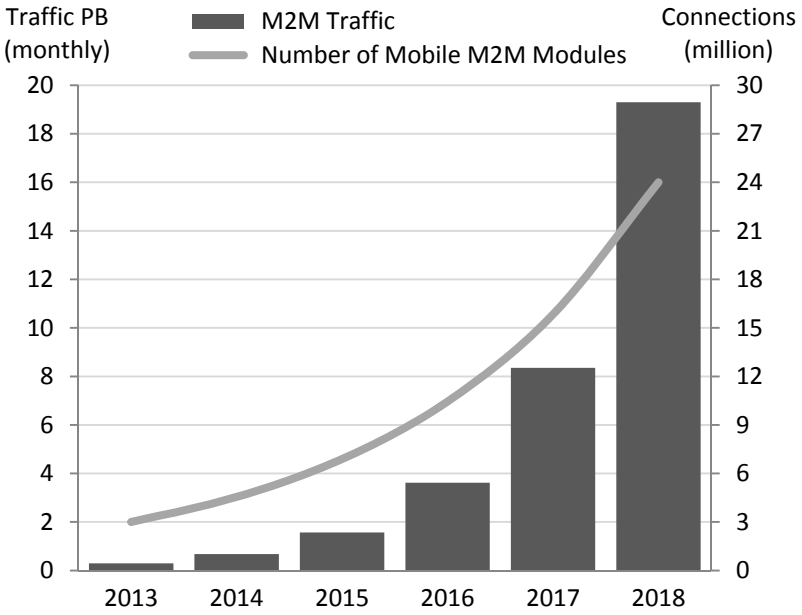
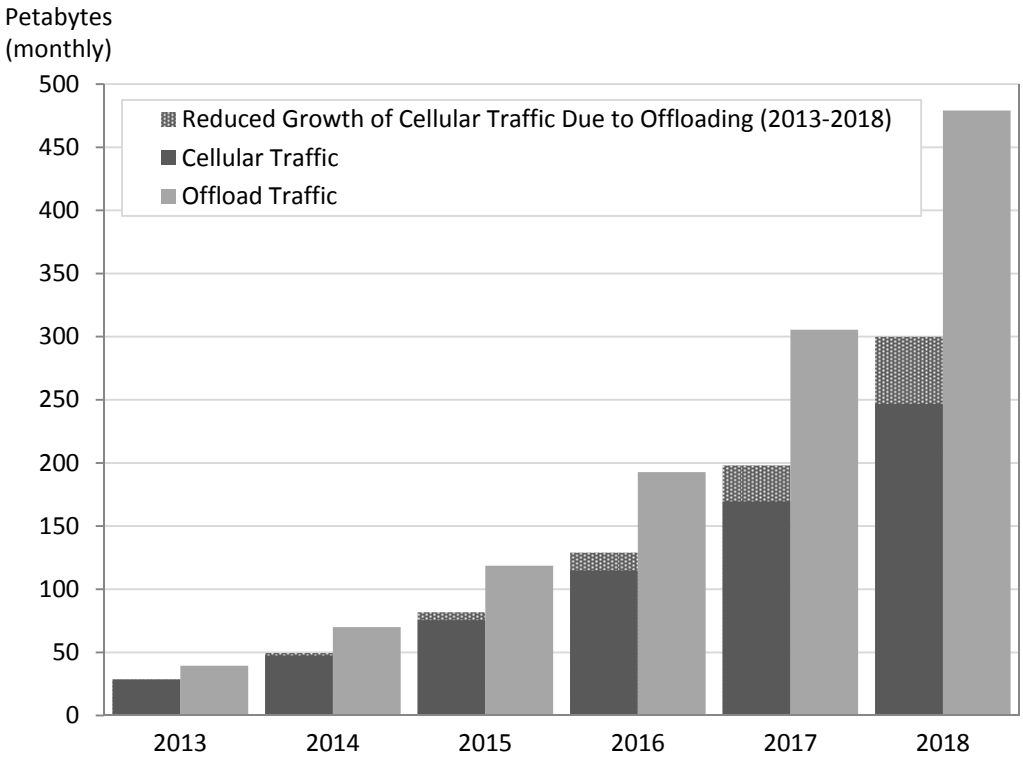
Appendix C Tables and Figures

Figure C-1: M2M Mobile Connections and Traffic Forecast 2013 - 2018 (Canada)



One Petabyte (PB) is equivalent to 1000 Terabytes (TB).
Sources: Cisco VNI Global Mobile Forecast, 2013-2018, February 2014;
Calculations by Author.

Figure C-2: Mobile Traffic Offload Forecast 2013 - 2018 (Canada)



One Petabyte (PB) is equivalent to 1000 Terabytes (TB).
Source: Cisco VNI Global Mobile Forecast, 2013-2018, February 2014;
Calculations by Author.

Table C-1: Regulated Canadian Pole Access Rates (per Pole per Year)

Jurisdiction	Regulating Body	Rental Rate per Pole (Year)
Nova Scotia	Nova Scotia Utility and Review Board	$14.15 (2002)[A]
Newfoundland	Board of Commissioners of Public Utilities	$12.84 (2001)[B]
Ontario	Ontario Energy Board	$22.35 (2005)[C]
New Brunswick	New Brunswick Energy and Utilities Board	$18.91 (2014)[D]
Alberta	Alberta Utilities Commission	$18.34 (2000)[E]

[A] Nova Scotia Utility and Review Board (2002): *In the matter of the Public Utilities Act and in the matter of an application by Nova Scotia Power Incorporated for Approval of an increase in its Pole Attachment Charge*.
[B] Newfoundland Power Inc. (2001), Direct Evidence and Exhibits of Newfoundland Power Inc., May 8, 2001.
[C] *CCTA Decision*.
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Utility pole attachments in Canada are regulated provincially by public utility boards that may conduct a full review if a utility makes an application to adjust regulated pole rental rates. Some jurisdictions had application to review regulated pole rental rates brought before public utility boards, among those are Nova Scotia, British Columbia, Newfoundland, New Brunswick and Ontario. The methodology to calculate the rental rate per pole varies across jurisdictions. No jurisdiction currently differentiates between the regulation of wireline and wireless pole attachments. In British Columbia, although the B.C. Utilities Commission has jurisdiction over pole attachment rates, it does not actively exercise its right to regulate rates, instead letting market participants negotiate pole attachment rates.[134]

[134] Nordicity, *Pole Attachment Regulation: Canada, U.S., U.K. and Other Jurisdictions*, ¶30-31.

Appendix D Confidential Material