

PUBLIC INTEREST IN THE DIGITAL AGE: TOWARDS A 21ST CENTURY SPECTRUM POLICY

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INTRODUCTION

“The beginning of the end of broadcast TV.”¹ This is how Huffington Post, the most popular electronic news source with over 88 million unique visitors per month, described the first-ever YouTube Music Video Awards.² From DVDs and CDs to newspapers and magazines, the rise of the Internet Age has disrupted many business models and industries. Rather than opening a freshly delivered newspaper, many families turn to a tablet to see the day’s headlines instantly delivered and constantly updated. And rather than tuning an antenna to watch a favorite show at primetime, many Americans instantly stream programs over the Internet to any device, at any time. Although most homes still receive ‘linear’—live, not time-shifted—television, the majority do so using cable, satellite, or another paid

1. David Mager, *The End of Broadcast TV*, HUFFINGTON POST (Nov. 11, 2013, 5:04 PM), http://www.huffingtonpost.com/david-mager/the-end-of-broadcast-tv_b_4247351.html.

2. *Id.*

service. Broadcast television may not be dead, but it is dying.

Before continuing, it is important to define “broadcast television” in the context of this analysis. This paper is not referring to the oft-excellent news, entertainment, and information (hereinafter, “media”) created by broadcast networks and local channels. Rather, it is referring to terrestrial, over-the-air broadcasting using antennas and wireless spectrum—to the conduit, not the content.³

As technology has shifted, so too has Americans’ spending on media and data subscriptions. Only 1 in 10 Americans receive ‘broadcast’ media from terrestrial broadcast.⁴ The vast majority of Americans receive broadcast content through a pay-television service (also known as a Multichannel Video Programming Distributor, “MVPD”) such as cable or satellite.⁵ Similarly impressive is the United States’ wireless broadband subscription penetration, which, according to the Organization for Economic Co-operation and Development (“OECD”), surpassed 100 percent at the end of 2013.⁶ However, accessing media and other data using a wireless connection requires a scarce and valuable resource: wireless spectrum.

Since the Communications Act of 1934, the Federal Communications Commission (FCC) has been tasked with weighing competing uses for spectrum and licensing its use in accordance with the “public interest, convenience, or necessity.”⁷ With the advent of television broadcasting in the mid-20th century, the FCC provided spectrum licenses to broadcast networks to transmit media to a newly connected nation. Now, following the advent of wireless Internet connectivity, demand for spectrum is growing exponentially. To meet this dramatic increase in demand, the FCC should reclaim all broadcast television spectrum, auction the spectrum licenses for wireless broadband use, and deploy the revenues to subsidize home broadband service. While doing so, the FCC should reorient the social contract from

3. Note that satellite television is technically also broadcast, but it is not terrestrial broadcast (from a land-based antenna). Satellite transmissions are on high-frequency microwave bands, not the congested UHF and VHF bands utilized by terrestrial broadcast television.

4. *Only Seven Percent of TV Households Rely on Over-the-Air Signals, According to CEA Study*, CONSUMER ELEC’S ASS’N (Jul. 30, 2013), <http://www.ce.org/News/News-Releases/Press-Releases/2013-Press-Releases/Only-Seven-Percent-of-TV-Households-Rely-on-Over-t.aspx>.

5. *Id.*

6. *Total fixed and wireless broadband subscriptions by country*, ORG. FOR ECON. CO-OPERATION AND DEV., <http://www.oecd.org/internet/broadband/1c-TotalBBSubs-bars-2013-12.xls> (last visited July 22, 2014) [hereinafter OECD].

7. 47 U.S.C. § 303 (2010) (“[T]he Commission from time to time, as public convenience, interest, or necessity requires, shall-- (a) Classify radio stations; [and] (b) Prescribe the nature of the service to be rendered by each class of licensed stations . . .”).

one that facilitates free broadcast television to one that ensures all Americans have access to affordable home broadband. The social contract that grants free over-the-air television is based on an outdated model of information consumption. Although broadcast television was the primary media conduit in the 20th century, it has been supplanted by a more powerful and flexible data communication technology—the Internet.⁸

Broadband Internet access can unlock economic opportunity.⁹ Just as telephone access enabled economic opportunity and raised standards of living in the 20th century, so too does broadband access in the 21st century. Unfortunately, Americans' access to reliable, affordable home broadband is restrained because of limited choice in the home broadband market.¹⁰ In large part because of this dearth of competition, Americans pay more for home broadband service than in many other developed countries.¹¹ The FCC should expand access to reliable, affordable home broadband service by rewriting an outdated social contract focused on an outdated communications technology.

In Part I, I discuss the nature and value of wireless spectrum. I make the case for reclaiming all broadcast spectrum in Part II. Part III considers how the FCC could reclaim this valuable resource from broadcast licensees. In Part IV, I rebut objections to ending television broadcast. Part V concludes by describing the benefits of a new social contract oriented around affordable, reliable home broadband access.

I. THE VALUE OF WIRELESS SPECTRUM

“You cannot invent it. You cannot grow it. You have to make sure you are using it as efficiently as possible and fortunately technology keeps allowing you to do that.”¹² This is how FCC Chairman Tom Wheeler described the valuable wireless spectrum over which his agency presides. Although the total electromagnetic spectrum is enormous, valuable spectrum is a scarce resource because not all frequencies are

8. See Barry M. Leiner et al., *Brief History of the Internet*, INTERNET SOC'Y, <http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet> (last visited Oct. 9, 2014).

9. *National Broadband Plan: Broadband & Economic Opportunity*, FED. COMM'NS COMM'N, <http://www.broadband.gov/issues/economic-opportunity.html> (last visited Aug. 21, 2014).

10. Hibah Hussain et al., *The Cost of Connectivity 2013*, NEW AM. FOUND. (Oct. 28, 2013), http://oti.newamerica.net/publications/policy/the_cost_of_connectivity_2013.

11. *Id.*

12. John Eggerton, *Wheeler: Spectrum Efficiency Doesn't Mean 'Chucking' Broadcasting, BROAD. & CABLE* (Nov. 7, 2013, 5:26 PM), <http://www.broadcastingcable.com/news/washington/wheeler-spectrum-efficiency-doesnt-mean-chucking-broadcasting/125073?rssid=20065>.

created equal.¹³ Different frequencies exhibit different propagation characteristics, power needs, and antenna requirements that render them either useful for, or ill-tailored to, mobile broadband.¹⁴ A relatively small band of frequencies possess characteristics that make them valuable for the burgeoning mobile broadband market.¹⁵ Generally, spectrum from 300 megahertz (MHz) to 3000 MHz is considered the “beachfront” property for wireless cellular applications.¹⁶ Transmissions on these frequencies are able to penetrate buildings and other structures using low power and small antennas, both vital considerations for mobile applications.¹⁷ This note will briefly discuss physical characteristics of the beachfront spectrum and demonstrate the extensive market value of this spectrum through spectrum auctions.

“Signal propagation” refers to the distance an electromagnetic signal can travel and its ability to penetrate buildings and other obstacles.¹⁸ Lower frequencies tend to travel further with less degradation of signal, and best penetrate obstacles.¹⁹ For wireless broadband applications, this means that users can acquire a signal further from the cell tower and experience better in-building coverage. However, these favorable propagation characteristics come at a cost: because of the distance the signal naturally travels, a wireless carrier is unable to “reuse” the frequency as often. “Frequency reuse” refers to the ability of a carrier to erect transmitters within a close proximity to those already broadcasting on the same frequency. Frequency reuse enables each wireless customer to enjoy greater bandwidth because the tower to which they are connected has fewer overall connections.²⁰

The Shannon-Hartley Theorem governs the amount of wireless data (commonly measured in bits per second) that can be transmitted over a wireless band.²¹ Although the mathematical details of the theorem are

13. PRESIDENT’S COUNCIL OF ADVISORS ON SCI. AND TECH., EXEC. OFFICE OF THE PRESIDENT, REPORT TO THE PRESIDENT: REALIZING THE FULL POTENTIAL OF GOVERNMENT-HELD SPECTRUM TO SPUR ECONOMIC GROWTH, *available at* http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

14. *Id.*

15. *Id.*

16. *Id.* at 8.

17. *Id.*

18. See Y. L. C. de Jong et al., *Comparison of Radio Propagation Characteristics at 700 and 2,500 MHz Pertaining to Macrocellular Coverage*, COMMC’NS RESEARCH CENTRE CAN., 24-25 (Apr. 2011), [http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/smse-005-11-bell-apndix3.pdf/\\$FILE/smse-005-11-bell-apndix3.pdf](http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/smse-005-11-bell-apndix3.pdf/$FILE/smse-005-11-bell-apndix3.pdf).

19. *Propagation of Waves*, FED’N OF AM. SCIENTISTS, <http://www.fas.org/man/dod-101/navy/docs/es310/propagat/Propagat.htm> (last visited Mar. 27, 2014).

20. *Frequency Reuse*, GARTNER, <http://www.gartner.com/it-glossary/frequency-reuse> (last visited Mar. 27, 2014).

21. See Claude E. Shannon, *Communication in the Presence of Noise*, 86 PROCEEDINGS

beyond the scope of this analysis, the theorem defines the relationship between channel capacity (the amount of data that can be sent per unit of time) and bandwidth (a fixed amount of wireless spectrum).²² This physical constraint is the primary motivating factor for spectrum policy because, not only is the amount of premium spectrum that is viable for mobile broadband limited, but that spectrum is constrained in the amount of wireless data it can carry. In other words, if a wireless carrier is licensed to transmit on a larger band of spectrum, they are able to provide their customers with higher data rates. Limited availability of spectrum and its restricted capacity drive scarcity of this essential resource.

Since Congress authorized the FCC to auction wireless spectrum in 1993,²³ it has raised billions of dollars in revenues for the federal government. In a 2008 auction of portions of the 700 MHz band, winning bids totaled over \$19 billion dollars.²⁴ As the *New York Times* reported in its coverage of the auction, the spectrum licenses would allow wireless providers “access to some of the best remaining spectrum—enabling them to send signals farther from a cell tower with far less power, through dense walls in cities and over wider territories in rural areas that are now underserved.”²⁵ Beachfront spectrum has enormous value.

The spectrum currently allocated for broadcast television use is ideal for wireless broadband because of its beachfront properties.²⁶ The value of this beachfront spectrum is exemplified by an upcoming spectrum auction, which hopes to reclaim 120 MHz of broadcast television spectrum for wireless broadband use and is expected to raise more than \$36 billion.²⁷ This spectrum is unique in that it has the potential to quickly be redeployed for wireless broadband use because there is only a single user (a television channel) on each spectrum band.²⁸ According to a 2012 analysis of spectrum, “[the] largest block of potentially available spectrum that is economically and technologically viable to reallocate to mobile broadband use is the 294 MHz allocated to

OF THE IEEE, 447 (1998), available at <http://www.stanford.edu/class/ee104/shannonpaper.pdf>.

22. *Id.* at 457.

23. See, e.g., 47 U.S.C. §§ 309(j) (1993).

24. Stephen Labaton, *Wireless Spectrum Auction Raises \$19 Billion*, N.Y. TIMES, (Mar. 19, 2008), <http://www.nytimes.com/2008/03/19/technology/19fcc.html>.

25. *Id.*

26. David Lieberman, *Mobile Broadband Covets Over-the-Air TV Space*, USA TODAY (Mar. 25, 2011, 9:40 AM), <http://usatoday30.usatoday.com/tech/news/2011-03-24-fcc-tv-stations-broadcast-spectrum.htm>.

27. *Id.*

28. See, e.g., *Cable TV/Broadcast TV Frequency Allocations*, QSL.NET, http://www.qsl.net/atn/library/Broadcast_freqs.htm (last visited Sept. 13, 2014).

broadcast television.”²⁹ Broadcast television spectrum has enormous potential for the mobile broadband industry, and the FCC knows it.

The FCC has recognized the importance of reallocating at least some broadcast spectrum to broadband spectrum. The FCC’s National Broadband Plan recommended making 500 MHz of spectrum available for wireless broadband within 10 years of the report’s publication in 2010.³⁰ The report further recommended that the FCC “reallocate 120 megahertz from the broadcast television (TV) bands.”³¹ Additionally, the plan found that “the spectrum occupied by broadcast television stations has excellent propagation characteristics that make it well-suited to the provision of mobile broadband services, in both urban and rural areas.”³² The FCC believes that reallocating broadcast spectrum to broadband “has the potential to create new economic growth and investment opportunities.”³³ The spectrum used for TV broadcasting has enormous value and is well suited for mobile broadband.

II. ALL BROADCAST SPECTRUM SHOULD BE RECLAIMED

Although the FCC has reallocated some broadcast television spectrum for broadband use, it has been hesitant to realize the full value of reallocation. The FCC should reclaim and redeploy all broadcast spectrum for wireless broadband service because the FCC is under a statutory obligation to allocate spectrum in accordance with the public interest.

Broadcasting poorly serves the public interest for three reasons. First, only a small fraction of the population utilizes broadcast television. Broadcasting is a low market value use, and consumer habits for consumption of media have shifted dramatically with the rise of technological diversification. Second, reclaiming and auctioning all broadcast spectrum could facilitate the exponential growth of mobile broadband usage. This would make wireless a more viable home-broadband alternative to wired service and stimulate economic growth. Third, the broadcast business model is under extreme pressure, and reallocating spectrum to wireless broadband would accelerate the necessary transition to more forward-looking business models. Technologies used in the modern media landscape, including broadcast

29. J. Armand Musey, *How the Traditional Property Rights Model Informs the Television Broadcasting Spectrum Rationalization Challenge*, 34 HASTINGS COMM. & ENT. L.J. 145, 146 (2012).

30. FED. COMM’NS COMM’N, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN 75 (2010) [hereinafter “NAT’L BROADBAND PLAN”].

31. *Id.* at 88.

32. *Id.* at 88.

33. *Id.*

television, pay-television, and Internet media, are converging into a single internet-delivery method. Therefore, it is anachronistic to differentiate between “broadcast networks,” “cable networks,” and “online video” when they are delivered over the same technology. The FCC should speed the arrival of a simplified, more consumer-friendly media landscape.

A. Consumer viewing habits have shifted away from television broadcasting, making it a low-value use of wireless spectrum

The most obvious reason to eliminate television broadcast is that few Americans utilize it. The FCC must consider its obligation to allocate the airwaves in the “public interest, convenience, or necessity.”³⁴ Although the FCC is under a statutory obligation to ensure the airwaves are deployed for the public welfare, only a small fraction of the public avail themselves of broadcast television.³⁵ In a July 2013 study, the Consumer Electronics Association (CEA) found that “just seven percent of American TV households rely solely on an antenna for their television programming.”³⁶ This was a slight decrease over their 2010 study that found only “eight percent of TV households reported using an antenna only for television programming.”³⁷ The CEA study further found that 83 percent of TV households “receive television programming through . . . cable, satellite or fiber to the home” and 28 percent “receive programming on their TVs through the Internet.”³⁸ Predictably, the National Association of Broadcasters (NAB) disputed these anemic broadcast viewership figures and claimed that 19.1 percent of TV households rely on broadcast.³⁹ However, a 2011 Nielsen study found similar results as the CEA, concluding that 9.6 percent of TV households rely on broadcast.⁴⁰ Whether the actual viewership of broadcast is 7, 9, or 19 percent, it pales in comparison to ubiquitous mobile broadband

34. Glen O. Robinson, *Title I, The Federal Communications Act: An Essay on Origins and Regulatory Purpose*, in A LEGISLATIVE HISTORY OF THE COMMUNICATIONS ACT OF 1934 3, 14 (Max D. Paglin ed., 1989).

35. CONSUMER ELEC’S ASS’N, *supra* note 4.

36. *Id.*

37. *Id.*

38. *Id.*

39. *How Many TV Households Rely on Terrestrial? Depends on Whom You Ask*, TV TECH. (Aug. 1, 2013), <http://broadcastengineering.com/blog/how-many-tv-households-rely-terrestrial-depends-whom-you-ask>.

40. *Cross-Platform Report Q3 2011*, Media & Entertainment, NIELSEN 6 (Feb. 10, 2012), <http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2012-Reports/Nielsen-Cross-Platform-Report-Q3-2011.pdf> (finding 11 million broadcast-only households out of 115.1 million total TV households).

subscribership⁴¹ and the 90 percent of Americans who subscribe to pay-television.⁴² In order to determine whether broadcast television spectrum allocations are in the public interest, we must better understand the meaning of the public interest standard.

The FCC is authorized to grant spectrum allocations for limited periods to licensees who demonstrate that their proposed spectrum use will serve the “public interest, convenience, or necessity.”⁴³ The breadth and vagueness of this standard grants the FCC substantial flexibility in adhering to its mandate.⁴⁴ Although the origins of the public interest standard are unclear, one report states that a young lawyer to the Senate Interstate Commerce Committee suggested the phrase “public interest, convenience, or necessity” should be added to the Radio Act of 1927.⁴⁵ The Senator working on the bill thought “[t]hat sounded pretty good, so we decided we would use it.”⁴⁶ Thus began the challenging task of defining the public interest in regards to spectrum policy.⁴⁷

FCC decisions regarding what is in the public interest are granted “substantial judicial deference” because the requirement was created by a Congressional delegation to the FCC.⁴⁸ According to Krasnow and Goodman, the “flexibility inherent in this elusive public interest concept can be enormously significant to the FCC not only as a means of modifying policies” but also as a source of “hard-to-resolve controversy.”⁴⁹ Public interest may best be determined by considering many factors, such as low viewership.

Another such factor is broadcast spectrum’s enormous marketplace value for wireless broadband use. Basic economic theory suggests that people will pay more for services that they find more valuable.⁵⁰

41. OECD, *supra* note 6.

42. See NIELSEN, *supra* note 40.

43. 47 U.S.C. § 307 (2013).

44. Fed. Comm’ns Comm’n v. WNCN Listeners Guild, 450 U.S. 582, 596 (1981).

45. Erwin G. Krasnow & Jack N. Goodman, *The “Public Interest” Standard: The Search for the Holy Grail*, 50 FED. COMM. L.J. 605, 610 (1998).

46. *Id.*

47. “‘Public interest, convenience or necessity’ means about as little as any phrase that the drafters of the [Radio] Act could have used and still comply with the constitutional requirement that there be some standard to guide the administrative wisdom of the licensing authority.”

Louis G. Caldwell, *The Standard of Public Interest, Convenience or Necessity as Used in the Radio Act of 1927*, 1 AIR L. REV. 295, 296 (1930).

48. *WNCN Listeners Guild*, 450 U.S. at 596.

49. Krasnow & Goodman, *supra* note 45, at 626 (“Few independent regulatory commissions have had to operate under such a broad grant of power with so few substantive guidelines.”).

50. See Reem Heikal, *Economics Basics: Supply and Demand*, INVESTOPEDIA, <http://www.investopedia.com/university/economics/economics3.asp> (last visited on Mar. 27, 2014).

Therefore, to determine which use of spectrum is most in the public interest, one method is to auction the asset to the highest bidder. This theory underlies the rationale for Congress' authorization of spectrum auctions.⁵¹ The winning bidder at auction is the party that believes it has the highest economic value; consequently, the high bidder is likely to deploy the spectrum for use that is valued by the public. The FCC first recognized in the 1970s that "the marketplace could more efficiently determine the audience's needs and interests than could the government."⁵² Consequently, the FCC estimates that the market value of television broadcasting is between eleven and fifteen cents per megahertz-population (a standard measure of the number of people to which a wireless license facilitates communication).⁵³ The National Broadband Plan valued that same spectrum at over ten times that amount for broadband purposes.⁵⁴ Although not a dispositive indicator of public interest or public values, the extreme disparity of market valuations between broadcasting and broadband indicates that the public interest would be better served by allocating that spectrum to broadband.

When the first television licenses were granted to broadcast networks in 1940, the media landscape was vastly different.⁵⁵ The promulgation of media technologies in the early 21st century has dramatically shifted American's habits for media consumption.⁵⁶ The archetype of a family sitting down for the nightly broadcast news program is uncommon in the new media landscape.⁵⁷ In 2011, half of high school-aged people watched or read news online.⁵⁸ Most people today do not watch a nightly news program, but instead actively use between two and five online news sources.⁵⁹ Because the Internet enables two-way communication, 37 percent of Internet users say they have

51. See Thomas W. Hazlett et al., *What Really Matters in Spectrum Allocation Design*, 10 NW. J. TECH. & INTELL. PROP. 93 (2012).

52. Krasnow & Goodman, *supra* note 45, at 632.

53. NAT'L BROADBAND PLAN, *supra* note 30, at 89 (Megahertz pop is a measure of frequency based on population).

54. NAT'L BROADBAND PLAN, *supra* note 30, at 89 ("average spectrum valuation for mobile broadband use of \$1.28 per megahertz-pop").

55. See *1940-1949 C.E.*, UNIV. OF MINN., MEDIA HISTORY PROJECT (May 18, 2012), <http://www.mediahistory.umn.edu/timeline/1940-1949.html> ("1940: U.S. gets first regular TV station, WNBT, New York; estimated 10,000 viewers").

56. Julie Moos, *The Next Generation of News Consumers Relies on Social Media, TV, Web for Information*, POYNTER (Sep. 16 2011, 5:06 PM), <http://www.poynter.org/latest-news/mediawire/146205/the-next-generation-of-news-consumers-relies-on-social-media-tv-web-for-information/>.

57. *Id.*

58. *Id.*

59. Barry Silverstein, *4 Lessons Marketers Can Learn From How Consumers Get Their News*, REVENews (Mar. 3, 2010), <http://www.revenews.com/contextual-advertising/4-lessons-marketers-can-learn-from-how-consumers-get-their-news>.

contributed to news, commented about it, or disseminated it on social media.⁶⁰ Social news consumption and participation such as this was technologically unfeasible in the age of broadcast television and radio. Other information that was once transmitted over broadcast, such as product and brand information, is also now widely viewed online: “89 percent of consumers turn to [search engines] to find information on products, services or businesses prior to making purchases.”⁶¹ Finally, consumers turn to electronic devices—such as gaming devices, tablets, and mobile phones—with much of their entertainment time and budget.⁶² Consumers now spend more time consuming internet-delivered media than any other form, including television.⁶³ Broadcast television has very low viewership and is a low value use of scarce and valuable spectrum. The consumer has moved past television broadcasting, and the FCC should follow their lead.

B. Facilitating mobile broadband growth and stimulating economic growth

By reallocating all broadcast spectrum to broadband, the FCC would accommodate the exponential growth of mobile broadband usage and unleash wireless competition in the home broadband market. An expansion of wireless broadband might also stimulate economic growth and unleash further gains in productivity.

In order for wireless bandwidth to increase along with consumer demand, the amount of spectrum available for Americans’ phones, tablets and laptops to transmit and receive data must also increase. Unfortunately, “[t]he supply of spectrum, strictly speaking, is fixed . . . [A]t the end of the day there are only so many frequencies on the electromagnetic spectrum.”⁶⁴ Limited supply and increasing demand led David Salway, the Director of a state Broadband Program Office, to declare, “spectrum is king.”⁶⁵ Allocating more of the spectrum to

60. *Id.*

61. Brafton Editorial, *89 Percent of Consumers Use Search Engines for Purchase Decisions*, BRAFTON (Feb. 2, 2012), <http://www.brafton.com/news/89-percent-of-consumers-use-search-engines-for-purchase-decisions>.

62. *Infographic: Mobile Gaming Statistics 2011*, DIGITAL BUZZ BLOG (Aug. 2, 2011), <http://www.digitalbuzzblog.com/infographic-mobile-gaming-statistics-stats-2011>.

63. Jim Edwards, *TV Is Dying, and Here Are the Stats That Prove It*, BUS. INSIDER (Nov. 24, 2013, 10:11 AM), <http://www.businessinsider.com/cord-cutters-and-the-death-of-tv-2013-11> (discussing how funds are following viewership statistics.).

64. Jeffrey A. Eisenach, *Spectrum Reallocation and the National Broadband Plan*, 64 FED. COMM. L.J. 87, 101 (2011).

65. David Salway, *Spectrum is ‘King’ in Today’s Broadband World*, ABOUT TECHNOLOGY, <http://broadband.about.com/od/ma/a/Spectrum-Is-King-In-Todays-Broadband-World.htm> (last visited Sept. 10, 2014).

wireless broadband enables faster wireless speeds and greater wireless coverage. The Tech Policy Institute highlights six costs incurred when spectrum is allocated to inefficient uses such as “broadcast TV and mobile satellite services.”⁶⁶ These include: (1) impeding the development of wireless broadband; (2) higher prices and lower penetration for broadband; (3) higher prices for all wireless services in general; (4) delay of new services; (5) lost consumer surplus; and (6) forgone federal government auction revenues.⁶⁷ The report mentions that “it takes at least six years, and possibly over a decade” to reallocate spectrum; therefore, spectrum policy must be forward thinking.⁶⁸

The need to be forward thinking is especially acute given the potential for economic growth stimulated by spectrum reallocation. As more appliances and mobile devices are connected with high-speed wireless broadband, the spectrum resource will be further strained. According to Global Information Inc., if sufficient spectrum is made available by the FCC, “[t]he wireless industry could see a \$1.2 trillion revenue opportunity out of the connected devices market by 2020.”⁶⁹ Additionally, a report by OECD found that because “the Internet is poised to connect an ever-greater number of users, objects, and information infrastructures . . . [t]he policy framework governing its use and development also needs to be adaptable [and] carefully crafted.”⁷⁰ When wireless bandwidth increases, wireless Internet service provides “a platform for innovation, for new communication technologies, the provision of new products and services and access to an unparalleled wealth of information.”⁷¹

The global mobile market has become a driver of economic growth that supports jobs, tax revenues, and gross domestic product. The mobile industry is projected to support 9.8 million jobs worldwide by 2017 and mobile operators’ revenues contributed 1.4 percent to global GDP in 2013.⁷² Furthermore, contributions to public funding are projected to

66. Thomas M. Lenard, Lawrence J. White & James L. Riso, *Increasing Spectrum for Broadband: What Are The Options?*, TECH. POL’Y INST. (Feb. 2010), http://www.techpolicyinstitute.org/files/increasing_spectrum_for_broadband1.pdf.

67. *Id.*

68. *Id.*

69. *Connected Devices Market a \$1.2 Trillion Revenue Opportunity by 2020; M2M in Intelligent Building and Smart City Sectors to Bring in Billions*, PR NEWSWIRE (Oct. 18, 2012), <http://www.prnewswire.com/news-releases/connected-devices-market-a-12-trillion-revenue-opportunity-by-2020-m2m-in-intelligent-building-and-smart-city-sectors-to-bring-in-billions-174833011.html>.

70. Simon Forge et al., *Towards a Future Internet*, INTERNETFUTURES.EU, 14 (Feb. 2010), <http://www.internetfutures.eu/wp-content/uploads/2010/05/FI-interim-report.pdf>.

71. *Id.*

72. Mark Page et al., *The Mobile Economy 2013*, A.T. KEARNEY 54 (2013), http://www.atkearney.com/documents/10192/760890/The_Mobile_Economy_2013.pdf.

total \$550 million by 2017, “primarily as a result of spectrum fees as well as direct and indirect taxes.”⁷³ The potential for economic prosperity from increased mobile broadband is immense; the FCC should reallocate all broadcast spectrum to facilitate this growth.

C. The FCC should encourage evolution of the broadcasting business model

Contrary to the positive rhetoric of the National Association of Broadcasters (NAB) and other lobbying groups, ongoing viability of the broadcast television business model is uncertain.⁷⁴ By reallocating all broadcast spectrum to broadband, the FCC would encourage a transition to sustainable business models that hasten innovation in the evolving media landscape. It would accelerate the ongoing transition to internet-delivered media and consumer adoption of more efficient and powerful information services. Increasing demand for broadband spectrum and declining viewership of broadcast present a unique opportunity for the FCC to speed the adoption of next-generation information services.

The \$60 billion-a-year television broadcast industry is facing competitive pressures on many sides.⁷⁵ Online video providers such as Netflix and Amazon are nibbling away at subscribership.⁷⁶ MVPDs are raising red flags over the high fees that broadcasters charge for their content, known as retransmission consent.⁷⁷ These fees will reportedly total almost \$3 billion in 2015; according to SNL Kagan, \$1.3 billion of this will go directly to the broadcast networks “as their cut of fees that the distributor will pay network affiliates.”⁷⁸ One example of the growth in retransmission fees is that CBS “almost doubled the amount it made

73. *Id.*

74. See Christopher Versace, *Apple TV, Google Chromecast and Aereo Put Broadcast Television On Death Watch*, FORBES (Jul. 29, 2013, 10:14 AM), <http://www.forbes.com/sites/chrisversace/2013/07/29/apple-tv-google-chromecast-and-aereo-put-broadcast-television-on-death-watch/>; see also Mager, *supra* note 1.

75. See Liana B. Baker & Ronald Grover, *Tech upstarts threaten TV broadcast model*, REUTERS (Apr. 8, 2013, 2:17 AM), <http://www.reuters.com/article/2013/04/08/us-broadcaster-threats-idUSBRE9360E220130408>.

76. See David Carr, *More Cracks Undermine the Citadel of TV Profits*, N. Y. TIMES (Apr. 14, 2013), <http://www.nytimes.com/2013/04/15/business/media/more-cracks-in-televisions-business-model.html>.

77. *Id.*; see also *Protect TV Viewers and Allow Broadcasters to Continue Negotiating in the Free Market*, NAT'L ASS'N OF BROADCASTERS, <http://www.nab.org/advocacy/issue.asp?id=1891> (last visited Sept. 10, 2014).

78. Joe Flint, *Broadcast networks will rake in retransmission fees, report says*, L.A. TIMES BLOG (Nov. 1, 2011, 12:24 PM), <http://latimesblogs.latimes.com/entertainmentnewsbuzz/2011/11/broadcast-networks-retransmission-consent-fees.html>.

from retransmission fees” in 2012 over 2011.⁷⁹ Despite increasing retransmission fees, the broadcaster’s core business is under assault. As reported in Harvard Business Review, “[t]he vastly expanding worlds of alternatives for entertainment and education have put [broadcasters] in a position of struggling to hang on to audiences.”⁸⁰ The increasing pressure on MVPDs to provide a la carte programming, instead of large bundled channel packages, “could conceivably wreak havoc on their business models.”⁸¹ Although structural headwinds blowing against broadcasters are growing, two specific challenges that demonstrate the long-term challenges of TV broadcasting are Aereo and the Hopper.

Possibly most troubling for the broadcasters is the early success of small startup Aereo. To understand the threat posed by Aereo, one must consider the two pillars of revenue that support the current broadcasting industry. The first is advertising revenue, and the second is the retransmission fees paid by MVPDs to broadcast stations in exchange for their local content.⁸² Before retransmission fees, broadcasters made their money solely off ad revenue, “but increasingly the big networks are now relying on licensing fees to do business.”⁸³ Aereo threatened the latter pillar by using “teeny antennas [to] snatch ‘free’ content that broadcasters send over the airwaves, then charge customers subscription fees” to view it over the internet.⁸⁴ Federal courts twice struck down the broadcasters’ attempts to enjoin Aereo’s service.⁸⁵

The broadcasters found this threat to their business model so serious that two out of the four networks opened discussions to end TV broadcasting altogether.⁸⁶ Chase Carey, Chief Operating Officer of Fox’s parent company, told an audience at the NAB meeting, “the network will go cable-only if it loses its bid to stop Aereo.”⁸⁷ Jeff Bercovici, a Forbes analyst, believes this is more than empty rhetoric and that Fox could begin “phasing out their affiliate deals on a market-by-market basis,

79. Mari Silbey, *Why IP Video Could Signal The End Of Free Broadcast TV*, SMARTPLANET (May 11, 2012), <http://www.smartplanet.com/blog/thinking-tech/why-ip-video-could-signal-the-end-of-free-broadcast-tv/11587>.

80. Rita McGrath, *Broadcast TV Needs a New Business Model*, HARV. BUS. REV. BLOG (Apr. 24, 2013, 2:00 PM), <http://blogs.hbr.org/2013/04/watching-broadcast-tv-for-a-ne/>.

81. *Id.*

82. See *Retransmission Consent*, FED. COMM’NS COMM’N, <http://www.fcc.gov/encyclopedia/retransmission-consent> (last visited Sept. 10, 2014).

83. Silbey, *supra* note 79.

84. McGrath, *supra* note 80.

85. Baker & Grover, *supra* note 75.

86. Jeff Bercovici, *Holy Cow: Two of the Big Four TV Networks Are Considering Going Off the Air*, FORBES (Apr. 8, 2013, 1:54 PM), <http://www.forbes.com/sites/jeffbervovici/2013/04/08/holy-cow-two-of-the-big-four-tv-networks-are-considering-going-off-the-air/>.

87. *Id.*; see also Baker & Grover, *supra* note 75.

starting in the areas where Aereo has the most penetration while continuing to broadcast in places where it doesn't."⁸⁸ However, for now, the immediate threat Aereo posed to broadcasters has been neutralized.

In June 2014, a divided U.S. Supreme Court ruled in favor of the broadcasters.⁸⁹ In a much-maligned decision,⁹⁰ the Court held that Aereo functioned similarly to a traditional cable system and should be bound by the same licensing requirements.⁹¹ Aereo has responded by claiming that, if it is functioning as a cable provider, then it should be given the same compulsory license to broadcast content as satellite and cable providers.⁹² Other streaming TV services are springing up to take Aereo's place as an alternative to traditional broadcast and MVPD services.⁹³ Although the broadcasters were successful in this case, their revenue model will continue to be threatened by committed challengers wielding modern technology.

Broadcasters' advertising revenue is also being challenged by an MVPD, DISH Network. The Hopper, DISH's set-top box, allows for automatic recording of the broadcaster's primetime content using "Primetime Anytime."⁹⁴ DISH also provides "Autohop" functionality that automatically skips commercials during primetime shows when it is

88. See Jeff Bercovici, *Why the Networks' Threat to Stop Broadcasting Is Worth Taking Seriously*, FORBES (Apr. 10, 2013, 10:10 AM), <http://www.forbes.com/sites/jeffbercovici/2013/04/10/why-the-networks-threat-to-stop-broadcasting-is-worth-taking-seriously/>; see also Jeff Bercovici, *Aereo Vs.. The Networks: Is It All Over But The Crying?*, FORBES (Apr. 2, 2013, 3:05 PM), <http://www.forbes.com/sites/jeffbercovici/2013/04/02/aereo-vs-the-networks-is-it-all-over-but-the-crying>.

89. ABC v. Aereo, Inc., 134 S. Ct. 2498, 2511 (2014).

90. See Anders Bylund, *How the Supreme Court Flunked the Aereo Decision*, THE MOTLEY FOOL (Jun. 25, 2014) <http://www.fool.com/investing/general/2014/06/25/how-the-supreme-court-flunked-the-aereo-decision.aspx>; Bill Hoffmann, *Lawyer Janet Johnson: Court Decision on Aereo 'Wrong'*, NEWSMAX (Jun. 25, 2014, 5:21 PM), <http://www.newsmax.com/Newsmax-Tv/Janet-Johnson-Aereo-court-Betamax/2014/06/25/id/579283/>; Jerry Markon, Robert Barnes & Cecilia Kang, *Supreme Court rules against start-up Aereo, saying it is violating copyright laws*, WASH. POST (Jun. 25, 2014) http://www.washingtonpost.com/national/supreme-court-rules-against-startup-aereo-saying-it-is-violating-copyright-laws/2014/06/25/59756f88-fc6b-11e3-8176-f2c941cf35f1_story.html.

91. *Aereo*, 134 S. Ct. at 2511.

92. See Wendy Davis, *Aereo Pushes To Resume Service In 6 Western States*, MEDIA POST (Aug. 12, 2014, 4:19 PM), <http://www.mediapost.com/publications/article/231845/aereo-pushes-to-resume-service-in-6-western-states.html>.

93. Emily Steel, *After Supreme Court Ruling, Aereo's Rivals in TV Streaming Seize Opening*, N.Y. TIMES (Jun. 29, 2014), <http://www.nytimes.com/2014/06/30/business/media/after-supreme-court-ruling-aereos-rivals-in-tv-streaming-seize-opening.html>.

94. See John Brandon, *DISH Hopper With Sling*, WIRED (Mar. 11, 2013 6:30 AM), <http://www.wired.com/reviews/2013/03/dish-hopper/all>.

played back from a recording.⁹⁵ The broadcasters have sued, claiming regulatory and contract violations.⁹⁶ The District Court ruled in DISH's favor on a motion for summary judgment, finding that there was not sufficient evidence of copyright violation to constitute a likelihood of success, and that Fox was unlikely to suffer irreparable harm as a result of any contract violation.⁹⁷ On appeal to the Ninth Circuit Court of Appeals, the higher court affirmed the district court's ruling; DISH's users continue hopping through advertisements.⁹⁸ Threats to both retransmission consent and advertising revenue are shaking the foundations of the broadcasting business model.

If the distinction between "broadcast network" and "cable network" was eliminated, these challenges to the broadcast business model would be rendered null and void. In a media landscape where all networks have the same status, all content providers would be compensated by video distributors (cable, satellite, or otherwise) based on the quality of their content as measured by the demand of the market. The former broadcasters would still benefit from two revenue streams but retransmission consent would transform into a standard licensing fee, similar to what broadcasters now receive for their cable networks. Broadcasters would benefit because Aereo and similar "teensy antenna" services would have no signal to access. Over 90 percent of customers would see no change as they would simply continue to receive formerly broadcast networks over their cable or satellite system, alongside all other networks.

III. HOW TO RECLAIM BROADCAST SPECTRUM

Since the Radio Act of 1927, the FCC has been tasked with licensing wireless spectrum for the public's good.⁹⁹ With meager guidance, the FCC has broad authority to both define the public interest and determine which private entities should be authorized to implement that interest.¹⁰⁰ At the dawn of the television age, the FCC provided

95. *Id.*

96. See Eriq Gardner, *Read the Ruling on Fox's Motion for an AutoHop Injunction*, HOLLYWOOD REPORTER (Nov. 12, 2012, 7:32 PM), <http://www.hollywoodreporter.com/thresq/foxs-motion-an-autohop-injunction-389645>.

97. *Id.*

98. Corynne McSherry, *Victory for Fair Use and Consumer Choice: Ninth Circuit Rejects Networks' Appeal in Fox v. Dish*, ELEC. FRONTIER FOUND. (Jul. 24, 2013), <https://www.eff.org/deeplinks/2013/07/victory-fair-use-and-consumer-choice-ninth-circuit-rejects-networks-appeal-fox-v>.

99. See Fritz Messere, *Federal Radio Commission*, STATE UNIV. OF N. Y. – OSWEGO, <http://www.oswego.edu/~messere/FRCpage.html> (last updated Aug. 22, 1997).

100. 47 U.S.C. § 303 (2010).

licenses, free of charge, to the nascent broadcasting industry.¹⁰¹ At that time, there were few competing demands on wireless spectrum and no cost-effective way to disseminate media other than using broadcast. The boom in mobile data usage has increased demand for spectrum and compelled the FCC to reallocate scarce spectrum for broadband use. The FCC could reclaim the spectrum currently licensed to broadcasters by (1) failing to renew broadcaster's spectrum licenses when they expire, (2) requiring broadcasters to return their spectrum licenses prior to expiration in exchange for compensation, or (3) a combination of these approaches.

According to Musey, “[o]ne possible solution for reallocating the television broadcast spectrum is for the FCC to simply not renew the licenses of the television broadcasters at the end of their license periods.”¹⁰² However, Congress created barriers to this option by adding § 309(k) to the Communications Act, which complicates the FCC's ability to decline to renew station licenses.¹⁰³ Before failing to renew a broadcast license, the FCC must find that a station (1) failed to serve “the public interest, convenience, and necessity,” (2) made “serious violations” of the “rules and regulations of the Commission,” or (3) violated the rules and regulations of the Commission in a way that “constitute[s] a pattern of abuse.”¹⁰⁴ Even if the FCC determines a licensee has failed one of these standards and that the license should not be renewed, it must give notice and the opportunity for a public hearing on the issue.¹⁰⁵ Finally, it must consider whether any “mitigating factors justify the imposition of lesser sanctions” than not renewing a broadcaster's license.¹⁰⁶ These statutory requirements make it difficult for the FCC to fail to renew broadcast licenses.

These requirements in § 309 conflict with the FCC's authorization in § 301 to grant and revoke licenses according to the public interest standard. The FCC is only permitted to license the “use of . . . channels, but not the ownership thereof, by persons for limited periods of time.”¹⁰⁷ This requirement is important because it grants permanent ownership of the airwaves to the people, not the licensee. The law further clarifies that “no such license shall be construed to create any right, beyond the terms,

101. See MEDIA HISTORY PROJECT, *supra* note 55.

102. J. Armand Musey, *How the Traditional Property Rights Model Informs the Television Broadcasting Spectrum Rationalization Challenge*, 34 HASTINGS COMM. & ENT. L.J. 145, 164 (2012).

103. See 47 U.S.C. § 309(k) (2012).

104. § 309(k)(1)(A-C).

105. § 309(k)(3); § 309(e).

106. § 309(k)(3).

107. 47 U.S.C. § 301 (2012).

conditions, and periods of the license.”¹⁰⁸ Therefore, a licensee is not granted any right, implied or otherwise, that is not specified in the license itself. § 309 conflicts with this standard by granting additional rights in the form of renewal guarantees.¹⁰⁹ Because of this contradictory statutory authority, the FCC may still be able to fail to renew broadcast licenses simply by invoking its authority under § 301 and claiming that broadcasting is failing to serve the public interest, as is also permitted by § 309. Although the FCC may have the authority to decline all broadcast license renewal applications, the disparity between §§ 301 and 309 may require congressional clarification before broadcast license renewals can be widely declined. Congress should repeal § 309(k) to ensure the FCC has the authority to decline broadcast license renewals and encourage the FCC to exercise that authority.

The second option for reclaiming broadcast licenses would be to simply require broadcasters to return their licenses and compensate them accordingly. The FCC could exercise its authority under § 301 of the Communications Act, decide that broadcasters are not serving the public interest, and revoke their licenses.¹¹⁰ Although it is not under a statutory or regulatory obligation to do so, the FCC under this option should provide former broadcasters with compensation. Many broadcasters have been in business for years; it would be inequitable to so affect their livelihoods without just compensation.

The best option may be a combination of these two approaches. In this solution, the FCC would offer to compensate broadcasters in exchange for their broadcast licenses. The compensation would be set by a national formula that treats all broadcasters fairly and accounts for the cost of moving to purely MVPD and online delivery. To encourage broadcasters to voluntarily give up their licenses, the amount of compensation would decrease over time as a broadcaster’s license nears expiration. Broadcasters would also be notified that the FCC would not be renewing any broadcast television licenses. Although many broadcasters would object to transitioning away from broadcast, their costs of operation might actually decrease, as they would no longer require expensive broadcast systems.¹¹¹

Critics of this option might claim that this plan is not voluntary in any way, as broadcasters must either take compensation or lose their licenses once they expire. Although an accurate critique, the plan could

108. *Id.*

109. § 309(k)(3).

110. *See* § 301.

111. *See Television Station Construction Costs*, NAT’L TELECOMM. & INFO. ADMIN., http://www.ntia.doc.gov/legacy/otiahome/ptfp/application/EquipCost_TV.html (last updated Jan. 12, 2011).

be executed over a long enough time period to minimize pain to the broadcasters and provide them with just compensation. The FCC is currently crafting rules for a voluntary “incentive auction” whereby broadcasters are paid to voluntarily leave the airwaves.¹¹² This option will hopefully reclaim a large swath of broadcast spectrum, but will not reclaim nearly as much as declining all broadcast license renewal applications.¹¹³ To maximize the aforementioned benefits, the FCC should exercise its § 301 authority and end broadcast television.

IV. OBJECTIONS TO RECLAIMING ALL BROADCAST SPECTRUM

Because this proposal represents a paradigmatic shift in spectrum use and licensing, there would be many objections to its implementation. Furthermore, the options for ending television broadcasting are currently politically unfeasible. The National Association of Broadcasters (NAB) is a powerful lobbying organization and has led opposition to even the voluntary spectrum reclamation plan outlined for the Incentive Auction.¹¹⁴ Groups of station owners claimed that the Incentive Auction would be “contrary to the public interest” and rob them of the value of their spectrum.¹¹⁵ Congress and the FCC would be hesitant to incur the wrath of industry lobbyists who would likely paint spectrum reclamation as the murder of a classic American industry. There is a kind of romance around classic broadcasting—the image of a family gathered around the television for a cherished nightly program—that would be invoked during this debate. However, broadcasting is merely a method of delivery and the vast majority of Americans have already left it behind. Policymakers and politicians should consider the costs of continuing to broadcast TV when Americans’ viewing habits and technology have shifted so drastically.

Another objection to ending television broadcasting is that it would have a disruptive effect on local broadcast channels. One of the FCC’s foremost goals for broadcasting has long been “localism.” Local broadcast channels clearly serve this goal by providing locally tailored news and entertainment to their communities. Currently, local stations

112. See *Incentive Auctions*, FED. COMM’NS COMM’N, <http://www.fcc.gov/incentiveauctions> (last viewed Mar. 28, 2014).

113. See *id.*

114. See Testimony of NAB EVP Rick Kaplan on Incentive Auction Implementation to the U.S. House Subcommittee on Communications and Technology (Jul. 23, 2013), available at <http://www.nab.org/documents/newsroom/pressRelease.asp?id=3185>.

115. John Eggerton, *Group Owners: FCC’s Spectrum Reclamation Plan Would Be Unlawful*, BROAD. & CABLE (Apr. 27, 2011, 4:33 PM), http://www.broadcastingcable.com/article/467399-Group_Owners_FCC_s_Spectrum_Reclamation_Plan_Would_Be_Unlawful.php.

receive advertising revenue and some funding from retransmission consent. In a post-broadcast landscape, how would local broadcasters be compensated for their media?

The local programming currently sent over broadcast airwaves could still reach consumers in the way that 90 percent of viewers receive it already (through MVPDs) and over the Internet. Similarly to the national networks, local stations would be compensated for their content by the MVPDs that already carry it. They would also continue to receive the increasing share of revenues that come from online advertising. It should be recognized that small local broadcasters might lack the market power to fairly negotiate licensing fees for their content with the much larger MVPDs. To level the playing field, the FCC could implement mandatory carriage (similar to today's must-carry provisions) for local channels on MVPD systems. As more consumers receive their media through the Internet, the FCC could consider policies that compensate local channels based on online viewership. Although the challenges for local channels presented by the end of broadcasting are myriad, they are not insurmountable.

Finally, opponents of ending broadcast television reasonably claim that doing so is unnecessary if there is no need for more wireless broadband spectrum. There is debate around whether the spectrum crunch described by the National Broadband Plan is actually occurring in the marketplace.¹¹⁶ The CEO of Verizon Wireless has even questioned the need for more spectrum for mobile broadband.¹¹⁷ But critiques such as these fail to fully consider the projected future growth of broadband use and many come from sources with deep vested interests in keeping broadband spectrum off the market.

Wireless broadband use is predicted to show strong growth over the coming years. Cisco Systems believes that "mobile data traffic will grow by a factor of 18 by 2016, and Bell Labs predicts it will increase by a factor of 25."¹¹⁸ This prediction shows steep increase despite presuming that most consumers will not use high-speed wireless for home broadband access. By vastly expanding the spectrum available for wireless broadband, it could become a viable alternative to wired broadband in the home, spurring competition and lowering costs for all subscribers. Furthermore, some critics of spectrum reclamation have an

116. John Eggerton, *Verizon CEO Does Not Back FCC Spectrum-Reclamation Proposal*, BROAD. & CABLE (Apr. 8, 2010, 3:08 PM), http://www.broadcastingcable.com/article/451209-Verizon_CEO_Does_Not_Back_FCC_Spectrum_Reclamation_Proposal.php.

117. *Id.*

118. David Talbot, *The Spectrum Crunch That Wasn't*, MIT TECH. REVIEW (Nov. 26, 2012), <http://www.technologyreview.com/review/507486/the-spectrum-crunch-that-wasnt/> (last updated Jan. 2, 2013).

incentive to keep more of the spectrum unavailable for wireless broadband. A leading mobile carrier may actually desire a spectrum crunch as spectrum scarcity increases the value of their licenses.¹¹⁹ Criticism from those with a deeply vested interest in the status quo should be considered with suspicion. The FCC answers to the American people and should allocate the wireless spectrum in the way most beneficial to the majority of Americans, not to vested interests.

V. TOWARDS A NEW SOCIAL CONTRACT

Rather than facilitating antiquated broadcast television, the FCC should usher in a new social contract that recognizes the growth of the information age and ensures all Americans have access to the opportunity it provides. The Internet has enabled new types of interactive media that provide more social benefit than the few video channels supplied by broadcast television. Furthermore, home broadband access provides opportunities for enhanced childhood education and economic opportunity. The FCC should encourage the deployment of fast, reliable home broadband at reasonable prices.

This proposal for reclaiming broadcast spectrum and reallocating it to broadband could increase affordable home broadband access in two ways. First, increasing the spectrum available for wireless broadband could spur competition, reduce consumer costs, and increase speeds for home broadband by providing a viable wireless alternative to wired options. Second, funds raised by auctioning broadband spectrum could be used to subsidize broadband access for low-income Americans and those that live in high-cost areas. These complementary benefits can be realized by reallocating spectrum to broadband and raising substantial funds from spectrum auctions.

By allocating more of the spectrum for wireless broadband and imposing reasonable network build-out requirements, the FCC could make wireless internet a more competitive home broadband alternative to wired service. Most Americans subscribe to a wired home broadband service because the speed and reliability of those services vastly exceed the wireless options available to them.¹²⁰ As discussed herein, more available spectrum for consumer data transmission means more potential bandwidth for those transmissions.¹²¹ Therefore, increasing the spectrum

119. See John Alden, *Exploring the Value and Economic Valuation of Spectrum*, INT'L TELECOMM. UNION (Apr. 2012), http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_SpectrumValue.pdf.

120. See *Eighth Broadband Progress Report*, FED. COMM'NS COMM'N, <http://www.fcc.gov/reports/eighth-broadband-progress-report> (last visited Mar. 28, 2014).

121. See Shannon, *supra* note 21.

available for wireless Internet may increase the speed and reliability of wireless broadband services enough to transform it into a viable competitor to wired broadband. Because building wired options to residences is extremely capital-intensive, wireless could be a more cost-effective way to increase competition and drive down costs. A viable wireless home broadband option is valuable if Americans need more competition in home broadband, and if an increase in choices for home broadband will actually drive down consumer costs.

Although most consumers have more than one option available to them for home broadband, the speed and costs of these services often vary dramatically.¹²² More troubling, the United States lags behind other industrialized countries in measures of broadband speeds and costs.¹²³ From 2012 to 2013, “[a]lthough international service providers . . . generally offer higher speeds at much lower prices, prices and speeds have stayed about the same in the United States.”¹²⁴ For instance, Verizon’s plan for a 500 Megabits per second (Mbps) download and 100 Mbps upload costs about \$300 a month where it is available in the United States; residents of Amsterdam enjoy “a symmetrical 500 Mbps broadband plan” for around \$86 a month.¹²⁵ The country that pioneered the consumer Internet is sadly lagging behind in the Internet Age due to insufficient competition and consumer choice.

Competition has a direct correlation with the speeds and availability of broadband coverage in the United States. This makes sense because the principle of supply and demand suggests that prices will be inflated where there is high demand for broadband with few providers. As of 2010, only 9 percent of Americans had access to three or more broadband providers.¹²⁶ Lack of competition has a direct effect on the affordability and quality of broadband: studies show that the “most affordable and fast connections are available in markets where consumers can choose between at least three competitive service providers.”¹²⁷ Other studies have also shown that the competitiveness of a market drastically affects the price of broadband.¹²⁸ It is important to note that the cost of transporting data is very low once the infrastructure is in place, as illustrated by the low costs of long-distance data transport,

122. *Eighth Broadband Progress Report*, *supra* note 120.

123. *See* Hussain et al., *supra* note 10.

124. Hussain et al., *supra* note 10.

125. *Id.*

126. *See* NAT’L BROADBAND PLAN, *supra* note 30.

127. Hussain et al., *supra* note 10.

128. Stacey Higginbotham, *Econ 101: Competition Lowers Broadband Costs*, GIGAOM (Oct. 3, 2012, 06:31), <http://gigaom.com/2012/10/03/econ-101-competition-lowers-broadband-costs/>.

so this is not a valid justification for high prices.¹²⁹ Furthermore, more competition in home broadband would push existing, incumbent wired providers to provide better service and lower prices.

These principles played out when Google introduced Google Fiber and disrupted both elements of broadband service (speed and price) by providing 1 Gbps (“gigabit”) speeds for prices rivaling nearly any international market. Already, there are signs that this competition is driving incumbents to lower prices and increase speeds. AT&T has announced its intention to launch gigabit service in select markets, apparently in response to Google’s service.¹³⁰ CenturyLink also released a list of “gig cities” to which it will be bringing gigabit internet service in the coming months.¹³¹ This competition has also decreased prices on the lower-speed end of the market; Comcast increased the speed of its low-income offering to match Google’s service.¹³² According to Stacey Higginbotham of GigaOm, the “big lesson in broadband pricing” is that “competition matters.”¹³³ Although these effects were felt by a challenger pushing the boundaries of broadband speed, the same benefits of competition could be realized by introducing low-cost services in the more modest speeds offered by 4G LTE wireless services.

In sharp contrast to wired broadband speeds, the United States has become a leader in wireless data speeds.¹³⁴ As of August 2013, Verizon Wireless’s LTE network covered a population of 301 million Americans.¹³⁵ Although Verizon was the early leader in LTE, all four major national carriers deployed or expanded their LTE network and all ended 2013 with at least 200 million people covered.¹³⁶ Actual speeds in

129. *Id.*

130. Stacey Higginbotham, *Take That, Google: AT&T Ups the Ante with Plans for Its Own Austin Gigabit Network*, GIGAOM (Apr. 9, 2013, 11:17), <http://gigaom.com/2013/04/09/take-that-google-att-ups-the-ante-with-plans-for-its-own-austin-gigabit-network/>.

131. *CenturyLink Expands Its Gigabit Service to 16 Cities, Delivering Broadband Speeds up to 1 Gigabit per Second*, CENTURYLINK NEWSROOM, (Aug. 5, 2014) <http://news.centurylink.com/news/centurylink-expands-its-gigabit-service-to-16-cities-delivering-broadband-speeds-up-to-1-gigabit-per-second>.

132. Stacey Higginbotham, *Want to See the Impact of Google Fiber? Look to Comcast*, GIGAOM (Aug. 13, 2013, 09:07), <http://gigaom.com/2013/08/13/want-to-see-the-impact-of-google-fiber-look-to-comcast/>.

133. *Id.* at ¶ 6.

134. See Phil Goldstein, *Progress Report: A Snapshot of U.S. LTE Deployments in 2013*, FIERCEWIRELESS (Aug. 14, 2013), <http://www.fiercewireless.com/special-reports/progress-report-snapshot-us-lte-deployments-2013>; see also *Wireless Quick Facts*, CTIA: THE WIRELESS ASSOCIATION, <http://www.ctia.org/your-wireless-life/how-wireless-works/wireless-quick-facts> (follow “World Leader” hyperlink) (last visited Nov. 14, 2014) (“The U.S. has 5% of the world’s wireless subscribers, but 47% of its LTE subscribers.”).

135. *Verizon Wireless – LTE in 2013*, FIERCEWIRELESS (Aug. 14, 2013), <http://www.fiercewireless.com/special-reports/verizon-wireless-lte-2013>.

136. Goldstein, *supra* note 134.

large cities ranged from six to ten Mbps in August 2013.¹³⁷ However, with more robust coverage and infrastructure, a five megahertz LTE channel has a peak data rate of 37.8 Mbps.¹³⁸

This capacity limit depends, first and foremost, on channel bandwidth. In other words, if more spectrum is available, a channel can transmit more data.¹³⁹ With a 20 MHz channel, the maximum compatible with LTE,¹⁴⁰ the potential bandwidth rises to 326 Mbps.¹⁴¹ The successor technology to LTE, LTE-Advanced, will allow even more impressive speeds by increasing maximum channel usage to 100 MHz and allowing transmissions that aggregate spectrum in different frequencies.¹⁴² This could increase maximum LTE speeds five-fold. Finally, next-generation “5G” wireless services have been tested to reach speeds over a gigabit.¹⁴³ Most customers will not realize this potential because it is dependent on the number of users, distance from the cellular tower, interference from other wireless devices, and other factors.¹⁴⁴ But, according to a FCC report, even the speeds realized with current LTE deployments are sufficient to handle today’s home broadband needs.¹⁴⁵

Freeing more of the spectrum for wireless broadband would allow wireless carriers to provide higher speeds in a more cost-effective way than deploying expensive technology upgrades. As the spectrum is deployed by wireless carriers, customers would enjoy faster data rates and less congestion on current networks. Critics of wireless Internet use

137. Charlie Osborne, *The Largest 10 US Cities and Their 4G LTE Coverage Rank in 2013*, ZDNET (Oct. 2, 2013, 22:54), <http://www.zdnet.com/uk/the-largest-10-us-cities-and-their-4g-lte-coverage-rank-in-2013-7000021470/>.

138. Frank Rayal, *LTE Peak Capacity Explained: How to Calculate It?*, FRANK RAYAL: STRATEGIC INSIGHTS & OPINIONS ON THE WIRELESS INDUSTRY AND TECHNOLOGIES (Jun. 27, 2011), <http://frankrayal.com/2011/06/27/lte-peak-capacity/>.

139. See Shannon, *supra* note 21.

140. Ariel Bleicher, *LTE-Advanced Is the Real 4G*, IEEE SPECTRUM (Dec. 31, 2013, 18:00 GMT), <http://spectrum.ieee.org/telecom/standards/lte-advanced-is-the-real-4g>; see also Joe White, *T-Mobile to Bring Enhanced 4G LTE Network to the Masses*, APPADVICE (Dec. 7, 2013), <http://appadvice.com/appnn/2013/12/t-mobile-to-bring-enhanced-4g-lte-network-to-the-masses>.

141. MOTOROLA, *Realistic LTE Performance – From Peak Rate to Subscriber Experience*, LTE PORTAL.COM BROADBAND SOLUTIONS, INC. (2009), http://www.lteportal.com/Files/MarketSpace/Download/_Realistic_LTE_Experience_WhitePaper_Motorola_August2009.pdf.

142. Bleicher, *supra* note 140.

143. Catherine Shu, *Samsung to Launch 5G by 2020, Hits Speeds of 1Gbps in Tests*, TECHCRUNCH (May 12, 2013), <http://techcrunch.com/2013/05/12/samsung-to-launch-5g-by-2020-hits-speeds-of-1gbps-in-tests/>.

144. MOTOROLA, *supra* note 141.

145. See FED. COMM’NS COMM’N, *Household Broadband Guide*, FEDERAL COMMUNICATIONS COMMISSION, <https://www.fcc.gov/guides/household-broadband-guide> (last visited Mar. 28, 2014) (stating that “high-demand application[s]” require a service of “6 to 15 Mbps”).

for home broadband cite the inherent limits of wireless and common data caps. They highlight that a wired connection will almost always be more reliable and faster than a wireless connection because of the potential for interference in wireless transmissions. Although true, this view does not adequately consider that, in reality, all wireless connections are wired. For instance, a Wi-Fi connection is wireless only from the router to the device (usually less than 50 feet); in the same way, a cellular connection is only wireless from the cellular tower to the device. By increasing the amount of spectrum available for wireless broadband, that technology's ability to compete with wired connections increases dramatically. Building a cellular tower to serve multiple homes is more cost effective than building new wired connections to every residence in the same area.¹⁴⁶ Although there are benefits to having a wired connection, LTE connections are up to the task of serving home broadband needs if there is sufficient wireless spectrum and incentive to build robust networks.

Wireless home broadband faces the more substantial critique that wireless carriers have imposed stringent data caps that render the service unfit for home usage. This concern is legitimate as many carriers impose data limits far below the amount of data most consumers use for home broadband.¹⁴⁷ Current high prices may be justified by the substantial investment that United States wireless carriers have made in next-generation services.¹⁴⁸ Regardless, the FCC could condition the auction of broadcast spectrum upon loosened or eliminated data caps for some or all consumer subscriptions. Although this may raise or eliminate data caps amongst the big carriers, it could also reduce the amount that they would be willing to pay for the licenses. In turn, the lower auction revenues would negatively affect the second pillar of the new social contract: subsidizing home broadband service.

Allocating more of the spectrum to wireless broadband could make it a viable alternative to wired service and auctioning the spectrum would provide funds subsidize home broadband for low-income Americans and

146. See *Wireless Broadband and Other Fixed-Wireless Systems: Broad Fundamentals*, NETWORK COMPUTING, <http://www.networkcomputing.com/netdesign/bb2.html> (last visited Mar. 28, 2014).

147. See *Fixed Wireless vs Mobile Broadband, and Cable Providers*, WONDERWAVE INTERNET (Aug. 25, 2012), <http://wonderwave.net/fixed-wireless-vs-mobile-broadband-and-cable-providers>.

148. See *Policy & Initiatives: Broadband*, CTIA: THE WIRELESS ASSOCIATION, <http://www.ctia.org/policy-initiatives/policy-topics/broadband> (last visited Nov. 14, 2014) (“U.S. wireless providers invested . . . \$94 per subscriber” while their “global counterparts” invested “\$16 per subscriber.”); see also Scott Moritz, *Verizon Profit Beats Estimates as Wireless Revenue Grows*, BLOOMBERG (Oct. 17, 2013, 14:33), <http://www.bloomberg.com/news/2013-10-17/verizon-misses-beat-estimates-on-solid-subscriber-additio.html> (Verizon “expects capital spending . . . to be \$16.6 billion this year, at the top of the company’s earlier projected range”).

those living in underserved areas. How to deploy these funds to maximize their impact presents a serious challenge. The FCC's Universal Service Fund (USF) is the foremost mechanism in the United States for subsidizing communications services. The National Broadband Plan suggested that the FCC pivot its focus from telephone service to broadband Internet subsidies. The funds from broadcast auctions could be deployed to further this goal. Although an in-depth consideration of USF reforms is outside the scope of this analysis, these reforms would be greatly aided by the infusion of billions of dollars from auction revenues.

The most significant reform of the USF consisted of the establishment of the Connect America Fund (CAF).¹⁴⁹ The CAF was established to provide "targeted support for broadband deployment."¹⁵⁰ Unfortunately, the success of these USF reforms efforts is questionable. Blair Levin, the leading author of the National Broadband Plan, commented that the USF reforms have "resulted in minimal deployments in the most problematic unserved areas identified in the Plan, a slow down of deployment in other areas, consumers paying more, [and] a failure to anticipate future needs."¹⁵¹ Although the current reforms maintain support for telephone, any funds raised in this auction should be limited to broadband support as this would simplify the subsidy programs and encourage transition to Internet-delivered media. A simplified fund could reduce the incentives for waste and abuse that Levin noted in the current reform efforts.

Given the importance of home broadband access, some commentators have advocated for an AT&T-style monopoly to be granted to a broadband provider in exchange for a guarantee of reasonable costs and low prices. The FCC's effort to connect all Americans with plain old telephone service (POTS) is seen as a 20th century success story.¹⁵² For the first time, loved ones could hear each other's voices instantly from many miles apart. This was accomplished, in part, by granting one company (American Telephone & Telegraph (AT&T)) a monopoly on telephone service.¹⁵³ Despite America's historical distaste for monopoly, it was believed that telephone service was a natural monopoly that required heavy regulation.¹⁵⁴ By granting a

149. See *Connect America Fund (CAF)*, FED. COMM'NS COMM'N, <http://www.fcc.gov/encyclopedia/connecting-america> (last visited Mar. 29, 2014).

150. Judith A. Endejan, *Blockbuster FCC Order Pulls Regulation into the Twenty-First Century*, 28 COMM. LAW. 1, 2 (2012).

151. Blair Levin on *Universal Service Fund Reform, and 'Better and Cheaper Broadband'*, ONE ECON. (Apr. 2013), <http://www.one-economy.com/blair-levin-on-universal-service-fund-reform-and-better-and-cheaper-broadband/#.UmIKUFckpRh>.

152. See NAT'L BROADBAND PLAN, *supra* note 30.

153. *Id.*

154. *Id.*

monopoly and allowing it to collect fees from low-cost areas (primarily, cities) to subsidize development of high-cost areas (primarily, rural), the nation was connected to a national communications grid.

This relative success begs the question: Why doesn't the FCC pursue a similar strategy to encourage the growth of home broadband? A single broadband provider could be protected from competition in exchange for connecting the nation to high-speed service. However, the technological and competitive landscapes are very different than those confronted by the FCC during the 20th century. There are many technologies to provide broadband Internet service to the home: cable, high-speed DSL, fixed wireless, mobile wireless, and high-speed satellite are all widely available. In mobile broadband alone, "82 percent of the U.S. population has a choice of at least four wireless broadband providers and approximately 92 percent of Americans are served by three or more providers."¹⁵⁵ Even in areas unserved by a high-speed wired option, satellite broadband technology provides 12 Mbps download speeds almost anywhere in the United States.¹⁵⁶ This multiplicity of technology offerings and cross-competitive landscape suggests that broadband is not a natural monopoly as the FCC considered POTS to be. Because Internet service is provided by many technologies and providers, monopoly regulation is not the best way to increase consumer access and decrease costs.

These two pillars of a new social contract—increased use of wireless for home broadband and subsidized broadband for low income Americans—justify the costs of suspending broadcast television. Millions of Americans could benefit from affordable, reliable home broadband connections that help them to fully participate in the new digital economy.

CONCLUSION

All of the wireless spectrum currently allocated for television broadcasting should be reallocated for wireless broadband use. Reclaiming this spectrum would fund the establishment of a new social contract oriented around the technology most Americans now use to consume their news, entertainment, and information: the Internet. This new social understanding would be built on two pillars: the increased availability of wireless for home broadband and subsidization of home

155. Implementation of §§ 6002(b) of the Omnibus Budget Reconciliation Act of 1993, *Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services*, 28 FCC Rcd. 3700, 4033 (2013).

156. See *High-Capacity Satellite System*, VIASAT, <http://www.viasat.com/broadband-satellite-networks/high-capacity-satellite-system> (last visited Mar. 29, 2014).

broadband for low-income and underserved populations.

Broadcast television viewership is anemic. This under-utilization of a scarce, valuable resource is not acceptable in light of the FCC's statutory obligation to license the wireless spectrum in accordance with the public interest. Reallocating this spectrum to wireless broadband—a service that over 90% of Americans avail themselves of—would result in far higher value use. Furthermore, the television broadcasting business is out of line with American media consumption habits and should be encouraged to evolve to a more forward looking model. Broadcast spectrum could be reclaimed by failing to renew broadcasters' licenses upon their expiration or by an incentive structure that encourages voluntary return of broadcast television licenses.

Admittedly, this proposal is currently unfeasible given the strength of the broadcast television lobby and the large number of broadcast employees who justifiably fear the risk to their livelihoods. But the writing is on the wall for television broadcasting. The FCC should remember its role as arbiter of the public good with respect to spectrum policy, and seriously consider whether television broadcasting is serving that good.

