municipal provision of wireless internet

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INTRODUCTION

Many leaders in the U.S. acknowledge that broadband Internet service ("broadband")[1] is crucial to the American people and its economy. For example, President George W. Bush noted in 2004 that: "This country needs a national goal for . . . the spread of broadband technology. We ought to have . . . universal, affordable access for broadband technology by the year 2007, and then we ought to make sure as soon as possible thereafter, consumers have got plenty of choices when it comes to [their] broadband carrier."[2] The President noted in 2004 that the U.S. ranked tenth "amongst the industrialized world in terms of broadband technology and its availability [and t]hat's not good enough for America."[3] The Federal Communications Commission's

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[1] The term "broadband" is commonly used to refer to data services that are "fast," always available, and capable of supporting advanced applications. Although there appears to be no strict definition, for purposes of this report "broadband" can be defined as "a general set of transmission capabilities and characteristics, such as always-on, high-speed Internet access with a sufficiently robust functionality suitable for evolving, bandwidth-hungry applications." FCC, CONNECTED & ON THE GO, BROADBAND GOES WIRELESS, REPORT BY THE WIRELESS BROADBAND ACCESS TASK FORCE 11 (2005) ("FCC Report"), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-257247A1.pdf. Generally, this includes data transmission speeds that "exceed 200 or 300 kbps [(kilobits per second)], or more, in one or both directions . . . ." (upload and download). *Id. See also infra* Appendix (summarizing major Internet technologies).

[2] THE WHITE HOUSE, A NEW GENERATION OF AMERICAN INNOVATION 11 (Apr. 2004), *available at* http://www.whitehouse.gov/infocus/technology/economic_policy200404/innovation.pdf. *See also* Memorandum from the White House to the Heads of Executive Departments and Agencies re: Improving Rights-of-Way Management Across Federal Lands to Spur Greater Broadband Deployment (Apr. 26, 2004) (directing the implementation of recommendations to facilitate the granting of rights-of-way access to broadband providers), *available at* http://www.whitehouse.gov/news/releases/2004/04/print/20040426-2.html.

"President Bush has called for a universal and affordable broadband for every American by 2007. And that's a commendable goal, one that will bridge the digital divide and improve economic opportunities for all citizens." *Hearing on State and Local Issues and Municipal Networks: Hearing Before the Senate Committee on Commerce, Science, and Transportation*, 109th Cong. (2006) (statement of Senator Frank Lautenberg).

[3] President George W. Bush, Remarks by the President at American Ass'n of Community Colleges Annual Convention, Minneapolis, MN (Apr. 16, 2004), *available at* http://www.whitehouse.gov/news/releases/2004/04/print/20040426-6.html. *See also* President George W. Bush, High Tech Improving Economy, Health, Care, Education, Remarks by the President on Innovation, U.S. Dept. of Commerce, Washington, D.C., (June 24, 2004), *available*

("FCC") 2005 Wireless Broadband Access Task Force report *Connected & On the Go, Broadband Goes Wireless* noted that "broadband networks . . . can increase productivity and drive economic growth, improve education, and allow consumers to make more informed purchasing decisions."[4] The FCC "has generally advocated market-based mechanisms that will promote competition, provide flexibility to broadband providers, and stimulate investment in broadband networks."[5] It believes that "[w]ireless broadband, as well as other alternative broadband platforms such as satellite and broadband over power lines, can create a competitive broadband marketplace and bring the benefits of lower prices, better quality, and greater innovation to consumers."[6]

Although traditional telecommunications and cable companies increasingly added broadband Internet services to their product offerings in the late 1990s, hundreds of municipalities throughout the country also have considered whether they should provide broadband Internet access to their residents, and if so, how.[7] During this time, some municipalities installed costly fiber optic or cable wiring. More recently, with the development of less-costly wireless Internet technology, municipalities also have explored and, in some cases played a role in the deployment of, municipal wireless broadband Internet networks ("wireless broadband" or "wireless Internet"). These municipalities have done so either in conjunction with an outside entity, such as a private Internet Service Provider ("ISP"), or in their own capacity as a municipal provider of wireless Internet service ("municipal wireless Internet" or "municipal wireless").[8]

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at http://www.whitehouse.gov/news/releases/2004/06/20040624-7.html; Scott Wallsten, *Broadband Penetration: An Empirical Analysis of State and Federal Policies* 1 (AEI-Brookings Joint Center for Regulatory Studies Working Paper 05-12, June 2005), *available at* http://www.aei-brookings.org/publications/abstract.php?pid=949 (noting that, according to the International Telecommunications Union, the U.S. had fallen to 16th in the world in broadband penetration by 2005).

[4] FCC Report, *supra* note 1, at 12.

[5] *Id*. at 13.

[6] *Id*. at 14.

[7] *See generally* HAROLD FELD ET AL., CONNECTING THE PUBLIC: THE TRUTH ABOUT MUNICIPAL BROADBAND 4 (white paper issued by the Consumer Federation of America, Media Access Project, and Freepress), *available at* http://www.mediaaccess.org/MunicipalBroadband_WhitePaper.pdf.

[8] As used in this report, the term "wireless technologies" refers to broadband Internet technologies that operate without any physical wire between sender and receiver, such as technologies that communicate using radio or microwaves. *See generally* WEBOPEDIA, WIRELESS (last visited Aug. 4, 2006), *at* http://webopedia.com/TERM/w/wireless.html. *See also*

Municipalities' increasing interest and involvement in the development and management of wireless Internet networks appear to have spurred both state and federal legislators to introduce legislation that would define the extent to which municipalities may provide such services. At least nineteen states have some kind of legislation that defines the extent to which municipalities may provide Internet service.[9] At least eight of those nineteen states passed such legislation in the 2004-2006 period; similar bills were introduced in at least nine other states during that time.[10] Some of these state bills have proposed to define, restrict, or eliminate municipalities' ability to provide wireless Internet service. Many of these recent bills require municipalities to undertake feasibility studies, long-term cost-benefit analyses, public hearings, or referendums. Critics of such legislation, however, believe these requirements slow local implementation.[11] Federal bills would, variously, preempt state laws prohibiting municipal wireless Internet provision;[12] define how municipalities may go about implementing wireless Internet networks;[13] or prohibit municipal wireless Internet provision altogether.[14]

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infra Appendix (summarizing major Internet technologies).

[9] *See generally* MICHAEL J. BALHOFF & ROBERT C. ROWE, MUNICIPAL BROADBAND: DIGGING BENEATH THE SURFACE 104-107 (2005), *available at* http://www.balhoffrowe.com/pdf/Municipal%20Broadband--Digging%20Beneath%20the%20Surface.pdf; INTEL, DIGITAL COMMUNITY BEST PRACTICES 10 (2005), *available at* http://www.intel.com/business/bss/industry/government/digital-community-best-practices.pdf.

[10] *See generally* BALHOFF & ROWE, *supra* note 9, at 104-108; THE BALLER HERBST LAW GROUP, PROPOSED STATE BARRIERS TO PUBLIC ENTRY (AS OF JUNE 8, 2006) (2006), *available at* http://www.baller.com/pdfs/Baller_Proposed_State_Barriers.pdf.

[11] *See generally* INTEL, *supra* note 9, at 10.

[12] S. Res. 1294, 109th Cong., 1st Sess. (2005), *available at* http://thomas.loc.gov/cgi-bin/query/z?c109:S.1294:. (McCain-Lautenberg "Community Broadband Act of 2005"); S. Res. 2686, 109th Cong., 2nd Sess. § 502 (2006), *available at* http://thomas.loc.gov/cgi-bin/query/z?c109:S.2686: (Stevens "Communications, Consumer's Choice, and Broadband Deployment Act of 2006"); H.R. 5252, 109th Cong., 2nd Sess. § 401 (2006), *available at* http://thomas.loc.gov/cgi-bin/query/z?c109:H.R.5252: (Barton "Communications Opportunity, Promotion, and Enhancement Act of 2006," as passed out of the House of Representatives and referred to the Senate).

[13] S. Res. 1504, 109th Cong., 1st Sess. § 15 (2005), *available at* http://thomas.loc.gov/cgi-bin/query/z?c109:S.1504: (Ensign "Broadband Investment and Consumer Choice Act of 2005"); S. Res. 2686, *supra* note 12.

[14] H.R. Res. 2726, 109th Cong., 1st Sess. (2005), *available at* http://thomas.loc.gov/cgi-bin/query/z?c109:H.R.2726: (Sessions "Preserving Innovation in Telecom Act of 2005").

The Supreme Court has recognized that, in some cases, it may be a "respectable position" to argue "that fencing governmental entities out of the telecommunications business flouts the public interest."[15] The Court also has recognized, however, that "there are . . . arguments on the other side, against government participation . . . ."[16] In particular, the Court noted that "(if things turn out bad) government utilities that fail leave the taxpayers with the bills," and that "in a business substantially regulated at the state level, regulation can turn into a public provider's weapon against private competitors . . . ."[17]

The FTC and its staff have previously engaged in advocacy related to competition in the cable industry and the allocation of radio bandwidth spectrum before state and federal entities.[18] In addition, the FTC has reviewed numerous cable industry mergers, as well as mergers involving providers of Internet technology and content.[19] The arguments for and against

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[15] *Nixon v. Missouri Municipal League*, 541 U.S. 125, 131 (2004). There, the Court held that a provision of the 1996 amendment to the Communications Act (47 U.S.C. § 253) authorizing the preemption of state and local laws prohibiting "any entity" from providing a statutorily defined "telecommunications service" did not preempt state statutes that bar political subdivisions from doing so. The Court noted, however, that "in any event the issue here does not turn on the merits of municipal telecommunications services." *Id*. at 132.

[16] *Id*. at 131.

[17] *Id*.

[18] *E.g., FTC Staff Comment Before the Federal Communications Commission In the Matter of Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006* (Feb. 28, 2006), *available at* http://www.ftc.gov/os/2006/03/ReplyoftheFTCBureauofEconomicsOnFCCAWSAuctionAUDocket06-30.pdf. *FTC Staff Comment to the Hon. Frank Sawyer Concerning Ohio H.B. 622 to Define Conditions Under Which Municipalities May Grant Additional Cable Franchises in Areas Having an Existing Cable System* (July 5, 1990); *FTC Staff Comment Before the FCC In the Matter of Competition, Rate Deregulation and the Commission's Policies Relating the Provision of Cable Television Service* (Apr. 1990); *FTC Staff Comment Before the FCC In the Matter of Evaluation of the Syndication and Financial Interest Rules* (Sept. 5, 1990); *FTC Staff Comment Before the Federal Communications Commission Concerning the Auction of Certain Unassigned Frequencies in the Radio Spectrum* (Oct. 29, 1986).

[19] *E.g., In the Matter of Time Warner, Inc., et al.*, 123 FTC 171 (1997) (consent order imposing certain conditions on Time Warner proposal to acquire Turner Broadcasting and create the world's largest media company, including several leading cable networks); *In the Matter of AOL, Inc. and Time Warner, Inc.*, FTC Dkt. No. C-3989 (2001) (consent order imposing certain conditions on merging parties, including that they allow competing Internet Service Providers to access Time Warner's broadband cable Internet systems, and to allow content providers competing with Time Warner to have access to AOL's Internet Service

municipalities providing wireless Internet service for their communities raise important competition issues. The purpose of this report is to summarize the FTC staff's research on wireless broadband Internet, including its provision in the municipal context, and to provide perspective on the competition issues that policymakers may encounter when considering municipal wireless Internet provision or related legislation.[20] To prepare this report, the FTC staff researched various technologies, legislative proposals, and case studies of municipalities that have participated in the deployment of, or are in the process of deploying, municipal wireless Internet systems.

The report is organized as follows. Part I and the Appendix describe the various wireless Internet technologies[21] that are currently being used or are under development. Part I also summarizes the legal status of wireless Internet. Part II describes the most common operating models being used to provide wireless Internet service. Part III summarizes proponents' arguments in favor of municipal wireless Internet provision, including its commercial and non-commercial uses. Part IV summarizes opponents' arguments why municipal wireless Internet provision should be limited or prohibited. Part V surveys recent federal and state legislative proposals regarding municipal wireless Internet provision. Finally, Part VI addresses competition issues that policymakers should consider in evaluating municipal wireless Internet legislation.

Provider), *available at* http://www.ftc.gov/opa/2000/12/aol.htm; *In the Matter of Cablevision Systems Corp.*, Dkt. No. C-3804 (1998) (consent order requiring Cablevision to divest certain assets of Tele-Communications, Inc. (TCI), in geographic areas where Cablevision and TCI competed as a condition for allowing the two companies to merge), *available at* http://www.ftc.gov/os/caselist/c3804.htm; *In the Matter of Tele-Communications, Inc.*, Dkt. No. C-3575 (1995) (consent order requiring TCI to divest either its cable television system or that of TeleCable Corp. in Columbus, Georgia, as a condition for allowing the two cable companies to merge).

[20] Municipal provision or facilitation of broadband Internet access through any medium – wireless, fiber, or other – may raise certain competition issues for policymakers. This report focuses on municipal involvement in wireless Internet access because it appears to be the medium most commonly considered by municipalities in recent years and has prompted a significant number of legislative responses both at the state and federal levels.

[21] The summary of technologies provided herein is to provide context and understanding for the remainder of the report. For a more detailed description of various Internet technologies, see FCC Report, *supra* note 1; WEBOPEDIA computer and Internet dictionary, http://www.webopedia.com.

I. MAJOR WIRELESS INTERNET TECHNOLOGIES AND THE MECHANICS OF IMPLEMENTATION

In recent years, with the development of wireless Internet technologies that are often less expensive to deploy than more traditional fiber optic or cable wireline networks, a variety of institutions from coffee shops to non-profit organizations to universities and municipalities have deployed wireless Internet networks to serve their customers or residents. Private businesses and institutions may use a proprietary network for localized use and may charge for access.[22] In the case of large-scale networks, municipalities typically regulate the terms of use for rights-of-way access to public spaces, such as street lights, traffic lights, and public buildings to install wireless Internet antennas.[23] To date, such wireless Internet networks, like wireline networks, have been used primarily to send and receive data, like web pages and email. More recently, new data applications have been developed, such as Voice over Internet Protocol ("VoIP"), that allow users to make phone calls via both wireless and wireline networks.[24] As many as 8,000 Wireless Internet Service Providers ("WISPs") provide wireless Internet service to customers as an alternative to traditional wireline technologies.[25] In addition, "[i]ncreasingly, broadband services are being offered using a combination of more than one type of facilities-based platform, including networks that combine licensed wireless broadband with unlicensed wireless technologies, wireless and wireline broadband technologies, terrestrial wireless with satellite broadband technologies, and wireless broadband with broadband over power lines."[26]

A. Wireless Internet Standards Using Unlicensed Radio Band Spectrum

"Wireless fidelity" ("Wi-Fi") is the most commonly used wireless Internet standard today. Wi-Fi is a registered trademark term promoted by the Wi-Fi Alliance, a group of wireless Internet hardware and software providers that certify "802.11" products for network interoperability.[27] An 802.11 network refers to a family of specifications approved by the

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[22] *E.g.*, T-MOBILE HOTSPOT, U.S. LOCATIONS (2006), https://selfcare.hotspot.t-mobile.com/locations/viewLocationMap.do.

[23] This power may vary, depending on a particular state's laws and a municipality's charter. State law may also affect whether a private provider could install a wireless Internet network without the use of such municipally granted rights-of-way by, for example, installing wireless antennas on private buildings.

[24] FCC Report, *supra* note 1, at 34.

[25] *Id*. at 3.

[26] *Id*. at 7.

[27] *See generally* WI-FI ALLIANCE, LEARN ABOUT WI-FI® (2006), *at* http://www.wi-fi.org/OpenSection/index.asp; FCC Report, *supra* note 1, at 3.

Institute of Electrical and Electronics Engineers ("IEEE") in 1997 for a wireless, over-the-air interface Local Area Network ("WLAN").[28] Generally, computer users can access the Internet with a high speed wireless connection if they are within 300 feet of a transmitting antenna and have the appropriate receiving hardware installed in their computer.[29] Wi-Fi provides data transmission at speeds of up to 11-54 Mbps.[30] Wi-Fi is commonly used to provide wireless Internet "hot spot" connections in coffee shops, airports, and on university campuses. The number of Wi-Fi hot spots in the U.S. has grown exponentially in recent years and may now number as many as 150,000, with approximately 30 million users.[31]

Most organizations, including municipalities, that have experimented with wireless Internet networks have done so using Wi-Fi, in part because it was one of the earliest wireless

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[28] WEBOPEDIA, 802.11 (last visited Aug. 4, 2006), *at* http://www.webopedia.com/TERM/8/802_11.html. *See also* WEBOPEDIA, WIRELESS LAN STANDARDS (last visited Aug. 4, 2006), *at* http://www.webopedia.com/quick_ref/WLANStandards.asp.

> There are three main types of Wi-Fi:
>
> Earliest to market, and hence most ubiquitous, is IEEE 802.11b, which operates on an unlicensed basis in the 2.4 Ghz band with data rates of up to 11 [(Megabits)]. IEEE 802.11g, the technological successor to IEEE 802.11b, uses [Orthogonal Frequency Division Multiplexing ("OFDM")] modulation and has data rates of up to 54 Mbps. It is also backward-compatible with IEEE 802.11b, such that WLANs can be configured using equipment manufactured according to either standard (although using both types of equipment together can reduce expected data rates). Finally, the IEEE 802.11a standard is used by WLAN equipment operating on an unlicensed basis using OFDM modulation in the 5 Ghz band.

FCC Report, *supra* note 1, at 19-20. Orthogonal Frequency Division Multiplexing is a "technique for transmitting large amounts of digital data over a radio wave. OFDM works by splitting the radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to the receiver. OFDM reduces the amount of crosstalk in signal transmissions." WEBOPEDIA, OFDM (last visited Aug. 4, 2006), *at* http://www.webopedia.com/TERM/O/OFDM.html.

[29] *See generally* FCC Report, *supra* note 1, at 3.

[30] *See supra* note 1, at 20; *infra* Appendix.

[31] FCC Report, *supra* note 1, at 3, 56. *See also* JIWIRE.COM, JIWIRE WIFI HOTSPOT FINDER (2006), *at* http://www.jiwire.com/search-hotspot-locations.htm.

Internet standards to be developed and tested. Wi-Fi networks can be set up by installing multiple toaster-size antennas on street lights, traffic signals, and buildings, so that multiple wireless hotspots overlap each other to form a continuous "mesh" network of wireless signals.[32] In order to provide an initial connection to the Internet and to manage network traffic, "backbone" technology (also called "backhaul" technology) must be installed at one or more points connected to the network. The installation of such a wireless network may be less expensive than installing a wireline network of the same size.[33] But whether the long-term operating costs of such a wireless network are more or less than those of a comparable wireline network is not clear at this point.[34] Also, it appears that multiple networks may be created in the same geographic area by installing multiple sets of antennas and backhaul connections.[35]

A user must have a computer or other device that is configured for wireless Internet use. Newer laptop computers often have such wireless connectivity built-in to them at the factory.[36] Older computers may be adapted through the addition of a wireless Internet "card." As many as

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[32] *See generally* FCC Report, *supra* note 1, at 4, 19-24.

[33] "[W]ireless technologies frequently are a more cost-effective solution for serving areas with less dense populations, and provide rural and remote regions new ways to connect to critical health, safety, and educational services." FCC Report, *supra* note 1, at 13.

[34] Moreover, although wireless Internet technology continues to improve, current technologies may be disrupted by severe weather conditions such as strong wind, physical structures such as buildings, large vehicles, trees, or fallen tree branches; by geographical features such as hills or valleys; or by other wireless signals such as those emitted by microwaves, baby monitors, or cordless phones. *See generally* TROPOS NETWORKS, METRO-SCALE MESH NETWORKING WITH TROPOS METROMESH™ ARCHITECTURE 9 (2005), *available at* http://www.tropos.com/pdf/tropos_metro-scale.pdf. Some wireless carriers have begun to deploy Orthogonal Frequency Division Multiplexing technology, which does not require a direct line-of-sight between the transmitter and the receiver. In April 2004, Nextel began offering this service in Raleigh-Durham, North Carolina. FCC Report, *supra* note 1, at 21-22.

[35] *See generally* Michelle Kessler, *City Takes Fast Track to High-Speed Access*, USA TODAY, May 1, 2004, at 3B, *available at* http://www.usatoday.com/money/industries/technology/2004-03-31-cerritos_x.htm. Cerritos, California, indicates that it will consider allowing multiple wireless Internet networks to compete with each other in the city.

[36] According to one study, among adults age eighteen to twenty-seven, 45 percent use a cellular phone equipped with wireless Internet capabilities and 22 percent use Wi-Fi enabled laptop computers. FCC Report, *supra* note 1, at 43 n.145 (citing John B. Horrigan, *28% of American Adults are Wireless Ready*, Pew Internet Project Data Memo, Pew Internet & American Life Project, May 2004).

41 percent of all Internet users, or 56 million Americans (28 percent of all Americans), have wireless Internet enabled devices.[37]

Currently in development is "worldwide interoperability for microwave access" ("Wi MAX"). Wi MAX is a registered trademark term promoted by the Wi MAX Forum, a group of wireless Internet hardware and software providers that certify "802.16" products for network interoperability.[38] An "802.16"network refers to a family of specifications approved by the IEEE in 2002 for a Wireless Metropolitan Access Network ("WirelessMan" or "WMAN").[39] Wi MAX "is capable of transmitting network signals covering in excess of 30 miles of linear service area" and could provide "multiple shared data rates of up to 75 Mbps," a significant advance over current Wi-Fi technology.[40]

Future wireless Internet standards, such as a Wi MAX network, would likely be installed in a manner similar to a Wi-Fi network. Wi MAX antennas, however, are expected to provide Internet coverage over distances of several miles versus the few hundred feet covered by Wi-Fi antennas. Thus, Wi MAX, and standards with similar coverages, would generally require fewer antennas than Wi-Fi to provide wireless Internet access for a given area.

Both Wi-Fi and some Wi MAX standards use unlicensed radio spectrum, like a cordless phone. Wi-Fi operates in the 2.4 and 5 GHz radio bands, a bandwith that may be shared by multiple users.[41] Wi MAX "includes fixed systems employing a point-to-multipoint architecture operating between 2 GHz and 66 GHz."[42] Both technologies continue to evolve as new technical standards are tested and approved by their respective standard-setting organizations.[43]

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[37] FCC Report, *supra* note 1, at 5.

[38] *See generally* WI MAX FORUM, WELCOME TO THE WI MAX FORUM (2006), *at* http://www.wimaxforum.org/home; FCC Report, *supra* note 1, at 3-4; 20-22.

[39] WMAN is also sometimes referred to as the "Wireless Microwave Access" or "Air Interface Standard."

[40] FCC, AVAILABILITY OF ADVANCED TELECOMMUNICATIONS CAPABILITY IN THE UNITED STATES, FOURTH REPORT TO CONGRESS 19 (2004) ("Availability of Advanced Telecommunications"), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-208A1.pdf.

[41] *Id*. at 18-19.

[42] *Id*. at 19.

[43] *See generally infra* Appendix.

B. Wireless Internet Standards Using Licensed Radio Band Spectrum

The FCC also licenses certain radio band spectrum for the wireless transmission of Internet service. Third generation wireless Internet services ("3G" or "advanced wireless services") operate within these licensed radio frequencies. 3G services typically use a licensed cellular network architecture that has been upgraded to carry data, in addition to voice. Subscribers can access the Internet while mobile, using devices such as laptop computers equipped with a wireless modem card, cellular phones, and personal digital assistants. Several major telecommunications companies, including Cingular, Sprint, and Verizon, now offer mobile wireless broadband service over their cellular networks. Thus, 3G Internet service is available to approximately 96% of the U.S. population, co-extensive with traditional cellular phone service. Typical data speeds in major metropolitan areas are between 220-700 Kbps. Outside of these areas speeds are slower, at approximately 40-135 Kbps.[44] In addition, some proposed Wi MAX standards may also use licensed radio band spectrum. In September 2006, the FCC concluded the auction of an additional 90 MHz of radio spectrum. The newly available spectrum will accommodate emerging technologies and help avoid interference and quality degradation as a result of multiple users operating in the same spectrum.[45]

C. Satellite Technologies

Three satellite broadband providers, HughesNet (previously DirecWay), Starband, and WildBlue, offer broadband Internet service via satellite. But as of mid-2003 they had only 200,000 subscribers.[46] Other companies have launched satellites and anticipate being able to

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[44] *See generally id*; FCC Report, *supra* note 1, at 24-26.

[45] Press Release, FCC, FCC to Commence Spectrum Auction that Will Provide American Consumers New Wireless Broadband Services (Dec. 29, 2004) (formally notifying the National Telecommunications and Information Administration ("NTIA") of the Department of Commerce of the FCC's intention to auction licenses for certain "3G" advance wireless services), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-255802A1.pdf; FCC, AUCTION 66, ADVANCED WIRELESS SERVICES (AWS-1) (2006), *at* http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=66. *See also FTC Staff Comment Before the Federal Communications Commission In the Matter of Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006, supra* note 18.

[46] FCC, Availability of Advanced Telecommunications, *supra* note 40, at 23. Some satellite Internet technologies, however, do not qualify as "broadband," as defined by the FCC, because they do not offer minimum data transfer speeds of 200 Kpbs both downstream and upstream.

offer broadband Internet service targeted primarily "to the estimated 25 million homes and small businesses that do not have access to other broadband Internet options."[47]

D. Broadband Over Power Lines

Some power companies began to offer broadband Internet service over power lines ("BPL") in limited geographic areas in 2003.[48] In June 2004, President Bush noted that spreading broadband Internet throughout America utilizing the existing electrical power lines is a "great opportunity," and that "our job in government is to help facilitate the use of electricity lines by helping with the technological standards that will make this more possible."[49]

BPL systems use existing, medium-voltage electrical power lines (up to 40,000 volts) to provide broadband Internet access by coupling radio frequency energy onto the line.[50] A utility converts Internet data from a backbone connection into higher frequencies than electrical current, so the two do not interfere with each other. Data is then transmitted along power lines into customers' neighborhoods. There, the utility can use wireless technology (such as Wi-Fi) to transmit data into customers' homes, or use a wall socket adapter to convert power line signals so they can be carried into a computer's usual ports.

There are now over forty deployments of BPL technology nationwide, most of which are in trial stages.[51] There are, however, a few commercial BPL systems, including Duquesne Light

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[47] *Id*. at 23.

[48] *Id*. at 22-23 (initial trials of BPL occurred in Manassas, Virginia; Allentown, Pennsylvania; and Cincinnati, Ohio). *See also* DEPARTMENT OF COMMERCE, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BROADBAND-OVER-POWERLINE REPORT (2004), *available at* http://www.ntia.doc.gov/ntiahome/fccfilings/2004/bpl/index.html; Michael D. Gallagher, Assistant Secretary for Communications and Information, National Telecommunications and Information Administration, U.S. Department of Commerce, Broadband over Power Lines: U.S. Innovation Driving Economic Growth, Presentation, Denver, Colorado (Sept. 16, 2006), *available at* http://www.ntia.doc.gov/ntiahome/speeches/2005/MG_BPL_09162005_files/frame.htm#slide0075.htm.

[49] President George W. Bush, High Tech Improving Economy, Health Care, Education, Remarks by the President on Innovation to the U.S. Department of Commerce (June 24, 2004), *supra* note 3.

[50] FCC, Availability of Advanced Telecommunications, *supra* note 40, at 22.

[51] *See generally* UNITED POWER LINE COUNCIL, BPL DEPLOYMENT MAP (2006), *at* http://www.uplc.utc.org/file_depot/0-10000000/0-10000/7966/conman/BPL+Map+12_12.pdf.

Company located in a suburb of Pittsburgh, Pennsylvania and Communications Technologies Inc. located in Manassas, Virginia, a suburb of Washington, D.C.[52] But some amateur radio operators have complained "that Internet signals, when carried as radio frequencies over medium-voltage power lines, can disrupt other radio signals," such as those used by amateur radio operators.[53]

E. Legal Status of Wireless Broadband Internet

Wireless broadband services are subject to minimal regulation by the FCC. Wireless technologies that use unlicensed radio band spectrum (such as Wi-Fi and Wi MAX) are subject to technical requirements in the FCC's rules that are intended to prevent interference with FCC-licensed services.[54] Advanced wireless services that use licensed spectrum (such as cellular phones, PDAs, and wireless modem cards) are subject to the relevant FCC rules for the particular licensing regime.[55] The issue of whether wireless broadband will be subject to additional regulation has not been fully resolved.

The FCC's Wireless Broadband Access Task Force addressed this issue in 2005 and recommended that the FCC "apply a deregulatory framework – one that minimizes regulatory barriers at both the federal and state levels – to wireless broadband services."[56] Accordingly, the Task Force recommended that the FCC consider classifying wireless broadband as an "information service."[57] Under the Communications Act, "information services" are not subject

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[52] Akweli Parker, *Broadband's New Outlet*, PHILLY.COM, Sept. 11, 2005, *available at* http://64.233.161.104/search?q=cache:KpJrawN9GjUJ:www.philly.com/mld/philly/12611837.htm+broadband%27s+new+outlet+akweli+parker&hl=en&gl=us&ct=clnk&cd=1. Duquesne has approximately 2,800 customers, and has reported no substantial problems with the technology. *Id*. *See also* COMMUNICATIONS TECHNOLOGIES, INC., COMTEKBROADBAND.COM (2006).

[53] According to some utilities, they are attempting to deal with such concerns by employing a technique called "notching," which reserves portions of the radio spectrum for hobbyists. Parker, *supra* note 52.

[54] 47 C.F.R. Part 15.

[55] *See generally* FCC Report, *supra* note 1, at 14-15.

[56] *Id*. at 66.

[57] An "information service" is "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications . . . ." 47 U.S.C. § 153(20). *See also Nat'l Cable & Telecom. Ass'n et al. v. Brand X Internet Services et al.*, 125 S.Ct. 2688, 2697-98 (2005) ("*Brand X*") (upholding FCC declaratory ruling that cable broadband is an "information" not a "telecommunications" service

to the Communications Act's Title II common carrier requirements for "telecommunications services."[58] As noted by the Task Force, however, even with a deregulatory framework, it is likely that certain regulatory requirements will be imposed on wireless broadband technologies.[59] One factor that may affect the regulation of wireless broadband is the possibility of federal legislation that would overhaul the Communications Act in order to address the convergence of telecommunications technologies.[60]

II. OPERATING MODELS

Municipalities and other entities that have implemented wireless Internet networks have most commonly used one of six general operating models, from which a variety of hybrids may be created by combining various features of each model. This report describes six of these models: non-profit, cooperative, contracting out, public-private partnership, municipal, and government loan-grant.

A. Non-Profit Model

Under this operating model, a non-profit organization (such as an I.R.S. § 501(c)(3) organization) volunteers to organize, fund, deploy, and maintain a wireless Internet network, perhaps without charge to users. The non-profit may raise funds from charitable donations or grants or secure loans from a private institution or municipality. The non-profit negotiates with a municipality to secure rights-of-way access to streetlights, traffic lights, or other buildings. It may contract with a private telecommunications company to design and operate certain aspects of the network. The non-profit may provide service to a particular public space or public attraction, such as a park or museum.

For example, the 501(c)(3) "Open Park Project" maintains Wi-Fi hotspots near the U.S. Supreme Court, the Library of Congress, and Pershing Park-Freedom Plaza, just off the National Mall in Washington, D.C. The organization has requested that the Smithsonian Institution let it

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under the 1996 amendment to the Communications Act).

[58] A "telecommunications service" is "the offering of telecommunications for a fee directly to the public . . . regardless of the facilities used." 47 U.S.C. § 153(46). "Telecommunications" is "the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received." 47 U.S.C. § 153(43). *See also Brand X* at 2697-98.

[59] FCC Report, *supra* note 1, at 67.

[60] *See e.g.*, S. Res. 1504, 109th Cong., 1st Sess. § 15 (2005), *available at* http://thomas.loc.gov/cgi-bin/query/z?c109:S.1504: (Ensign "Broadband Investment and Consumer Choice Act of 2005")

place rooftop antennas on buildings around the Washington Mall. According to the organization, it is operated by volunteers and relies on private donations to cover its expenses.[61]

B. Cooperative Model

In a cooperative model local businesses and other private community groups pool resources to design, fund, implement, and maintain their own wireless Internet network. Like a conventional private business model, the municipality's involvement in these activities is minimal and its main role is to provide rights-of-way access for installation of wireless antennas. For example, MontpelierNet is a community consumer-member cooperative formed to create wireless Internet hotspots in downtown Montpelier, Vermont.[62]

C. Contracting Out Model

In this model, a municipality contracts with one or more private telecommunications companies to design, fund, implement, and maintain a wireless Internet network. Generally, the municipality's involvement in these activities is minimal and its main role is to provide rights-of-way access for installation of wireless antennas. Such an arrangement may be structured in the form of a franchise granted by the municipality.[63] The private provider typically charges most subscribers a market-based rate. The municipality, however, may negotiate with the private provider to regulate rates, secure special rates for low-income persons, or obtain a discounted rate for itself in exchange for serving as an "anchor tenant" of the network.[64]

For example, in April 2004, Aiirmesh Communications, a private start-up company, began operating a Wi-Fi network in Cerritos, California, a 52,000 person suburb of Los Angeles.[65] City officials viewed the wireless network as a way to bring faster Internet service to

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[61] *E.g.*, OPEN PARK PROJECT, ABOUT US (2006), *at* http://openpark.net. *See also* Jacqueline Trescott, *Smithsonian Reconsiders Web Access Plan on the Mall*, THE WASHINGTON POST, May 10, 2005, at C04.

[62] MONTPELIERNET, HOME (2006), *at* http://www.montpeliernet.org/index.html. *See also* COLUMBIA RURAL ELECTRIC ASSOC., COLUMBIA ENERGY, L.L.C. (2006), *at* http://www.columbiarea.com/about/energy.php.

[63] *See generally* CITY OF PLANO, TEXAS, SOLICITATION 2006-20-C RFO FOR WIRELESS NETWORK SERVICES 9 (2006), *available at* http://www.muniwireless.com/reports/docs/PlanoTexasRFO.pdf (request for offer for non-exclusive franchisee agreement for wireless network services).

[64] FCC Report, *supra* note 1, at 34.

[65] Kessler, *supra* note 35.

its residents without having to install more expensive underground cable or digital subscriber line ("DSL") wirelines. At the time, some Cerritos residents were not served by cable or DSL. The city provides access to city traffic lights and city buildings for the placement of antennas. Aiirmesh charges customers approximately $30 per month for service. In addition, Cerritos has purchased sixty subscriptions for itself, mainly for use by city code enforcement officials and other employees who need to file reports while in the field.[66]

In October 2005, Madison, Wisconsin contracted with Cellnet Technology and Wireless Facilities, Inc. to install a Wi-Fi network in the city's downtown area, and, if successful, to expand the network to other areas. The network will be owned and operated by Cellnet and designed and deployed by Wireless Facilities, without the use of taxpayer money. The two companies have contracted with Madison Gas and Electric for access to its power poles. The city's role is mainly that of a facilitator. The city began charging users for service in June of 2006, after a spring trial period. The network indicates it will sell Wi-Fi-equipped mobile phones that will allow customers to make calls within covered areas and that it is considering letting other ISPs also use the network.[67]

D. Public-Private Partnership Model

In a public-private partnership model, a municipality contributes substantially to designing, funding, implementing, and/or maintaining a wireless network. One or more of these functions, however, is contracted out to a private partner. The municipality may negotiate with a partner to regulate rates (including, perhaps, setting lower rates for low-income persons), or to "insource" telecommunications services that the municipality leases from other non-partner, private telecommunications companies. In addition, access to this type of network may also be resold on a wholesale basis to other private telecommunications companies.[68]

To date, the largest attempted public-private wireless Internet network appears to be the 135-square mile Wi-Fi network being installed in Philadelphia, Pennsylvania. The Wireless

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[66] *See id.*; FCC Report, *supra* note 1, at 34.

[67] Eric Griffith, *The Wisconsin City Has Had a Rocky Year Trying to Get to This Point, But New Vendors are Now Signed to Install the City-Wide Network*, WI-FIPLANET.COM, Oct. 12, 2005, 2005 WLNR 17084141; Ben Fischer, *Web Setup May Not be City Wide There's No Guarantee That the Wireless Internet Project Will Cover All Areas*, WISC. STATE J. at A1, Nov. 19, 2005, 2005 WLNR 19286519; James Edward Mills, *City Wi-Fi Network Improves*, WISC. STATE J., Aug. 9, 2006, *available at* http://www.madison.com/wsj/home/biz/index.php?ntid=94068&ntpid=1.

[68] *See generally* CITY OF PHILADELPHIA, THE WIRELESS PHILADELPHIA™ EXECUTIVE COMMITTEE, WIRELESS PHILADELPHIA™ BUSINESS PLAN (Feb. 2005), *available at* http://www.wirelessphiladelphia.org/pdfs/Wireless-Phila-Business-Plan-040305-1245pm.pdf.

Philadelphia™ Executive Committee's initial business plan proposed that the city create a non-profit, public-private corporation to oversee implementation. The plan called for securing start-up funding from foundations, grants, bank loans, and other non-city sources. The city's role would be to provide access to city-owned assets, such as light poles, for the placement of Wi-Fi antennas. The design, deployment, management, and maintenance of a city-wide Wi-Fi network would be contracted out to private companies.[69]

The business plan called for the corporation to provide market-based rates lower than those of cable and DSL, and to provide discounted rates to low-income persons, certain other residents, and small businesses. Free service would be provided in public spaces like parks and squares. Access to the network also would be available to retail service providers, telecommunications companies, and other institutions at low, wholesale rates. The corporation would use excess cash flow to promote computer and Internet use by low-income persons and small businesses. In addition, the city of Philadelphia would be an anchor tenant for the network and would purchase certain services from the corporation, such as business-class DSL, T-1 lines, and mobile data services. The city's wireless executive committee originally estimated that the project would require a $10 million investment in the first year and $500,000 per year for the following four years.[70]

In October 2005, however, Philadelphia announced that it would partner with EarthLink to fund, deploy, maintain, and own the network's hardware. In January 2006, the parties reached a ten-year agreement. Although the contract does not specify the monthly rate that consumers will be charged, city officials indicate they expect rates to be about $20 per month, with a discounted rate of about $10 per month for low-income users and $9 per month for wholesalers. EarthLink also will give Wireless Philadelphia five percent of revenues, which, in turn, will fund the non-profit corporation's "digital divide" program.[71] Deployment and operating costs have been estimated at $15-18 million, including $10 million for infrastructure.[72]

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[69] *See generally id.*

[70] *Id*. at 12-13, 27, 30-31, 37-38.

[71] Generally, the expression "digital divide" has been used to refer to differences in computer and Internet access and literacy in society.

[72] *Earthlink Wins Philadelphia Bid*, MUNIWIRELESS.COM Oct. 4, 2005, *at* http://www.muniwireless.com/municipal/bids/851; *EarthLink Nabs Philadelphia Wi-Fi Deal*, BROADBAND BEAT, Oct. 8, 2005, 2005 WLNR 17768806. Larry Eichel, *Wi-Fi Highway Is Uncertain Route for Several Cities, Phila. Ponders Potential Tax Burdens, Lack of Demand, and the Economics of Digital Divide*, PHILA. INQUIRER, Nov. 13, 2005, at A1, 2005 WLNR 18331304; Deborah Yao, *EarthLink Inc. Has Finalized a 10-year Contract to Provide Wireless Internet Service Across Philadelphia, A City Official Said Monday*, THE WASHINGTON POST, Jan. 30, 2006, *available at* http://www.washingtonpost.com; *Next Step for Phila.'s Wireless*

E. Municipal Model

In a municipal model, a municipality is primarily responsible for designing, funding, implementing, and maintaining the wireless Internet network. Although some aspects of creating and operating the network may be contracted out to private parties, the municipality remains principally responsible for the network. A municipality may offer wireless Internet as an amenity for residents, businesses, or tourists, or to enhance other municipal services.[73]

For example, in June 2004 Chaska, Minnesota, began offering wireless Internet coverage to about ninety-five percent of its 22,000 residents for $17 per month. The network uses 250 antennas mounted on city light poles to cover an area of approximately sixteen square miles. According to the city, the network breaks even financially at 1,500 subscribers and had signed up more than 2,000 subscribers by February 2005.[74]

F. Government Loan-Grant Model

The federal government has established several programs to help improve broadband access, affordability, and adoption rates.[75] For example, in 2003, the FCC and the United States Department of Agriculture's Rural Utilities Service ("RUS") created the Rural Wireless Community VISION Program to accelerate access to advanced wireless telecommunications

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Internet: City Council Approval, BIZJOURNALS.COM, Jan. 31, 2006, *available at* http://biz.yahoo.com.

[73] *See, e.g.*, NEVADA, MISSOURI TURNED ITSELF INTO ONE, COMPLETE HOTSPOT, NEVADAMO.ORG (2006), *at* http://www.nevadamo.org/pages/press/neighborlink.htm (explaining that Nevada, Missouri, presents its wireless Internet network as "a unique selling point that is helping the community develop its own brand, an enriched and more convenient life for its residents, and much more.").

[74] CHASKA.NET (2006); TROPOS NETWORKS, TROPOS METROMESH PROVEN: METRO-SCALE WI-FI IN CHASKA, MN (2005), *available at* http://www.tropos.com/pdf/chaska_performance.pdf; *Utility or Futility? How Chaska, Minnesota (pop: 18,000) is Showing Big Cities the Way Forward*, CORANTE.COM, Feb. 14, 2005, *at* http://corante.com/vision/wireless/chaska.php?page=1; North Dakota Ass'n of Telecommunications Cooperatives, *Minnesota City to Offer Wireless Broadband for $16*, THE STATEWIDE BUZZER, Oct. 6, 2005, *at* http://www.ndatc.com/buzzer-oct2004.htm.

[75] *See generally* ANALYSIS OF RURAL COMMUNICATIONS NEEDS – FCC AND USDA RUS PROGRAMS, *available at* http://www.usda.gov/rus/jointoutreach/presentations/ruralcommunicationschart.pdf. *See also* USDA, JOINT FEDERAL RURAL WIRELESS OUTREACH INITIATIVE (2006), *available at* http://www.usda.gov/rus/jointoutreach/.

across rural America. The agencies state that: "[a]ccess to e-commerce, e-government, telemedicine, and distance learning translate into better jobs, more responsive government, improved health care, greater educational opportunities, and a brighter future for all Americans."[76] To apply for the program, a community must submit an essay describing "the community's vision for wireless connectivity and services and how the community will benefit from this vision."[77] If a community is chosen, a team of regulatory, legal, and technical experts from the FCC, along with loan-grant officers and regional field representatives from RUS, will work on-site with community and business leaders to help the community make the project a success.[78]

III. ARGUMENTS IN FAVOR OF MUNICIPAL WIRELESS INTERNET

Proponents of municipal wireless Internet provision have offered various reasons in favor of such service. Some of the proponents' arguments are: (1) incumbent telecommunications providers have been slow to offer broadband Internet services in certain areas and municipal provision could increase competition; (2) municipalities may be able to use such networks to improve the efficiency of traditional municipal services; (3) municipal provision may be more cost-effective than traditional wireline technologies or private provision; (4) wireless Internet service may produce certain positive externalities, such as attracting or retaining businesses or accelerating the use of new and beneficial technologies in a community; and (5) political accountability and competition with other municipalities minimizes the risk of inefficient provision.[79]

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[76] FCC, WIRELESS OUTREACH (Mar. 24, 2006), *at* http://wireless.fcc.gov/outreach/ruralvision/.

[77] *Id*.

[78] *Id*.

[79] *See generally* FELD ET AL., *supra* note 7. *See also* JOSEPH STIGLITZ ET AL., THE ROLE OF GOVERNMENT IN A DIGITAL AGE, 2-5, 53-76 (2000), *available at* http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN002055.pdf (commissioned by the Computer & Communications Industry Ass'n). The report sets forth twelve principles for evaluating the appropriate role of government in a digital age. Three principles address "green light" activities that raise few concerns; six principles address "yellow light" activities that raise increasing levels of concern; and three principles address "red light" activities that raise significant concern. *Id*. The report sets forth a decision tree within these three general categories for government policy-makers. One "green light" activity is improving the efficiency with which governments provide traditional government services, even if doing this would displace or reduce the revenue of private firms. *Id*. *See infra* Part VI.

A. Incumbent Providers Have Been Slow to Offer Broadband in Certain Areas and Municipal Provision Could Increase Competition

Proponents of municipal wireless Internet provision generally argue that incumbent cable and DSL providers have been slow to offer broadband Internet services in certain rural and low-income urban communities because the prospective financial returns in these areas are not attractive enough to support the high costs of wireline deployment. Thus, proponents suggest that municipal involvement will improve both the availability and rate of adoption of broadband Internet in these areas, and also serve as a spur to competition generally.[80]

One study concludes that:

> innovative solutions to the unique problems of rural deployment are being implemented by both private and public interests. In fact, there are a multitude of examples of rural deployment barriers being overcome by entrepreneurs, cooperatives, municipalities and public-private partnerships. Many creative solutions have resulted from "grass roots" community efforts when local telephone or cable companies could not be convinced to serve.[81]

Critics of municipal wireless Internet provision argue that contracting out the provision of such service to a private provider is generally the best solution, as private providers are better-equipped to operate in fast-changing telecommunications markets and will be liable for any network failure, instead of the municipality itself. Alternatively, they argue that if a municipality does choose to become involved in the provision of wireless Internet service, it should minimize the potential risk of doing so by looking first

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[80] *See generally* FELD ET AL., *supra* note 7, at 7-8. Thus, proponents concerned about addressing an area's lack of any broadband Internet access are generally willing to consider any level of municipal participation or facilitation of wireless Internet service. *See supra* Part II A. - F. (describing six general operating models).

[81] THE FLORIDA PUBLIC SERVICE COMMISSION OFFICE OF MARKET MONITORING AND STRATEGIC ANALYSIS ON BEHALF OF THE FEDERAL-STATE JOINT CONFERENCE ADVANCED SERVICES, BROADBAND SERVICES IN THE UNITED STATES: AN ANALYSIS OF AVAILABILITY AND DEMAND (Oct. 2002), *available at* http://www.fcc.gov/jointconference/services_study-oct2002.pdf. *See also* Rukmini Callimachi, *Biggest Wi-Fi Cloud is in Rural Oregon*, USA TODAY, Oct. 16, 2005, *available at* http://www.usatoday.com/tech/products/services/2005-10-16-oregon-wi-fi_x.htm (describing privately owned and operated 700 square mile Wi-Fi and WiMAX network in rural Oregon constructed for approximately $5 million by EZ Wireless); Michael Allison Chandler, *Rural Areas Find Internet Answer in the Air*, THE WASHINGTON POST, Mar. 14, 2006, at B04, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2006/03/13/AR2006031301797.html.

to incentive strategies and public-private partnerships before committing itself to building and maintaining a network.[82]

B. Wireless Internet Networks May Improve the Efficiency of Traditional Municipal Services

In addition to offering Internet service for citizens' private use, some municipalities have also deployed wireless Internet networks to provide traditional governmental services more efficiently.[83] In particular, some proponents contend that higher-speed wireless Internet networks may improve employee productivity by replacing lower-bandwidth wireless radio or cellular technologies.[84]

For example, the San Mateo, California, police department installed a wireless Wi-Fi network that allows its patrol officers to use in-car laptops or PDAs to search vehicle records, criminal databases, drivers' license photographs, and fingerprints; to monitor streaming video of traffic; and to file reports and write tickets from the field.[85] Fire, ambulance, and other government operations, such as the U.S. border patrol, also have used wireless broadband Internet networks to more effectively deliver their services.[86] Municipalities have used wireless

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[82] *See generally* BALHOFF & ROWE, *supra* note 9, at 111-121. *See supra* Part II A., B., C., D., F. (describing non-profit, cooperative, contracting out, public-private partnership, and government loan-grant models).

[83] *See generally* FELD ET AL., *supra* note 7, at 7.

[84] *See* TROPOS NETWORKS, METRO-SCALE WI-FI FOR PUBLIC SAFETY SAN MATEO POLICE DEPARTMENT (2004), *available at* http://www.tropos.com/pdf/SMPD_Casestudy.pdf; Paul Swidler, *Patrolling With Wi-Fi*, WI-FI PLANET.COM, Nov. 10, 2003, *at* http://www.wi-fiplanet.com/columns/article.php/3106771. The use of wireless Internet to support traditional government services could be through any of the six general operating models described in Part II A. - F.

[85] TROPOS NETWORKS, *supra* note 84.

[86] Ed Sutherland, *Viva Las Vegas Mesh*, WI-FI PLANET, Aug. 26, 2004, *available at* http://www.cwti.us/press/CWTI-PR_2004.08.26-1_WiFi_Planet_-_Viva_Las_Vegas_Mesh.pdf (describing a Las Vegas test of wireless "Quadrature Division Multiple Access" one-mile radius radio technology to support city's Traffic Engineering Department, Metro Police, Fire Services, and Emergency Vehicle Preemption system); *VOIP at 80 MPH: World's First Wi-Fi Highway*, EWEEK, February 23, 2005, *available at* 2005 WLNR 3954436 (describing U.S. Department of Homeland Security grant for construction of Wi-Fi network along Arizona I-19 corridor).

broadband Internet networks to implement metro-scale video surveillance networks and traffic monitoring systems.[87]

Municipalities also are experimenting with using wireless Internet networks to make various metering activities more efficient. For example, in 2002 Corpus Christi, Texas, explored ways to automate municipal gas and water metering. The city installed a wireless network that connected its outlying areas with an existing fiber optic network. Meters can be read automatically when employees drive within range of a metered property. In addition, police, fire, emergency, public works, and city workers with wireless Internet-equipped vehicles can access in-office applications by connecting to their office computers.[88] Municipalities have also installed wireless broadband Internet networks in public libraries in lieu of, or as a complement to, traditional wireline Internet Local Area Networks.[89]

Again, critics of municipal wireless Internet provision argue that contracting out the provision of such service to a private provider is generally the best solution. In their view, merely because traditional municipal services may be made more efficient through the use of a wireless Internet network does not automatically mean that a municipality must build and maintain a network itself. Instead, critics argue that municipalities should first look to private providers, incentive strategies, and public-private partnerships before involving themselves, if at all, in the construction and long-term maintenance of a wireless network.[90]

C. Municipal Provision of Wireless Internet May be More Cost-Effective Than Traditional Wireline Technologies or Private Provision

Another argument put forward in favor of municipal wireless Internet provision is that wireless networks may generally be more cost-effective than wireline technologies. An additional argument is that, in certain circumstances, municipal provision may be more cost-

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[87] *See, e.g.*, TROPOS NETWORKS, TROPOS METRO-SCALE WI-FI NETWORKS FOR VIDEO SURVEILLANCE (2004), *available at* http://www.tropos.com/pdf/metro-scale_video.pdf.

[88] TROPOS NETWORKS, PIONEERING MULTI-USE METRO-SCALE WI-FI: CITY OF CORPUS CHRISTI, TEXAS (2005), *available at* http://www.tropos.com/pdf/corpus_casestudy.pdf.

[89] *E.g.*, THE NEW YORK PUBLIC LIBRARY, FREE WIRELESS COMPUTING AT THE LIBRARY, *at* http://www.nypl.org/branch/services/wifi.html (2006) (allowing wireless Internet access to laptop computer users having built-in Wi-Fi capability or a Wi-Fi compliant 802.11b wireless Ethernet device installed).

[90] *See generally* BALHOFF & ROWE, *supra* note 9, at 111-121.

effective than private provision.[91] Private firms proposing to build out a large-scale wireless Internet network have generally needed to negotiate rights-of-way usage with a municipality in order to install transmitting antennas at various points around the municipality. If such negotiations entail a substantial cost to a private firm it may be less expensive for a municipal provider to internally manage such rights-of-way usage by using the municipality's power of eminent domain and control over infrastructure. Where a municipality would be an anchor tenant to a wireless Internet network, some proponents argue that there may be efficiencies from having a network provider coordinate with such an anchor tenant in the construction and maintenance of the network. Again, critics question whether municipal provision is actually more cost-effective than private provision, and generally believe that relying on a private third-party Internet service provider to the greatest extent possible is the best approach.[92]

D. Wireless Internet Networks May Produce Positive Externalities

Proponents of municipal wireless Internet provision often cite Internet networks' potential to produce certain positive externalities, such as enhancing economic development by attracting or retaining businesses.[93] Sometimes, this argument is framed as a way to solve a "chicken-and-egg" problem, where no private firm will make such infrastructure investments without a substantial economic base, while businesses refuse to re-locate before those infrastructure investments have been made. Some studies contend that municipal broadband networks have, in fact, produced such benefits.[94] But studies of other types of municipal infrastructure investments have concluded that municipalities may not, in fact, experience better

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[91] *See generally* FELD ET AL., *supra* note 7, at 5, 7-8. Thus, proponents generally argue that in such circumstances municipal provision or, perhaps, a public-private partnership might be more cost-effective than private provision.

[92] *See generally* BALHOFF & ROWE, *supra* note 9, at 111-121.

[93] *See generally* FELD ET AL., *supra* note 7, at 8, 17. Proponents are generally willing to consider any level of municipal participation or facilitation of wireless Internet service to try to generate such externalities.

[94] *See* GEORGE S. FORD & THOMAS M. KOUTSKY, BROADBAND AND ECONOMIC DEVELOPMENT: A MUNICIPAL CASE STUDY FROM FLORIDA, APPLIED ECONOMIC STUDIES, INC. (2005), *available at* http://www.aestudies.com/library/econdev.pdf; GEORGE S. FORD, DOES MUNICIPAL SUPPLY OF COMMUNICATIONS CROWD-OUT PRIVATE COMMUNICATIONS INVESTMENT?, APPLIED ECONOMIC STUDIES, INC. (2005), *available at* http://www.aestudies.com/library/crowdout.pdf. *But see* BALHOFF & ROWE, *supra* note 9, at 70-71 (questioning on technical grounds the conclusions of DOES MUNICIPAL SUPPLY OF COMMUNICATIONS CROWD-OUT PRIVATE COMMUNICATIONS INVESTMENT?).

economic growth and/or lower unemployment, as compared to cities that do not make such municipal investments.[95]

Some proponents suggest that wireless Internet networks will help accelerate the use of new and beneficial technologies in a community, especially if service is provided at low or no cost to persons who do not presently have Internet access.[96] As many leaders have noted, broadband Internet access is increasingly important for individuals and the U.S. economy. It is important to note, though, that a lack of Internet use by certain persons or groups may be due to a variety of socio-economic factors such as income, education, profession, computer ownership,

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[95] Some economic studies find a positive correlation between certain public investments, such as highways and hospitals, and economic growth. Other studies, however, express skepticism as to whether such public expenditures actually do cause that growth. Specifically, some studies suggest that economic growth may, itself, lead to higher incomes, greater tax revenues, and, thus, greater government spending, or that other exogenous factors could cause both economic growth and public investments to increase together. In addition, whatever its source, economic growth may create spillover effects across jurisdictions. Thus, the more narrow an analysis becomes (e.g. a municipal or state-level analysis instead of a country-level analysis), the more difficult it may be to trace and identify particular relationships between a public expenditure made in one jurisdiction and economic growth occurring there. *See generally* Alicia Munnell, *Policy Watch: Infrastructure Investment and Economic Growth*, 6 J. ECON. PERSPECTIVES 189 (1992).

Moreover, the marginal returns from public investments may decline after a certain point, as is generally the case with private investments, or in some cases may even be negative overall. One recent study investigating the effects of substantial increases in a city's public infrastructure expenditures concludes. "Empirical evidence from a sample of large US cities suggests that while public capital provides significant productivity and consumption benefits, an ambitious program of locally funded infrastructure provision would likely generate negative net benefits for these cities." A.F. Haughwout, *Public Infrastructure Investments, Productivity and Welfare in Fixed Geographic Areas*, 83 J. Pub. Econ. 405-28 (2002).

For certain types of infrastructure investments, such as sports stadiums, research indicates that claims that they produce increased economic growth relative to other investments in similar municipalities often turn out to be spurious. ROGER G. NOLL & ANDREW ZIMBALIST, SPORTS, JOBS, AND TAXES: THE ECONOMIC IMPACT OF SPORTS TEAMS AND STADIUMS (1997) (making such findings). This is not to say, however, that a public infrastructure investment, such as a sports stadium, may not generate other benefits to a community.

[96] *See generally* FELD ET AL., *supra* note 7, at 6-7, 17.

age, interest, etc., and not simply whether or not Internet access is available.[97] In addition, some commentators have suggested that it is important to compare municipal wireless proposals to other alternative strategies for improving Internet access, such as subsidizing first-time personal computer purchases.[98]

E. Political Accountability and Competition Among Municipalities Reduces the Risk of Inefficient Provision

Some municipal Wi-Fi proponents argue that municipalities are politically accountable to their constituents and, thus, will undertake the provision of a wireless Internet network only if it is genuinely in the interest of its constituents.[99] Otherwise, elected municipal representatives will pay a price at the polls. Proponents also suggest that municipalities, to some degree at least, compete with each other to attract and retain residents and businesses by offering them an array of public services at an associated tax or user fee rate. Individuals and businesses can "vote with

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[97] *See generally* FCC, Availability of Advanced Telecommunications, *supra* note 40, at 28-37. *See also generally*, GAO, BROADBAND DEPLOYMENT IS EXTENSIVE THROUGHOUT THE UNITED STATES, BUT IT IS DIFFICULT TO ASSESS THE EXTENT OF DEPLOYMENT GAPS IN RURAL AREAS (2006) (finding that a variety of factors influence whether consumers adopt broadband service), *available at* http://www.gao.gov/new.items/d06426.pdf.

[98] *See generally* Jeffrey T. Prince, *Measuring the Digital Divide: Structural Estimation of Demand for Personal Computers* (2004) (working paper, Cornell University), *available at* http://www.scholar.google.com. According to this study, a short-term $200 subsidy to first-time personal computer purchasers would increase demand by 60 percent. Prince's estimate implies that a one-year $200 subsidy would cost a city the size of Philadelphia approximately $5.4 million. The city of Philadelphia has approximately 600,000 households. U.S. CENSUS BUREAU, STATE AND COUNTY QUICKFACTS (Dec. 13, 2005), *available at* http://quickfacts.census.gov/qfd/states/42/4260000.html (590,071 households as of 2000). Assuming that 40% of the households do not own a personal computer, if the annual rate of first-time purchases is 7% (as in Prince's data set), then 600,000 * .40 * .07 = 16,800 first-time purchases would be expected each year. With a 1-year, $200 per-household subsidy for the purchase of a personal computer, demand would be expected to increase 60%. Thus, 1.6 * 16,800 = 26,880 first-time purchases would be expected. Such a subsidy would cost the city 26,880 * 200 = $5.4 million. *See also supra* Part II F. (describing government loan-grant model).

[99] *See generally* FELD ET AL., *supra* note 7, at 6-7. Proponents maintain that political accountability and competition among municipalities reduces the risk of inefficient provision in general, an argument that generally is applicable to any of the six basic operating models.

their feet" by choosing to reside in a municipality that offers a preferred array of services.[100] Thus, according to this argument, such competition among communities ensures that a municipality will only provide a wireless Internet network if it genuinely meets the preferences of its citizens. Public choice scholarship, however, indicates that the democratic political process itself is imperfect, may produce sub-optimal economic outcomes and, in some cases, can even result in outright government failure. Thus, critics suggest that relying on a private third-party Internet service provider to the greatest extent possible is the best approach.[101]

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[100] In the wireless Internet context, the most relevant conditions for this "Tiebout"-type competition are: (1) there are enough different communities so that each type of individual can find the level of public services he or she prefers; (2) relocation among these communities is costless; (3) there are no spillovers between jurisdictions; and (4) the per-unit cost of public services does not continually decline as the number of residents increases (i.e., economies of scale are eventually exhausted). *See* Charles Tiebout, *A Pure Theory of Local Government Expenditure*, LXIV J. POL. ECON. 416 (1956) (proposing that if public goods or services are provided by a large number of local governments, consumers will be able to choose an efficient level of services).

The first two conditions are quite restrictive and do not hold perfectly. Nonetheless, the U.S. economy is both substantially diverse and substantially mobile. Because wireless Internet networks are generally excludable, they are unlikely to generate spillovers effects between jurisdictions and, thus, condition three appears to generally hold. Similarly, as explained below, wireless Internet networks do not appear to be characterized by substantial economies of scale and, thus, condition four also appears to hold. *See infra* Part IV C. A product or service that meets conditions three and four, however, generally loses its resemblance to a public good or natural monopoly. In such a situation, economic theory would generally expect a private firm to provide this kind of good. *See* Truman F. Bewley, *A Critique of Tiebout's Theory of Local Public Expenditures*, 49 ECONOMETRICA 713 (1981).

Empirical evidence for the Tiebout Hypothesis is mixed but generally supportive. *See* W.E. OATES, *On Local Finance and the Tiebout Model*, 71 THE AMERICAN ECON. REV. PAPERS AND PROCEEDINGS 93 (May 1981); D.L. Rubinfeld, *The Economics of the Local Public Sector* in A.J. AUERBACH & M. FELDSTEIN, EDS., HANDBOOK OF PUBLIC ECONOMICS, VOL. 571 (1987).

[101] *See generally* JAMES M. BUCHANAN, PUBLIC CHOICE: THE ORIGINS AND DEVELOPMENT OF A RESEARCH PROGRAM (2006), *available at* http://www.gmu.edu/centers/publicchoice/pdf%20links/Booklet.pdf. *See also Nixon v. Missouri Municipal League*, 541 U.S. 125, 131 (2004) (noting that "(if things turn out bad) government utilities that fail leave the taxpayers with the bills."); FELD ET AL., *supra* note 7, at 16 ("it is no doubt true that some municipal enterprises will fail, the same is true of many businesses.").

IV. ARGUMENTS AGAINST MUNICIPAL WIRELESS INTERNET

Opponents of municipal wireless Internet provision have presented various arguments why municipalities should not be in the business of competing with the private sector. These arguments include: (1) a government-run enterprise may not perform as well as a private enterprise; (2) a government enterprise may have incentives to engage in anticompetitive conduct against private competitors, distorting the marketplace; (3) the traditional justifications for government intervention in the marketplace do not support municipal provision of wireless Internet service; and (4) a municipality may become "locked-in" to an inefficient operating standard if the chosen technology becomes quickly outdated.[102] Thus, opponents generally suggest first looking to non-government solutions, such as contracting out to a private third-party or a public-private partnership.

A. Performance of Government Enterprises

Opponents of municipal wireless Internet suggest that government enterprises that are exposed to competition with the private sector perform better than government enterprises that face no such competition.[103] An extensive body of literature has explored the performance of government enterprises and documented significant savings and better performance from complete privatization or increased competition with the private sector (as, for example, through contracting out).[104] Government responsibility for such an enterprise typically requires that it

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[102] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, "NOT IN THE PUBLIC INTEREST – THE MYTH OF MUNICIPAL WI-FI NETWORKS" WHY MUNICIPAL SCHEMES TO PROVIDE WI-FI BROADBAND WITH PUBLIC FUNDS ARE ILL-ADVISED Executive Summary (2005), *available at* http://www.newmillenniumresearch.org/archive/wifireport2305.pdf; BALHOFF & ROWE, *supra* note 9, at 11 (2005) ("The case against municipal operations is based on the assumptions that (1) municipal advantages are more likely to result in market distortions, (2) from a financial perspective, municipal broadband has frequently fallen short of projections and resulted in sizeable subsidizations, (3) municipal broadband initiatives can undercut national competitive policy, and (4) private-sector competitive markets lead to increased consumer benefits in terms of pricing, innovation and service."). *See also* Kathryn A. Tongue, Note, *Municipal Entry Into The Broadband Cable Market: Recognizing The Inequities Inherent in Allowing Publicly Owned Cable Systems to Compete Directly Against Private Providers*, 95 NW. U. L. REV. 1099, 1101-02 (2001) ("a serious competitive problem accompanies municipal ownership of broadband cable networks: municipalities enjoy unfair advantages over private competitors, including the ability to cross-subsidize, to reap the benefits of special tax status, to exempt themselves from franchise fees, and to avoid pole fee regulation.").

[103] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 16-19.

[104] *E.g.*, JOHN C. HILKE, COMPETITION IN GOVERNMENT-FINANCED SERVICES (1992) (compiling numerous study findings). *See also* JOHN HILKE, COST-SAVINGS FROM

obtain precise information on demand and cost conditions in order to pick the most efficient price and output points. Academic literature indicates that this process may function poorly in practice.[105]

Critics of government provision of commercial services often argue that when insulated from competitive forces, government enterprises generally have reduced incentives to provide better products, services, and prices. An additional concern is that a government enterprise may be prohibited from adopting certain productivity-increasing techniques of a private business because of other mandated, non-profit maximizing goals (such as universal service requirements or discounted pricing to certain customers). Other critics also suggest that government enterprises not subject to the disciplining forces of capital markets may over-invest in capital equipment and labor in order to secure non-pecuniary benefits such as reduced complaints from consumers (who are also voters) and the reduction of labor strife.[106]

In response, proponents of municipal wireless Internet networks argue that municipalities generally do not seek to provide commercial services unless there is a genuine need and the private sector has failed to do so. Also, they contend that it is the legitimate role of local government to promote economic and educational opportunities, support traditional local government services, facilitate access to telemedicine, and accelerate the use of new and beneficial technologies in a community. In addition, they argue that most municipal communications projects have, in fact, been successful.[107]

PRIVATIZATION: A COMPILATION OF STUDY FINDINGS, EXECUTIVE SUMMARY (Mar. 1993) (Reason Foundation How-To Guide No. 6), *available at* http://www.reason.org/guide6.html; Andrei Shleifer, *State Versus Private Ownership*, 12 J. ECON. PERSPECTIVES 133, 138 (1998) (concluding that privatization generally leads to both cost reductions and quality improvements when incentives to do so are strong); William L. Megginson & Jeffrey M. Netter, *From State to Market: A Survey of Empirical Studies on Privatization*, 39 J. ECON. LIT. 321 (2001) (surveying literature on privatization of state-owned enterprises and concluding that privately owned firms are generally more efficient and more profitable than comparable state-owned firms).

[105] *See generally* W.K. VISCUSI ET AL., ECONOMICS OF REGULATION & ANTITRUST Chs. 11-14 (2000, 3d Ed.).

[106] *See generally id*. at 441-42, 446-47.

[107] *See generally* Jim Baller, *Deceptive Myths About Municipal Broadband, Disinformation About Public Ownership Is Impeding Progress*, BROADBAND PROPERTIES, May 2005, at 14-17, *available at* http://www.baller.com/pdfs/Baller_BroadbandProperties_May05.pdf. *But see* BALHOFF & ROWE, *supra* note 9, at 31-57 (concluding that the financial performance of municipal broadband operations has generally been disappointing, in part because of the introduction of new competitive factors over time).

B. Incentives of Government Enterprises to Engage in Anticompetitive Conduct

Opponents also suggest that a government-run wireless Internet network may have incentives to engage in anticompetitive conduct against private competitors,[108] a hypothesis that the academic literature has explored in other contexts.[109] Such conduct may include, among other things, below-cost pricing, strategies to raise rivals' costs, or predation through government processes.[110] The Supreme Court also has noted that "in a business substantially regulated at the state level, regulation can turn into a public provider's weapon against private competitors . . . ."[111] Such competitive risks may be heightened because anticompetitive conduct by a government enterprise may be immune from challenge under the state-action[112] or *Noerr-Pennington* doctrines,[113] depending on the particular enabling charter of the enterprise and the extent of state supervision of its actions. Proponents counter that existing federal and state laws require municipal communications enterprises to act in a competitive, non-discriminatory fashion or, alternatively, that even if municipalities can discriminate against private competitors, they rarely do so.[114]

1. Below-Cost Pricing

Opponents suggest that municipal wireless Internet providers may set prices below some relevant cost, such as a product's marginal cost, as part of an anticompetitive strategy to damage

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[108] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 17.

[109] *See generally* John R. Lott, Jr., *Predation by Public Enterprises*, 43 J. PUB. ECON. 237 (1990); David E. Sappington & J. Gregory Sidak, *Incentives for Anticompetitive Behavior by Public Enterprises*, 22 REV. INDUS. ORG. 183, 183-84 (2003). "Because public enterprises may pursue objectives other than profit maximization, their behavior may differ systematically from the behavior of profit-maximizing firms. . . . One might suspect that a reduced concern with profit could render the public enterprise a less aggressive competitor. We find, to the contrary, that a reduced focus on profit can provide a public enterprise with stronger incentives than profit-maximizing firms to pursue activities that disadvantage competitors." *Id*. at 184.

[110] *See generally* Sappintgon & Sidak, *supra* note 109.

[111] *Nixon v. Missouri Municipal League*, 541 U.S., at 131.

[112] *Parker v. Brown*, 317 U.S. 341 (1943).

[113] *Eastern Railroad Presidents Conference v. Noerr Motor Freight, Inc.*, 365 U.S. 127 (1961); *United Mine Workers v. Pennington*, 381 U.S. 657 (1965).

[114] *See generally* Baller, *supra* note 107, at 15.

private providers or deter them from entering.[115] Some academic literature suggests that government enterprises may have incentives to engage in anticompetitive below-cost pricing because they are less focused on profit-maximization than are private businesses, which must earn a certain return for their investors. For example, a government enterprise may be subject to a legislative mandate that requires it to pursue goals other than profit-maximization, such as universal service or discount pricing, to certain customers. In this view, government enterprises may have an incentive to manipulate accounting data to understate marginal production costs and preclude the appearance of below-cost predatory pricing.[116] Alternatively, a government enterprise might choose an inefficient operating technology that has a relatively low marginal production cost, but a relatively high associated fixed overhead cost compared to more efficient comparable technologies.[117] Or, a government enterprise might cross-subsidize a service in a competitive market with funds derived from a service in a less-competitive market or some other governmental source.[118] Also, critics of municipal wireless Internet networks argue that municipalities' exemption from federal and state income taxes gives them an unfair advantage in financing their projects and pricing their services.[119]

In response, proponents argue that even if municipal Internet providers do have the ability to engage in a below-cost pricing strategy, they rarely do so. In addition, they argue that private telecommunications and cable companies routinely cross-subsidize their own services and that municipalities also should be able to so. Further, proponents argue that municipal utilities often make certain payments in lieu of taxes to local governments that are often higher than those that private entities must pay and that municipalities are not eligible for numerous tax credits, write-offs, and depreciation deductions that private providers enjoy.[120]

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[115] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at viii, 26-27.

[116] Sappington & Sidak, *supra* note 109, at 193-95, 199-201.

[117] *Id*. For example, a government enterprise might install general-purpose equipment (versus speciality or cutting-edge technology which requires specialized, project-specific equipment) on a large scale. *Id*. at 195. Or, the enterprise might retain a large on-site staff with broad legal, engineering, computing, and/or marketing expertise that can substitute for specialized expertise in particular areas, and their higher associated marginal costs. *Id*.

[118] *Id.* at 189 n.17. *Cf.* R. Braeutigam & John C. Panzar, *Diversification Incentives Under "Priced-Based" and "Cost-Based" Regulation*, 20 RAND J. ECON. 373 (1989); Timothy J. Brennan, *Cross-Subsidization and Cost Misallocation by Regulated Monopolists*, 2 J. REG. ECON. 37 (1990).

[119] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 13.

[120] *See generally* Baller, *supra* note 107, at 15.

2. Raising Rivals' Costs

Some academic literature suggests that a government enterprise might attempt to raise its rivals' costs to disadvantage them.[121] This literature suggests that a government enterprise might increase the costs of a private competitor by lobbying for regulations that increase rivals' operating costs, using its incumbent position to restrict access to necessary inputs, or purchasing excessive amounts of necessary inputs in order to increase their market price.[122] As noted above, proponents of municipal wireless Internet networks argue that even if municipal Internet providers have the capacity to engage in anticompetitive conduct, they rarely do so.[123]

3. Predation Through Government Processes

Opponents also argue that a government enterprise might use government processes to inhibit the conduct of existing competitors or to preclude or dissuade the entry of potential rivals.[124] For example, a government enterprise might erect legal or regulatory barriers to entry or lobby a legislative or executive branch to do so.[125] Some observers agree that the potential misuse of government processes becomes a significant concern where government involves itself

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[121] Sappington & Sidak, *supra* note 109, at 196-99. Academic literature indicates that private firms may find it profitable to raise their rivals' operating costs in order to secure a comparative competitive advantage in the marketplace. *See generally* Steven Salop & David Scheffman, *Raising Rivals' Costs*, 73 AM. ECON. REV. 267 (1983); Thomas Krattenmaker & Steven Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price*, 96 YALE L. J. 209 (1986); Steven Salop & David Scheffman, *Cost Raising Strategies*, 36 J. INDUS. ECON. 19 (1987).

[122] Sappington & Sidak, *supra* note 109, at 196-99.

[123] *See generally* Baller, *supra* note 107, at 15.

[124] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 17.

[125] *See* Sappington & Sidak, *supra* note 109, at 196-99. In addition, a government enterprise might also initiate litigation through the courts to effectuate similar goals, though it is not apparent that a government enterprise would have any greater incentive than a private enterprise to engage in such litigation.

in the provision of wireless Internet service.[126] Again, proponents argue that even if municipal enterprises have the ability to engage in such conduct, they rarely do so.[127]

C. Traditional Justifications for Government Intervention in the Marketplace Do Not Support Municipal Wireless Networks

Opponents argue that traditional justifications for government intervention in the marketplace do not support municipal provision of wireless Internet service.[128] In particular, they note that municipal wireless Internet networks do not appear to give rise to the type of "natural monopoly"[129] situation that is often cited as a reason for government regulation or provision of a service.[130] Instead, it appears that multiple wireless Internet networks may be constructed in the same geographic area for a substantially smaller fixed investment than required of a traditional wireline cable or DSL network.[131] Wireless Internet networks do not require that wires be laid

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[126] *See generally In the Matter of Petition for Declaratory Ruling of Continental Airlines, Inc.* FCC ET Docket No. 05-247 (filed 2005) (seeking declaratory ruling under FCC regulations to allow Continental to continue Wi-Fi service at Boston-Logan International Airport despite restrictions and/or removal of such antenna sought by the Massachusetts Port Authority). *See also Hearing on State and Local Issues and Municipal Networks: Hearing Before the Senate Committee on Commerce, Science, and Transportation*, 109th Cong. (2006) (prefiled testimony of Robert K. Sahr, Chairman, South Dakota Public Utilities Commission), *available at* http://commerce.senate.gov/hearings/witnesslist.cfm?id=1706. According to Sahr, "In the worst cases, government ownership usurps, prohibits or discourages private investment. One of the most egregious cases is currently pending before the Federal Communications Commission and involves the Massachusetts Port Authority's attempt to create a monopoly on Wi-Fi services at Boston's Logan International Airport." *Id*. at 8.

[127] *See generally* Baller, *supra* note 107, at 15.

[128] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 12-13.

[129] A natural monopoly is said to occur where one firm can produce at a certain level of output at a lower cost than could be achieved by any combination of two or more other firms, rendering it the only viable competitor. Typically, the rationale for government regulation or provision of a natural monopoly service is to prevent a private party from engaging in some perceived or potential abuse of its exclusive position that harms competition and consumers. *See generally* VISCUSI ET AL., *supra* note 105, at Ch. 11.

[130] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 12-15.

[131] *See generally Hearing on State and Local Issues and Municipal Networks: Hearing Before the Senate Committee on Commerce, Science, and Transportation*, 109th Cong. (2006) (testimony of Dianah L. Neff, Chief Information Officer, City of Philadelphia,

underground or strung through neighborhoods, as is the case with traditional electric, telephone, and cable networks. Also, wireless Internet networks generally do not appear to give rise to many of the "last line" or interconnection issues associated with traditional wireline networks that are frequently cited as a rationale for government intervention into telecommunications markets.[132]

Likewise, opponents maintain wireless Internet networks fail to exhibit the "non-excludable" property of a classic public good, such as national defense, that may require government provision in order to prevent "free riders" from consuming the good but not paying for it.[133] Instead, it appears that security protocols make it relatively easy for a network to exclude non-paying or non-member users and prevent free-riding.[134] Further, wireless networks fail to exhibit the "non-rivalrous" property of a classic public good, at least when a network is at or near capacity. A non-rivalrous good is one that is costless (or nearly costless) for additional persons to consume at the same time, without diminishing each others' enjoyment of that good.[135] At or near capacity, wireless Internet networks may slow considerably as data network traffic becomes congested. Thus, wireless Internet networks do not appear to fit the classic definition of a non-excludable, non-rivalrous "public good" that may be undersupplied by the private marketplace and, therefore, requires government provision.

In addition, wireless Internet networks do not appear to give rise to significant interconnection issues relating to so-called network effects.[136] For example, where one consumer joins a network, like a telephone network, and thus allows other subscribers to place and receive

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Pennsylvania). According to Neff, Philadelphia's agreement with Earthlink to provide Wi-Fi service to the city, *see supra* Part II D., is not exclusive and Philadelphia would allow other wireless ISPs to construct additional networks in the same area. *Id*.

[132] *See generally* FCC Report, *supra* note 1, at 13-14.

[133] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 12-15.

[134] *See generally* TROPOS NETWORKS, ELEMENT MANAGER 1 (2006), *available at* http://tropos.com/pdf/EMS_datasheet.pdf.

[135] *See generally* THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW VOL. 3 99-101 (Peter Newman ed., 1998).

[136] *See generally* Michael Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985); Joseph Farrell & Garth Saloner, *Standadization, Compatibility, and Innovation*, 16 RAND J. ECON. 70 (1985). For a more specific treatment of incentives for interconnection in Internet backbones see Jean-Jacques Laffont et al., *Internet Interconnection and the Off-Net-Cost-Pricing Principle*, 34 RAND J. ECON. 370 (2003).

calls with that consumer, the resulting increase in the utility of the network is called a positive network externality. Competition between multiple networks may lead to inefficiencies, as occurred in some municipalities when early telephone networks refused to interconnect a century ago. In some cases consumers needed to pay for dual subscriptions or forego connections with large parts of the community.[137] Internet service providers, however, have consistently interconnected with each other, allowing users to communicate with each other via an integrated Internet infrastructure.[138]

Notwithstanding these points, proponents argue that municipal wireless Internet networks may still be justified where no private provision exists, or is sub-optimal. Also, they stress that it is local government's legitimate role to promote the welfare of its citizens and to support local government services.[139]

D. Danger of Technological Obsolescence or Lock-In

Some critics of municipal wireless Internet provision also question whether government is well suited to participate in a communications marketplace that they view as being subject to

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[137] MILTON MUELLER, UNIVERSAL SERVICE: COMPETITION, INTERCONNECTION, AND MONOPOLY IN THE MAKING OF THE AMERICAN TELEPHONE SYSTEM (1998).

[138] *See generally* Laffont et al., *supra* note 136. Recently, however, at least one major Internet service provider has suggested it would like to charge content providers non-uniform, market-based fees for bringing their content to consumers. *See generally* Arshad Mohammed, *SBC Head Ignites Access Debate*, THE WASHINGTON POST, Nov. 4, 2005, at D01, *available at* http://www.washingtonpost.com. A decision by one or more ISPs to charge differential fees for content delivery could conceivably lead ISPs that prefer so-called "network neutrality" to disconnect from such a fee-based network in deference to consumer demand for uniform access.

The FCC has indicated its policy is "to ensure that providers of telecommunications for Internet access or Internet Protocol-enabled (IP-enabled) services are operated in a neutral manner." *In the Matters of Appropriate Framework for Broadband Access of the Internet Over Wireline Facilities et al.*, FCC 05-151 3 (2005), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf. Recent federal legislation also proposes to prohibit such fees. *See* Press Release, U.S. Senator Ron Wyden, "The Internet Non-Discrimination Act of 2006" Introduced by Senator Ron Wyden (D-Ore.) (Mar. 2006), *available at* http://wyden.senate.gov/media/2006/03022006_net_neutrality_bill.html.pdf.

[139] *See generally* Baller, *supra* note 107.

rapid technological change and intense competition from private providers.[140] They suggest that imperfections in the political and governmental decision-making processes may result in sub-optimal outcomes and the adoption of technology standards that could become quickly outdated. Further, they suggest that such problems may be exacerbated if a municipal provider uses its status as a government enterprise to anticompetitively insulate itself from changing market conditions and evolving technology standards.[141]

Opponents of municipal provision point out that fast-moving telecommunications markets differ in many ways from the more stable gas, water, and electric technologies that municipalities have operated in the past.[142] In particular, some observers suggest that as communications technologies continue to evolve and consumers demand increasingly fast data speeds, current technologies may quickly become obsolete.[143] For example, they suggest that Wi MAX may replace Wi-Fi as the leading terrestrial wireless Internet standard by 2007-08.[144] Potentially, such an event might require an existing Wi-Fi network to upgrade itself or risk becoming locked-in to an inferior or obsolete technology standard.[145] Further, existing wireless Internet technologies do not provide enough bandwidth to support the type of real-time video transmission that may be possible with emerging technologies, such as fiber-optic wirelines.[146] Thus, a municipality considering whether to participate in the provision of wireless Internet

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[140] NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at 21. *See also* BALHOFF & ROWE, *supra* note 9, at 81-100.

[141] *See supra* Part IV B.

[142] *See generally* NEW MILLENNIUM RESEARCH COUNCIL, *supra* note 102, at v.

[143] *See generally* BALHOFF & ROWE, *supra* note 9, at 81-100.

[144] *See generally id.*

[145] *See generally* Stephen E. Margolis, *Path Dependence, Lock-in and History*, 11 J. LAW, ECON., & ORG. 205 (1995); Stephen E. Margolis, *Path Dependence and Public Policy: Lessons from Economics* (Jan. 2005) (working paper), *available at* http://www.gmu.edu/departments/economics/pboettke/workshop/spring05/Margolis.doc (surveying economic path dependence and lock-in theories discussing the appearance of path dependence in public policy). *See also* TEX. PUB. UTIL. COMM. RULES & LAWS CH. 26.142 (1999), *available at* http://www.puc.state.tx.us/rules/subrules/telecom/26.142/26.142.cfm. The Texas Public Utilities Commission required that dominant telecommunications utilities make Integrated Services Digital Network ("ISDN") service available to customers in certain areas by February 22, 1995. *Id.* ISDN, however, turned out to be a relatively slow and expensive technology (providing speeds up to only 128 Kbps) that was surpassed by DSL and cable modems. Wallsten, *supra* note 3, at 3.

[146] *See generally* BALHOFF & ROWE, *supra* note 9, at 92; *infra* Appendix.

service must make important decisions about whether it should facilitate the adoption of an existing technology or wait for a prospectively superior technology to mature, and whether it may need to upgrade its network in the future.

Proponents suggest that municipalities are inherently risk-averse and would not consider providing wireless Internet service unless it were genuinely necessary. In addition, they argue that municipal involvement in other communications technologies such as cable television has been generally successful and demonstrates that municipalities can competently participate in a technologically sophisticated industry.[147] In addition, proponents generally recognize the potential for new technological developments and typically state that municipalities both can and should plan ahead to upgrade their technologies in the future, if necessary.[148]

V. LEGISLATIVE PROPOSALS RELATING TO MUNICIPAL WIRELESS INTERNET PROVISION

Recent federal and state legislative responses to the issue of municipal wireless Internet provision have ranged from prohibiting all restrictions on the provision of such services to prohibiting such provision outright, subject to certain exceptions, as well as numerous variations in between.

A. Federal Bills

Senators McCain and Lautenberg's proposed "Community Broadband Act of 2005" would modify the 1996 amendment to the Communications Act to provide that:

> (1) No State statute, regulation, or other State legal requirement may prohibit or have the effect of prohibiting any public provider from providing, to any person or any public or private entity, advanced telecommunications capability or any service that utilizes the advanced telecommunications capability provided by such provider.
>
> (2) To the extent that any public provider regulates competing private providers of advanced telecommunications capability or services, it shall apply its ordinances and

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147 *See generally* Baller, *supra* note 107. *But see* BALHOFF & ROWE, *supra* note 9, at 31-57 (concluding that the financial performance of municipal broadband operations has generally been disappointing, in part because of the introduction of new competitive factors over time).

148 *See generally* Baller, *supra* note 107, at 14-15.

rules without discrimination in favor of itself or any advanced telecommunications service provider that it owns.[149]

Representative Barton's proposed "Communications Opportunity, Promotion, and Enhancement Act of 2006" contains a similar provision.[150] Such provisions appear designed to guard against unregulated municipal provision of a telecommunications service giving rise to anticompetitive conduct against private sector rivals, while still allowing municipalities to provide broadband services.[151]

Senator Stevens' "Communications, Consumer's Choice, and Broadband Deployment Act of 2006" would preempt states and local governments from prohibiting public provision of an advanced communications service. The bill has non-discrimination provisions that require public providers to: apply ordinances, rules, and policies without discrimination; be subject to the same laws and regulations applicable to a non-governmental entity; and grant to a private entity the right to place similar facilities in the same locations as the public provider. The bill also encourages public-private partnerships through an open bidding process and allows the public provider to proceed with a project only if no private entity submits a bid to provide equivalent services to consumers at the same or a lower cost, as determined by a neutral third party. In

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[149] S. Res. 1294, 109th Cong., 1st Sess. (2005) (McCain-Lautenberg "Community Broadband Act of 2005").

[150] H.R. 5252, 109th Cong., 2nd Sess. § 401 (2006) (Barton "Communications Opportunity, Promotion, and Enhancement Act of 2006," as passed out of the House of Representatives on June 8, 2006 and referred to the Senate). Under the bill, "[n]either the Communications Act of 1934 [47 U.S.C § 151 *et seq*.] nor any State statute, regulation, or other State legal requirement may prohibit or have the effect of prohibiting any public provider of telecommunications service, information service, or cable service . . . from providing such services to any person or entity." *Id*. at § 401(a). The bill also would prohibit states or their political subdivisions that are affiliated with a public provider of telecommunications service, information service, or cable service from granting "any preference or advantage" to such a provider. *Id*. *at* § 401(b).

A subsequent Senate version of the Barton bill would incorporate the McCain-Lautenberg bill's language on non-discrimination. H.R. 5252, 109th Cong., 2nd Sess. § 501 (2006), *available at* http://commerce.senate.gov/public/_files/HR5252RSa.pdf (Barton "Communications Opportunity, Promotion, and Enhancement Act of 2006," as reported out of the Senate Committee on Commerce, Science & Transportation). S*ee also supra* note 149. This version would also incorporate modified language from the Stevens bill regarding public-private partnerships, open bidding, approval, and existing and pending proposals. *See* note 152.

[151] *See supra* Parts IV B., III A., respectively.

addition, the bill contains a "grandfather" clause for existing public providers.[152] This language addresses the same concerns as the McCain-Lautenberg and Barton bills, with an additional emphasis on looking first to private and public-private solutions before municipal provision.[153] This emphasis is also consistent with the concern that government provision may not be as efficient as private provision.[154]

Senator Ensign's "Broadband Investment and Consumers Choice Act of 2005" states that it is designed to provide protection against undue government competition with the private sector.[155] Under the bill, any state or local government seeking to provide a communications service must give conspicuous notice and a detailed accounting of the proposal. Within 90 days of the notice, it must allow private parties to submit open bids on equal terms with the government in a process conducted by a neutral third party, and, in the event of identical bids, the neutral third party must give preference to the private party. If a state or local government wins the bid, "a non-governmental entity shall have the ability to place facilities in the same conduit, trenches, and locations . . . for concurrent or future use under the same conditions . . . ."[156] It appears to address issues similar to those covered by the Stevens bill.[157]

Representative Sessions' proposed "Preserving Telecom Act of 2005" would amend the Communications Act of 1934 such that:

> (1) Effective 60 days after the date of enactment of the Preserving Innovation in Telecom Act of 2005, neither any State or local government, nor any entity affiliated with such a government, shall provide any telecommunications, telecommunications service, information service, or cable service in any geographic area within the jurisdiction of such government in which a corporation or other private entity that is not affiliated with any State or local government is offering a substantially similar service.

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[152] S. Res. 2686, 109th Cong., 2nd Sess. § 502 (2006) (Stevens "Communications, Consumer's Choice, and Broadband Deployment Act of 2006").

[153] *See supra* Parts IV B., III A.

[154] *See supra* Part IV A.

[155] S. Res. 1504, 109th Cong., 1st Sess. § 15 (2005) (Ensign "Broadband Investment and Consumers Choice Act of 2005"). The bill also provides a grandfather clause for an existing state or local government communications service, unless it "substantially" expands its existing service or enters into a new line of commerce. *Id*. at § 15(e).

[156] *Id*. at § 15(d).

[157] *See supra* notes 153-54 and related text.

(2) Paragraph (1) shall not prohibit a State or local government or affiliated entity thereof from providing in any geographic area within the jurisdiction of such government any service that such government or entity was providing on the date of enactment of the Preserving Innovation in Telecom Act of 2005.[158]

Again, these provisions appear to respond to concerns that government provision of a telecommunications service may create competitive problems, while allowing a grandfather exception for existing providers.[159]

B. State Bills

A variety of state bills have proposed to prohibit, limit, or define the ability of municipalities to participate in the creation and operation of a wireless Internet network. Some of these bills would prohibit municipalities from providing Internet service in all circumstances or subject to certain exceptions like a grandfather clause for existing municipal providers,[160] instances where private provision is unavailable,[161] or after offering an incumbent telecommunications company a right of first refusal.[162] Other bills would prohibit the expansion

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158 H.R. Res. 2726, 109th Cong., 1st Sess. (2005) (Sessions "Preserving Innovation in Telecom Act of 2005").

159 *See supra* Part IV A. - D.

160 *See* Texas H.B. 789, 79th 1st CALLED SESS. § 54.201 *et seq.* (2005), *available at* http://www.legis.state.tx.us/home.aspx. As originally proposed, H.B. 789 would have prohibited municipalities from providing any "telecommunications" or "information" services as defined under federal law. *Id.* An amended version of the bill incorporated a number of exceptions, including: a grandfather clause for existing municipal providers of video or broadband services and an exception for the provision of wireless Internet for governmental functions. Ultimately, the bill died in conference committee.

161 *See* Ohio H.B. 188, 126th GEN. ASSEM. (2005), *available at* http://www.legislature.state.oh.us/bills.cfm?ID=126_HB_188. H.B. 188 would have prohibited subject to certain exceptions state and local agencies from providing any new electronic commerce services or expanding a similar communications network where such a service is provided by two or more private providers. The bill died in committee.

162 *See* Pennsylvania H.B. 30, SESS. OF 2003 § 3014 (H) (2003) (as amended on third consideration, in Senate, Nov. 18, 2004, signed into law Nov. 30, 2004), *available at* http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?syear=2003&sind=0&body=H&type=B&bn=0030.

of current municipal Internet services to other areas,[163] prohibit service to the public,[164] or impose a temporary moratorium on municipal provision.[165] Such bills address concerns that government provision may be problematic by prohibiting municipal provision or requiring a municipality to look first to private solutions when deciding whether or to what extent it should provide such services.[166]

Some bills contain provisions related to government accountability, such as requiring a municipality to hold public hearings on any proposed wireless Internet network.[167] Likewise,

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[163] *See* Florida S.B. 1714 / H.B. 1325, 107th REG. SESS. (2005), *available at* http://www.flsenate.gov/cgi-bin/view_page.pl?Tab=session&Submenu=1&FT=D&File=sb1714.html&Directory=session/2005/Senate/bills/billtext/html/. As originally proposed, Florida S.B. 1714 / H.B. 1325 would have prohibited municipalities providing communications or information services from extending their service areas, adding new subscribers, or adding new services, except for its internal operating needs. However, those municipalities with existing service could continue to provide such service. Ultimately, a different bill was signed into law. *See infra* note 169.

[164] *See* Michigan H.B. 4600, 93rd LEGIS. (2005), *available at* http://www.legislature.mi.gov/documents/2005-2006/billintroduced/house/pdf/2005-HIB-4600.pdf. H.B, 4600 proposed that "a governmental entity shall not provide a communications service except for the use of the entity itself." *Id*. at § 3(2). Ultimately, a different bill was signed into law that allows a public entity to provide telecommunications services if it complies with certain requirements. Michigan H.B. 5237, 93rd LEGIS. § 252 (2005), *available at* http://www.legislature.mi.gov/documents/2005-2006/billenrolled/house/pdf/2005-HNB-5237.pdf.

[165] *See* Nebraska L.B. 645, 99th LEGIS., 1st SESS. (2005), *available at* http://www.unicam.state.ne.us/legal/SLIP_LB645.pdf. Nebraska has enacted into law, effective September 4, 2005, a moratorium on the retail or wholesale provision of broadband, Internet, telecommunications, or video service by a state agency or political subdivision. The moratorium lasts until December 31, 2007, subject to certain exceptions, such as a grandfather provision for agencies or subdivisions providing such services as of January 1, 2005. In addition, the law creates a broadband task force to study the provision of such services by state agencies or political subdivision and requires it to complete its work by December 1, 2006.

[166] *See supra* Part IV A.- D.

[167] *See* Ohio H.B. 188, *supra* note 161. H.B. 188 would have required a municipality to hold a public hearing, make certain findings of fact including initial and lifecycle costs and benefits, per-taxpayer costs, and specify service needs not met by the private sector.

several bills would require voter approval for any such network[168] and regular reports by the municipality on the network's progress.[169] Some bills also have proposed that a municipal network meet certain financial specifications or performance requirements.[170] These provisions address concerns that a government enterprise may not perform as well as a private provider, a possibility that may be mitigated through public transparency and accountability.[171] They are also consistent with proponents' arguments that political accountability reduces the risk of inefficient provision.[172]

Several bills would prohibit the cross-subsidization of municipal telecommunications services with revenue from other sources, and would prohibit below-cost pricing.[173] Such prohibitions are aimed at concerns that a government enterprise may engage in anticompetitive conduct against private sector rivals. They also require efficient performance, consistent with that of a similar private provider.[174]

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[168] *See* Iowa H.F. 861, 81st GEN. ASSEM. 2005 SESS. (2005), *available at* http://coolice.legis.state.ia.us/Legislation%5CBills%5CHouseFiles%5CIntroduced%5CHF861.html. H.F. 861, which died in committee, would have required a municipality to obtain super-majority voter approval of at least 60 percent both to provide a wireless Internet service and to issue revenue bonds to pay for such a project.

[169] *See* Florida S.B. 1322 2nd ENGROSSED, 107th REG. SESS. (2005), *available at* http://www.flsenate.gov/data/session/2005/Senate/bills/billtext/pdf/s1322er.pdf. S.B. 1332, which was signed into law on June 2, 2005, requires a municipality providing a communications service to hold a public meeting each year to report on the municipal network's progress toward its objectives. *Id*. at § 8(2)(k).

[170] S.B. 1322 requires that if a municipal wireless system's revenues do not cover operating costs and bond payments after four years, the municipality must hold a public hearing to review a plan to do one of four things: (1) shut down the system; (2) sell the system; (3) enter into a partnership with a private entity; or (4) continue operating the system. *See id.* at § 8(2)(k)(1).

[171] *See supra* Part IV A.

[172] *See supra* Part III E.

[173] Under S.B. 1322, "[a] governmental entity providing a communications service may not price any service below the cost of providing the service by subsidizing the communications service with moneys from rates paid by subscribers of a noncommunications services utility or from any other revenues." S.B. 1332 at § 8(2)(k)(1)(f).

[174] *See supra* Parts IV A., B.

VI. SUGGESTED GUIDING PRINCIPLES

In February 2005, an FCC Task Force noted that wireless "community networks can act as a low-cost alternative where access to cable modem or DSL service is either unavailable or too expensive."[175] The Task Force also stated, "Ensuring that all citizens have access to broadband services is of increasing importance to local governments."[176] Rural communities appear to be at a significant disadvantage to urban communities concerning available and affordable broadband access. According to 2003 statistics compiled by the Department of Commerce's National Telecommunications and Information Administration, 22.1 percent of rural dial-up users cited that broadband was not available, compared to 4.7 percent of urban dial-up Internet households. Moreover, 38.9 percent of all dial-up Internet users stated that they did not use broadband Internet at home because it was too expensive.[177]

Nonetheless, concerns about municipalities being both a market participant and a regulator underlie some arguments against the municipal provision of wireless Internet service.[178]

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[175] FCC Report, *supra* note 1, at 32.

[176] *Id*. at 33.

[177] U.S. DEP'T OF COMMERCE, NAT'L TELECOMMUNICATIONS AND INFORMATION ADMIN., A NATION ONLINE: ENTERING THE BROADBAND AGE 13-14 (2004), *available at* http://www.ntia.doc.gov/reports/anol/NationOnlineBroadband04.pdf. *See also* THE FLORIDA PUBLIC SERVICE COMMISSION OFFICE OF MARKET MONITORING AND STRATEGIC ANALYSIS, *supra* note 81, at 34-39.

[178] *See generally* BALHOFF & ROWE, *supra* note 9, at 116.

A number of years ago, the FTC staff expressed views about government provision of telecommunications and information services in competition with the private sector that have some relevance to the current debate about municipal provision of wireless Internet service. *See Hearing on The Provision of Telecommunications and Information Services by the Federal Government in Competition with the Private Sector, Hearing Before the House Government Information and Individual Rights Subcommittee of the Committee on Government Operations,* 97th Cong. (1982) (testimony of Timothy J. Muris, Director, Bureau of Consumer Protection, Federal Trade Commission, on behalf of the FTC Bureaus of Consumer Protection and Economics). Staff cautioned that government competition with the private sector may potentially stifle the development of innovative and competitive services in the private marketplace where government oversteps limits on its role in providing such service, is slow to react to changing market conditions due to bureaucratic operating constraints, or uses political channels to help it compete on unequal terms. Staff also observed that competing with the government entails a perceived risk that the rules of competition may favor the government, particularly where a government enterprise has regulatory powers over the activity in question. Thus, staff advised

Some commentators warn that a municipality may use its role as a regulator that controls rights-of-way access for antennas, cable, copper, or fiber lines in order to disadvantage competitors. Proponents, however, suggest that municipal entry, or even its threat, may spur competition and, thus, benefit consumers. In response to these concerns, some commentators have suggested that a distinction be maintained between a government entity acting as a regulator and a government entity acting as a market participant.[179]

Because broadband Internet service is increasingly important to the U.S. and its economy, state and federal legislatures that are considering banning or restricting municipal involvement in wireless Internet provision may want to consider distinguishing between these two roles. The McCain-Lautenberg, Barton, and Stevens bills seem to make such a distinction. These bills would allow municipalities to offer broadband Internet services but also require that they deal with other firms in a non-discriminatory manner. As Senator McCain commented, "Many of the countries outpacing the United States in the deployment of high speed Internet services, including Canada, Japan and South Korea, have successfully combined municipal systems with privately deployed networks to wire their countries."[180]

Policymakers considering this issue may want to evaluate whether competition and consumers would be better served if they permitted municipalities to provide broadband Internet services but ensured that municipalities would not engage in conduct that disadvantaged or excluded private competitors. Alternatively, more limited forms of government involvement, such as franchise bidding, also may be worth considering. Franchise bidding is attractive in principle because private firms submit competitive bid proposals to secure the right to provide a certain good or service. In practice, however, franchise bidding may require extensive price- and

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that the mere existence of a government enterprise inevitably creates a concern in the marketplace that government will expand its role further, a concern that may deter private competitors from entering.

[179] *See generally* Sahr, *supra* note 126, at 8-9 (criticizing the conduct of the Massachusetts Port Authority as both regulator of Logan Airport and competitor in the provision of wireless Internet service as self-interested and exclusionary toward private competitors). *See also* BALHOFF & ROWE, *supra* note 9, at 121 (emphasizing that municipal involvement should be neutral, pro-competitive, non-exclusionary, conscious of possible conflicts of interest, and transparent and accountable to the public).

[180] Roy Mark, *McCain Bill Would Help Municipal Wi-Fi*, WI-FIPLANET.COM, June 23, 2005, *available at* http://www.wi-fiplanet.com/news/article.php/3515206. Others suggest, however, that in countries such as Korea it is not necessarily public-private provision that has led to higher penetration rates among consumers but rather higher population densities have allowed new technologies to be rolled-out to more people more quickly. *See generally* John Borland & Michael Kanellos, *South Korea Leads the Way*, NEWS.COM, July 28, 2004, *available at* http://news.com.com/South+Korea+leads+the+way/2009-1034_3-5261393.html.

quality-monitoring by the municipality to ensure that the franchisee is meeting the terms of its bid and is not misusing its franchise rights. Policymakers also may find it useful to look at various federal programs that are encouraging the deployment of broadband Internet services through grants and low-interest or federally guaranteed loans, some of which are available to municipal governments.

In considering whether, or to what extent, a municipality should participate in the provision of wireless Internet services, policymakers may wish to consider the following principles articulated by the federal government and commentators when deciding whether a service should be provided by the government or by a private firm. In practice, applying such principles to specific cases may be difficult and involve complicated fact issues. However, considering them in a decision-tree analysis may be a useful framework for evaluating municipal provision of wireless Internet service.[181]

The federal government has a general policy on using government or private service providers to perform needed activities. Specifically, Office of Management and Budget Circular No. A-76 (Revised) states, "The longstanding policy of the federal government has been to rely on the private sector for needed commercial services. To ensure that the American people receive maximum value for their tax dollars, commercial activities should be subject to the forces of competition."[182] Thus, Circular A-76 requires that federal agencies identify all government

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[181] *See generally* STIGLITZ ET AL., *supra* note 79, at 77.

[182] EXECUTIVE OFFICE OF THE PRESIDENT, OFFICE OF MANAGEMENT AND BUDGET, CIRCULAR NO. A-76 1 (REVISED) (May 29, 2003), *available at* http://www.whitehouse.gov/omb/circulars/a076/a76_incl_tech_correction.pdf. *See also* EXECUTIVE OFFICE OF MANAGEMENT AND BUDGET, REVISION TO OFFICE OF MANAGEMENT AND BUDGET CIRCULAR NO. A-76, "PERFORMANCE OF COMMERCIAL ACTIVITIES" (2003), *available at* http://www.whitehouse.gov/omb/fedreg/rev_a76_052903.html.

personnel activities as either commercial[183] or inherently governmental[184] and perform inherently governmental activities with government personnel. A cost estimate is also required to determine if government personnel should perform a commercial activity, and a specific rationale for such performance must be supplied. Thus, the circular sets out a generalized, normative framework for deciding whether an activity should be performed by government personnel or by the private sector.

Private commentators have come up with principles to guide this decision as well. For example, Stiglitz et al. articulate twelve general principles for the role of government in a digital age.[185] These principles are meant to provide guidance for decision-makers tasked with

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[183] The Circular states:

> A commercial activity is a recurring service that could be performed by the private sector and is resourced, performed, and controlled by the agency through performance by governmental personnel, a contract, or a fee-for-service agreement. A commercial activity is not so intimately related to the public interest as to mandate performance by government personnel. Commercial activities may be found within, or throughout, organizations that perform inherently governmental activities or classified work.

OMB CIRCULAR NO. A-76 (REVISED), *supra* note 182, at A-3.

[184] The Circular states:

> An inherently governmental activity is an activity that is so intimately related to the public interest as to mandate performance by government personnel. These activities require the exercise of substantial discretion in applying government authority and/or in making decisions for the government. Inherently governmental activities normally fall into two categories: the exercise of sovereign government authority or the establishment of procedures and processes related to the oversight of monetary transactions or entitlements.

Id. at A-2.

[185] These principles are:

> ***"Green Light" for On-Line and Informational Government Activity***
> Principle 1: Providing public data and information is a proper governmental role
> Principle 2: Improving the efficiency with which government services are provided is a proper governmental role
> Principle 3: The support of basic research is a proper governmental role

determining when government should act or not act in an increasingly digital economy. The authors suggest that an evaluation of government actions that affect the marketplace proceed as follows:

> [P]olicy makers should ask . . . whether the good or service is a public good or externalities (or other market failures) are present. If the answer to that question is no, the government should not provide the good or service. If the answer is yes, policy-makers must . . . [ask] whether the good or service can be provided more efficiently through appropriate regulation or subsidization, relative to direct public provision. If the answer to that question is yes, the government should proceed with appropriate regulation or subsidization if private-sector entities are already active, and not attempt to enter the market as a direct or indirect service provider itself. If either public-sector provision would be more efficient or if no private-

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> ***"Yellow Light" for On-Line and Informational Government Activity***
> Principle 4: The government should exercise caution in adding specialized value to public data and information
> Principle 5: The government should only provide private goods, even if private-sector firms are not providing them, under limited circumstances
> Principle 6: The government should only provide a service on-line if private provision with regulation or appropriate taxation would not be more efficient
> Principle 7: The government should ensure that mechanisms exist to protect privacy, security, and consumer protection on-line
> Principle 8: The government should promote network externalities only with great deliberation and care
> Principle 9: The government should be allowed to maintain proprietary information or exercise rights under patents and/or copyrights only under special conditions (including national security)
>
> ***"Red Light" for On-Line and Informational Government Activity***
> Principle 10: The government should exercise substantial caution in entering markets in which private-sector firms are active
> Principle 11: The government (including government corporations) should generally not aim to maximize net revenues or take actions that would reduce competition
> Principle 12: The government should only be allowed to provide goods or services for which appropriate privacy and conflict-of-interest protections have been erected

STIGLITZ ET AL., *supra* note 79, at 5. The authors indicate that, "[t]he principles, while developed to reflect recent technological advances, are intended to be applicable in both the digital and 'bricks and mortar' world." *Id.* at 50.

sector entities exist, policy-makers should proceed with direct provision only if privacy and pricing issues have been appropriately addressed.[186]

Balhoff and Rowe provide a decision schematic specific to potential municipal involvement with wireless Internet.[187] They suggest that a community should first evaluate whether there is a functioning private broadband marketplace. If private sector provision exists but is underdeveloped or underutilized, the community may consider strategies to facilitate increased deployment and/or use. If a private provider will not serve the community on its own, the municipality may consider a pro-competitive public-private partnership. Finally, as a last resort, the municipality may consider incurring the risk of owning and/or operating a broadband wireless network itself. Robert K. Sahr, Chairman of the South Dakota Public Utilities Commmission, has proposed a similar decision framework.[188]

Figure 1 draws on these principles to provide a decision-tree analysis that may be useful in evaluating whether a municipality should participate in the provision of wireless Internet service.[189] First, a municipality should ask whether broadband Internet service is available from a private provider or will be provided by a new entrant in a timely manner. If the answer is yes, the municipality should then ask whether additional broadband provision would create a substantial positive externality, substantially improve the efficiency of an inherently governmental service, or meet substantial unmet demand. If the answer to these questions is no, the municipality should not provide a wireless Internet service. If, however, the answer to one or more of these questions is yes, the municipality should then ask whether broadband provision could be improved more efficiently through incentive strategies for individual users and/or private

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[186] *Id*. at 75-76.

[187] BALHOFF & ROWE, *supra* note 9, at 120-122.

[188] In Sahr's view "[f]irst, municipalities should act only where a market failure exists." Sahr, *supra* note 126, at 5-6. "Second, where market failure exists, communities should ascertain whether or not providers are willing to serve the market immediately or in the near term." *Id*. "Third, municipalities should consider available funding sources [such as federal grants] and possible incentives to attract private investment." *Id*. "Fourth, after pursuing the first three options, municipalities should consider public-private partnerships." *Id*. "Fifth, municipalities, after assessing the appropriate risks and benefits, may consider constructing and operating a municipal-owned or sponsored network." *Id*. But a municipality "should continue to evaluate opportunities for non-governmental solutions." *Id*.

[189] This report addresses the issue of municipal provision or facilitation of wireless Internet service as a possible low-cost alternative to more traditional wireline technologies. This decision-tree framework and its underlying principles are also sufficiently broad, however, to be informative to policymakers considering similar decisions in the wireline broadband Internet context.

providers than through municipal provision. If the answer is yes, then the municipality should proceed with the incentive strategy. If the answer is no, the municipality should then ask whether wireless Internet provision can be supplied more efficiently through a pro-competitive partnership with a private provider, versus purely municipal provision. If other concerns, such as technology and performance standards, pricing, financing, operating costs, rights-of-way, accountability, non-discrimination, and privacy issues have all been addressed, the municipality should proceed with a public-private partnership if it is more efficient. Otherwise, the municipality may consider incurring the risk of providing wireless Internet service itself.

If broadband Internet service is not available from a private provider and will not be provided by a new entrant in a timely manner, the municipality should ask whether the introduction of broadband Internet would create a substantial positive externality, substantially improve the efficiency of an inherently governmental service, or meet substantial unmet demand. Again, if the answer to all of these questions is no, the municipality should not provide wireless Internet service. If, however, the answer to one or more of these questions is yes, the municipality should then ask whether broadband provision could be improved more efficiently through incentive strategies for individual users and/or private providers than through municipal provision and proceed with the remainder of the analysis outlined above.

In any case, if a municipality chooses to participate in the provision of wireless Internet service, it should periodically re-evaluate whether its involvement remains appropriate given evolving technology and market conditions. If changed circumstances result in a different decision-tree outcome, the municipality should consider whether to modify, privatize, or sunset its participation.

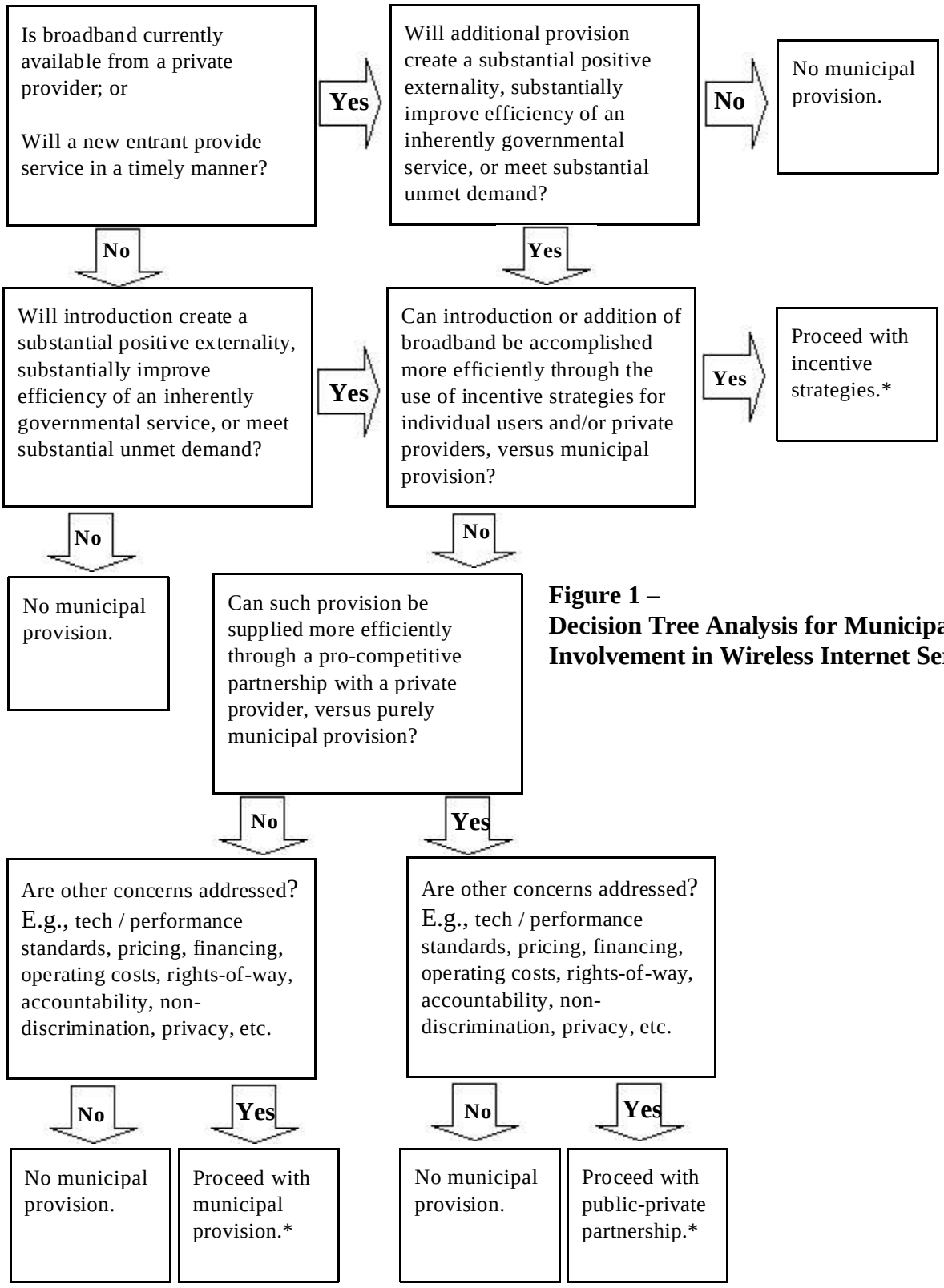

Figure 1 –
Decision Tree Analysis for Municipal Involvement in Wireless Internet Service

*Periodically re-evaluate whether municipal involvement remains appropriate, given current technology and market conditions.

CONCLUSION

The decision of whether, and through what vehicle, a municipality should facilitate or provide wireless Internet service requires a highly fact-specific analysis that is not amenable to a one-size-fits-all policy recommendation. For example, the situation of a large metropolitan area served by multiple wireline telecommunications providers and high-speed cellular Internet technology is quite different from that of a small rural town with only one or no wireline telecommunications providers and low-speed cellular service. Moreover, municipalities offer their residents varying levels of governmental services, some of which may potentially be supported more efficiently through the addition of a wireless Internet network.

Accordingly, rather than attempt to provide a single answer, this report provides guidance for policymakers considering whether and how a municipality should involve itself in the provision of wireless Internet service. It sets forth a framework that recognizes that the relevance of arguments for and against municipal involvement may vary depending on the particular factual circumstances. In addition, by identifying a range of operating models, the framework suggests a variety of options available to policymakers. Guiding this approach is a concern for competition principles, and the framework's overall approach attempts to reduce the likelihood of competitive harm in this area. Finally, the report discusses process considerations, such as transparency and accountability, that can improve the decisionmaking process overall.

Appendix – Major Internet Technologies[1]

Technology	Delivery	Speed	Price Per Mo.	Range	Development	Performance	Deployment
Dial-Up Modem	Dial-up via traditional copper wireline telephone connection	Traditional: up to 56 Kbps[2] Hi-speed: up to 280 Kbps[3]	Traditional: $5+ Hi-speed: $10+[4]	Traditional copper wireline telephone connection	Mature	Connection generally consistent	Available via traditional telephone connections
Digital Subscriber Line	Copper wireline telephone connection capable of supporting digital data	Up to 32 Mbps[5] Providers generally offer service of 1.6 to 6.4 Mbps[6]	$13-40+[7]	DSL-ready copper wireline connection; up to about 3 miles without use of "repeater" to regenerate signal strength[8]	Mature	Connection generally consistent; speed depends on distance from provider[9]	Substantial deployment in major cities; lesser deployment in other areas
Cable Modem	Coaxial wireline cable connection	Up to 30 Mbps[10] Providers generally offer service of 1.8 to 6.7 Mbps[11]	$40+[12]	Cable wireline connection[13]	Mature	Connection generally consistent; speed does not depend on distance from provider[14]	Substantial deployment in major cities; lesser deployment in other areas

Technology	Delivery	Speed	Price Per Mo.	Range	Development	Performance	Deployment
Wi-Fi	Unlicensed radio spectrum	802.11a: up to 54 Mbps 802.11b: up to 11 Mbps 802.11g: up to 54 Mbps[15]	$17-30+[16]	Up to 300 feet[17]	Mature, but improvements still expected	802.11b and a standards subject to line of site disruptions from physical objects and interference from other wireless signals; 802.11g uses OFDM to allow non-line of site transmission and to reduce distortions[18]	Up to 150,000 U.S. hotspots,[19] 56+ operational municipal networks, 29+ city hot zones, 42+ municipal or public safety networks[20]
Wi MAX	Licensed and unlicensed radio spectrum	802.16a: up to 75 Mbps[21]	N/A	Up to 30 miles[22]	Emerging technology; 802.16a standard extended to include 802.16d standard; 802.16e mobile standard also in development[23]	802.16a uses OFDM to allow non-line of site transmission and to reduce distortion from other wireless technologies[24]	Limited deployment
"3G" Wireless Mobile Broadband	Licensed wireless communication networks	Data transfer up to 2 Mbps, typical download speeds of 300-500 Kbps[25]	220 Kbps-700 Kbps data transfer speed in major cites, 40-135 Kbps data transfer in other areas: $60-80[26]	Co-extensive with cellular network coverage, 96%+ of U.S. population[27]	Emerging technology	Co-extensive with cellular network performance, subject to line of site disruptions from physical objects	Co-extensive with cellular network coverage, 96%+ of U.S. population; broadband available only in major cities; reduced speeds available in other areas[28]

Technology	Delivery	Speed	Price Per Mo.	Range	Development	Performance	Deployment
"4G" Wireless Mobile Broadband	Licensed wireless communication networks	Up to 1 Mbps[29]	N/A	Similar to metro wireless networks; vehicular mobility up to 155 mph[30]	In development	In development	No substantial deployment
Broadband Over Powerlines	Existing electric power distribution networks	Up to 3.5 Mbps[31]	Up to 500 Kbps: $28.95 Up to 1.5 Mbps / 2 Mbps: $40 Up to 2.5 Mbps / 1 Mbps $60 Up to 2.5 Mbps / 1 Mbps $80[32]	Wireline connection via electrical outlet[33]	Emerging technology	Connection generally consistent, but subject to disruption during electric transmission spikes[34]	Limited deployment[35]
Satellite Internet	Satellite signal received via base station dish and clear line-of-sight to provider's satellite	Up to 1.5 Mbps download / 256 Kbps upload[36]	Up to 500 Kbps / 120 Kbps: $50-60 Up to 750 Kbps / 128 Kbps: $60-110 Up to 1 Mbps / 256 Kbps: $70 - 140 Up to 1.5 Mbps / 256 Kbps: $80 + dish hardware: $300 - 700 [37]	Wireline connection to base station dish[38]	Emerging technology	Subject to line of site disruptions from physical objects or severe weather	Throughout U.S., including Alaska, Hawaii, and Puerto Rico[39]

Technology	Delivery	Speed	Price Per Mo.	Range	Development	Performance	Deployment
Fiber to the Home	Fiber optic wireline connection	Up to 30 Mbps download / 5 Mbps upload[40]	Up to 5 Mbps / 2 Mbps: $35-40 Up to 15 Mbps / 2 Mbps: $45-50 Up to 30 Mbps / 5 Mbps: $180[41]	Fiber optic wireline connection[42]	Emerging technology	Connection generally consistent; speed does not depend on distance from provider	Substantial deployment in major metropolitan areas, lesser deployment in other areas

1. Sources used in this paper and Appendix regarding Internet technology characteristics and related market prices are drawn from generally recognized and up-to-date authorities. As technological standards and market conditions continue to evolve, however, such information is subject to change.

2. *See generally* NETZERO, NETZERO.COM (2006).

3. *See generally id.*

4. *See generally id. See also* COMPARENOW.NET, DIAL UP INTERNET PROVIDERS (2006), *at* http://comparenow.net/dialup.html.

5. *See generally* WEBOPEDIA.COM, xDSL (2006), *at* http://webopedia.com/TERM/x/xDSL.html.

6. *See generally* CNET.COM, TOP DSL PROVIDERS (Feb., Aug. 2006), *at* http://reviews.cnet.com/7020-9031_7-0.html?tag=bbw&sortColumn=speed&ac=.

7. *See generally* COMPARENOW.NET, BROADBAND INTERNET PROVIDERS (2006), *at* http://comparenow.net/broadband.html.

8. *See generally* WEBOPEDIA.COM, *supra* endnote 5.

9. *See generally id.*

10. Press Release, Cisco Systems, UPC to Test Cable Internet Speeds of up to 30 Mbps (2004), *available at* http://www.cisco.com/global/UK/news/pdfs/2004/20041201.pdf.

11. *See generally* CNET.COM, TOP CABLE PROVIDERS (Feb., Aug. 2006), *at* http://reviews.cnet.com/7020-9031_7-0.html?tag=bbw&ac=&filter=9032&action=Go%21.

12. *See generally* COMPARENOW.NET, *supra* endnote 7; EARTHLINK.COM, HIGH SPEED PRICING (2006), *at* http://www.earthlink.net/highspeed/pricing/.

13. *See generally* WEBOPEDIA, CABLE VS. DSL (2006), *at* http://www.webopedia.com/DidYouKnow/Internet/2005/cable_vs_dsl.asp.

14. *See generally id.*

15. *See generally* FCC Report, *supra* note 1, at 19-20; WEBOPEDIA, WIRELESS LAN STANDARDS (2006) *at* http://www.webopedia.com/quick_ref/WLANStandards.asp.

16. *See generally* CHASKA.NET; Kessler, *supra* note 35.

17. FCC Report, *supra* note 1, at 3.

18. *See generally id.* at 19-20.

19. *See generally id.* at 3, 56. *See also* JIWIRE.COM, *supra* note 31.

20. *See generally* MUNIWIRELESS.COM, FEBRUARY 2006 LIST OF MUNI WIRELESS NETWORKS POSTED (UPDATE TO THE JULY 2005 REPORT) (2006), *at* http://muniwireless.com/municipal/1035/.

21. *See generally* FCC Report, *supra* note 1, at 21.

22. *See generally id.* at 3.

23. *See generally id.* at 3-4, 20-21.

24. *See generally id.* at 21.

25. *See generally id.* at 24.

26. *See generally* VERIZON, VERIZON.COM (2006); SPRINT, SPRINT.COM (2006); CINGULAR, CINGULAR.COM (2006).

27. *See generally* FCC Report, *supra* note 1, at 24.

28. *See generally id.*

29. *See generally id.* at 26-27.

30. *See generally id.*

31. *See generally* COMMUNICATIONS TECHNOLOGIES, INC., COMTEKBROADBAND.COM (2006); Robert Valdes, *How Broadband Over Powerlines Works*, HOWSTUFFWORKS.COM (2006), *at* http://computer.howstuffworks.com/bpl.htm.

32. *See generally* COMMUNICATIONS TECHNOLOGIES, INC., *supra* endnote 31.

33. *See generally id.*

34. *See generally* Valdes, *supra* endnote 31.

35. *See generally* UNITED POWER LINE COUNCIL, BPL DEPLOYMENT MAP (2006), *at* http://www.uplc.utc.org/file_depot/0-10000000/0-10000/7966/conman/BPL+Map+12_12.pdf.

36. *See generally* STARBAND, STARBAND.COM (2006); DIRECWAY, DIRECWAY.COM (2006); WILDBLUE, WILDBLUE.COM (2006).

37. *See generally* STARBAND, *supra* endnote 36; DIRECWAY, *supra* endnote 36; WILDBLUE, *supra* endnote 36.

38. *See generally* STARBAND, *supra* endnote 36; DIRECWAY, *supra* endnote 36; WILDBLUE, *supra* endnote 36.

39. *See generally* STARBAND, *supra* endnote 36; DIRECWAY, *supra* endnote 36; WILDBLUE, *supra* endnote 36.

40. VERIZON, THE SPEED OF FIOS™ WILL CHANGE FOR YOUR LIFE (2006), *at* http://www22.verizon.com/FiOSforhome/channels/FiOS/root/package.aspx.

41. *See generally id.*

42. *See generally id.*

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