

Feeding the Beast: Addressing the Internet’s Insatiable Power Consumption

KEVIN HOTCHKISS*

ABSTRACT

The Internet has a seemingly endless hunger for electricity; a hunger which will only continue to grow at a rapid rate. By 2025, the Internet may be the fifth largest power consumer in the world. With growing concern about climate change, and resolutions such as the United Nations Sustainable Development goals, the United States needs to begin considering how to make the Internet more power efficient. The most energy efficient means for the Internet to exist is a complete fiber to home network that spans the entire country, but there are many economic barriers that prevent full development of a fiber to home network.

In order to combat the economic barriers that block the development of a completely fiber broadband infrastructure, the United States should create broadband cooperatives. Broadband cooperatives combine public funding with private ownership and eliminate corporate barriers to proper development of expensive infrastructure. There is strong historical precedents to the success of cooperatives, and this approach would likely appeal to all sides of the political spectrum. Faced with the near imminent danger of climate change, and the Internet’s continuously growing appetite for electricity, the United States needs to look to the past to pave a way to the future.

TABLE OF CONTENTS

Introduction	124
I. The Internet’s Growing Energy Appetite: The Internet of Things	125
II. Economics of the Internet Infrastructure: Capitalism and the FCC.	129
III. Initial Public Experiments and the Telecommunications Lobby.	133
A. A Spark of Hope: The Initial Success of Municipal Fiber	133
B. Roadblocks to Municipal Broadband.	135
C. The Federal Communication Commission’s Ability to Act	138
IV. The Road ahead: Utilizing History to Pave the Way for the Future	140
A. Reclassifying Broadband as a Common Carrier	140

* Georgetown Law, J.D. expected 2020; Excelsior College, B.S. 2017. Many thanks to Professor Julie Cohen for her advice, feedback, and guidance as I wrote this Note. I would also like to thank the editors and staff members of The Georgetown Environmental Law Journal who have helped prepare this Note for publication. © 2019, Kevin Hotchkiss.

B. Creating Broadband Cooperatives	141
Conclusion	144

INTRODUCTION

In 2015, all member states of the United Nations adopted Sustainable Development Goals to be achieved by 2030.¹ This Note will explore an issue that rests at the intersection of the seventh goal, to ensure access to affordable, reliable, sustainable and modern energy for all; the eighth goal, to promote economic growth and employment for all; and the ninth goal, to build resilient infrastructure that will foster innovation.² One major use of energy in today's economy is technology, specifically, the technology that enables access to the Internet. In 2016, it took over seventy-billion kilowatt hours to run the Internet, and it is estimated that by 2020 the Internet will require at least seventy-three-billion kilowatt hours per year.³ To put this number in perspective, 70 billion kilowatt hours is "equivalent to about 8 big nuclear reactors, or twice the output of all the nation's solar panels."⁴ Yet the current national strategy in the United States is to deploy an Internet infrastructure that will require even more power.

There is another option; this Note will posit that the United States should deploy a strategy to build a fiber to home network to support the country's basic Internet infrastructure. This infrastructure, in turn, will help the nation ensure access to sustainable energy, will promote economic growth and employment, and will itself be a resilient infrastructure that will foster innovation. Whereas wireless 4G and 5G networks are fast, efficient, and cheap, they are far less energy efficient than hard-wired fiber networks. 3G wireless technology required fifteen times more energy than fiber, 4G wireless technology required twenty-three times more energy, and 5G is expected to require significantly more power than 4G due to the increased amount of small-cell antennas necessary.⁵ Collectively, this means that despite having the technological means available to create fiber-to-home networks, the Federal Communications Commission (FCC) is pushing a less energy efficient network that will have a higher carbon footprint.⁶

1. G.A. Res. 70/1, Transforming our world: the 2030 Agenda for Sustainable Development, ¶ 3, (Sep. 25, 2015).

2. *Id.*

3. Christopher Helman, *Berkeley Labs: It Takes 70 Billion Kilowatt Hours A Year to Run the Internet*, FORBES MAG. (Jun. 28, 2016), <https://perma.cc/UG8H-8HWK>.

4. *Id.*

5. Ctr. for Energy-Efficient Telecomms., *The Power of Wireless Cloud*, BELL LABS & UNIV. OF MELBOURNE (Apr. 2013), <https://perma.cc/6MY4-CJ76>.

6. *Id.*

Unfortunately, the FCC is supporting the growth of 4G and 5G networks and limiting local governments' control of their own Internet infrastructure.⁷ Recently, the FCC proposed to cut fees and costs of deploying new 5G networks by limiting how much local governments can charge Internet service providers for installation.⁸ Many local governments have complained that the fees listed are *de minimis* when measured against the cost that the city incurs during installation of 5G small cells.⁹ The FCC's cost cutting provisions are part of a large national strategy to expedite the deployment of the 5G network.

This Note focuses on the dichotomy between the United States fulfilling its pledged sustainable development goals, and a market which is not incentivized to produce the sustainable infrastructure that the sustainable development goals demand. In Part I, this Note examines the problem—the energy hungry Internet and its growing need for power, and, how the United States' broadband deployment strategy is at odds with the United Nations' Sustainable Development Goals. Part II then explores how the problem got to where it is today. Part III examines the federal, state, and local barriers fiber infrastructure faces and discusses the steps cities have taken to solve this problem for themselves. Finally, in Part IV, this Note draws parallels to the past in order to propose a solution which may guide the United States to creating a sustainable, high-tech, and secure infrastructure.

I. THE INTERNET'S GROWING ENERGY APPETITE: THE INTERNET OF THINGS

The Internet is a huge consumer of electricity. By 2025, the Internet could consume one fifth of the world's energy as the world's data generation grows and the "Internet of things" spreads.¹⁰ Some of the Internet's growing energy appetite is due to the concept of the "Internet of things," where everyday devices such as lightbulbs, refrigerators, and cameras connect to the Internet, which will only increase the amount of power that the Internet and wireless technologies consume.¹¹ Part I of this Note will explore how energy is consumed when it comes to broadband access, and what forms consume the most energy. These statistics will be examined in light of the United Nations' sustainable development goals and call to question how the United States can meet these goals without lowering its energy consumption as a country and while still improving the nation's infrastructure.

7. See generally, Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment, 83 Fed. Reg. 19440 (July 2, 2018) (to be codified at 47 C.F.R. pt. 1).

8. *Id.*

9. Jon Brodtkin, *FCC Angers cities and towns with \$2 billion giveaway to wireless carriers*, ARS TECHNICA (Sept. 21, 2018), <https://perma.cc/2KBG-LHE5>.

10. John Vidal, *'Tsunami of data' could consume one fifth of global electricity by 2025*, GUARDIAN (Dec. 11, 2017), <https://perma.cc/S9ZS-5HVF>.

11. Ctr. for Energy-Efficient Telecomms., *supra* note 5.

Wired Internet consumes considerably less electricity than wireless Internet. A common misconception when discussing Internet power consumption is that data centers are responsible for the lion's share of energy consumption; however, this is not true. Data centers are responsible for only 9% of the Internet's power consumption, with wireless technologies consuming 91% of the power required to fuel the Internet.¹² As previously stated, the Internet required seventy-billion kilowatt hours to run in 2016, but it is important to note that this is only for traditional wired Internet and data centers that process the data.¹³ Wireless networks such as 3G, 4G, and 5G require tremendous amounts of power, especially in comparison with their wired counterparts.¹⁴ The power consumption of 5G is speculated and contested because the network is not yet fully deployed. Some experts say that 5G will require less power, despite it requiring significantly more antennas than 4G, because the antennas will require less energy to run and will only run when they are in use.¹⁵ Other experts, however, have refuted this point by stating that even though 5G antennas will only consume power when they are in use, in most areas, they will be in use a vast majority of the time due to the nature of the mesh network.¹⁶ A user attempting to access the Internet through the 5G network will connect to the closest antenna, and then move through the mesh network of antennas.¹⁷ Although antennas may not be in use at all times, in high population areas which will have the highest concentration of antennas, it is unlikely that the antennas will spend much time asleep,¹⁸ and instead, will be consuming power at a much higher rate than its 4G predecessor.¹⁹

As the Internet continues to expand and infiltrate everyday life, expected power consumption will only increase. Internet of things devices are supposed to be low power consuming devices, and as such, many industry professionals have not considered them a threat to sustainability.²⁰ Cisco, one of the leading providers in networking training, certifications, and equipment, predicted that by 2020 there

12. CTR. FOR ENERGY-EFFICIENT TELECOMMS., *The Power of Wireless Cloud* (Apr. 2013), <https://perma.cc/DH64-NYJZ>.

13. HELMAN, *supra* note 3.

14. Ctr. for Energy-Efficient Telecomms., *supra* note 5.

15. Dexter Johnson, *The 5G Dilemma: More Base Stations, More Antennas—Less Energy?*, INST. OF ELEC. AND ELEC. ENG'RS (Oct. 3, 2018, 4:22 PM), <https://perma.cc/S692-S5LL>.

16. *Id.* (A mesh network is an interconnected series of devices which connect, automatically, to nearby available devices. A series of connections routes data through nearby antennas, the route is determined by different routing protocols which will automatically choose the most efficient route. Due to this network, in high density areas, most antennas will likely be active and connected to other antennas).

17. *Id.*

18. *Id.* ("Asleep" implies that the device is in a lower power mode, as opposed to idle, which would imply the device is not currently transferring data but is still drawing a normal amount of power.)

19. *Id.*

20. *Id.*

will be over fifty-billion devices connected to the Internet.²¹ With so many devices connected, the devices being “low power” is irrelevant, and the sustainability of these devices should be considered.

There have been improvements in the energy consumption of wireless technology, but in a world that is increasingly relying on wireless devices, power consumption will continue to rise. In 2011, the Institute of Electrical and Electronics Engineers (IEEE) tested the power consumption rates for several different means of transmitting data.²² The IEEE created a model and a controlled test that allowed them to measure energy consumption per customer for various networks. In their findings, they state that by 2020 they expect most means of transmitting data to consume 70% less energy than they did in 2011. However, they also stated that wireless technologies have “limited scope to improve in the future,” and “will continue to consume at least ten times more power than wired technologies when providing comparable access rates and traffic volumes.”²³ Wireless technologies provide consumers with convenience, but that convenience comes at a price.

The United States’ push for less energy efficient means of Internet access seems to be at odds with its adoption of the United Nations’ Sustainable Development Goals in 2015.²⁴ A common misconception due to the current political climate is that the United States dropped its commitment to the U.N. sustainable development goals; this is not true. An important distinction when considering the United States’ current role in the United Nations’ sustainable development goals is that, despite the United States leaving the Paris Climate Accord,²⁵ the Sustainable Development Goals were reached as a decision by the General Assembly of the United Nations while the Paris Climate Accord is a complementary “instrument to the [Sustainable Development Goals] that address[es] climate change.”²⁶ This means that despite the United States’ public exit from the Paris Accord, the United States is still a member state of the United Nations and still ratified the Sustainable Development goals.²⁷

The seventh sustainable development goal pushes member states to find an energy infrastructure that is affordable, reliable, and sustainable. The FCC’s

21. Dave Evans, *The Internet of Things: How the Next Evolution of the Internet is Changing Everything*, CISCO (Apr. 2011), <https://perma.cc/X5MR-92J5> (“Looking to the future, Cisco IBSG predicts there will be 25 billion devices connected to the Internet by 2015 and 50 billion by 2020”).

22. Jayant Baliga, et. al., *Energy Consumption in Wired and Wireless Access Networks*, INST. OF ELEC. AND ELEC. ENG’RS COMM. MAG. (Jun. 2011), <https://perma.cc/J5HM-CHT7>.

23. *Id.*

24. *Member States*, UNITED NATIONS, <https://perma.cc/5T73-3WCY>.

25. Brad Plumer, *What to Expect as U.S. Leaves Paris Climate Accord*, N.Y. TIMES, (Jun. 1, 2017), <https://perma.cc/92FP-VV4E>.

26. Julie Raymond, *The Paris Agreement and the Sustainable Development Goals: The Right Hand Knows what the Left Hand is doing*, AMERICAN ANTHROPOLOGICAL ASS’N, <https://perma.cc/HPJ3-7MTK> (last visited Sept. 25, 2019).

27. See generally G.A. Res. 70/1, *Transforming our world: the 2030 Agenda for Sustainable Development*, (Sept. 25, 2015).

current focus on deploying and expanding wireless networks in lieu of wired infrastructures is not in sync with the seventh sustainable development goal. However, a fiber to home broadband network would consume less electricity than a wired network and would help the United States in achieving the seventh goal. The current energy consumption of the Internet is twice the power generated by all of the solar panels in the United States.²⁸ Wireless technologies require significantly more electricity than wired technologies.²⁹ With more efficient means available, like expanding the nation's fiber infrastructure, the "national strategy" is still to expand and accelerate the deployment of 5G technologies.³⁰ The United Nations states that to meet the seventh goal, nations will need to focus on becoming more energy efficient and on using more sources of renewable energy. At our current rate of expansion of wireless technologies, in lieu of more efficient alternative, the United States is positioned directly against meeting the United Nation's sustainable development goals. Additionally, the FCC may soon seek to replace the less power-hungry wired network with more convenient wireless networks. In the FCC's Declaratory Ruling and Third Report and Order titled, "Accelerating the Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," the FCC discusses a "national strategy" to promote and accelerate the build out of 5G networks.³¹ This is problematic because 5G will likely consume more energy than 4G, and the speeds will be faster than what many consumers have access to in their home, likely resulting in 5G becoming the dominant means to access the Internet upon its deployment.³²

Meanwhile, efforts to build a fiber infrastructure are largely being halted. Many municipal governments have sought to create their own fiber networks but have been blocked by state laws.³³ The FCC's bid to preempt state laws that would restrict municipal networks was struck down by the Sixth Circuit.³⁴ Additionally, twenty states currently have laws that restrict the development of municipal networks.³⁵ Lastly, private companies that are the would-be saviors, developing fiber networks in lieu of the government, are pulling out of the market because these networks require a large investment with no short-term return.³⁶ This all comes together to paint a bleak picture; private companies are not

28. Helman, *supra* note 3.

29. Baliga et al., *supra* note 22.

30. 83 Fed. Reg. 19440, *supra* note 7.

31. *Id.*

32. See Klint Finley, *The Wired Guide to 5G*, WIRED (Dec. 13, 2018), <https://perma.cc/ZP6P-SPW7> (5G network speeds will surpass the speed of Google Fiber's service, and telecom providers like Verizon wireless are already offering "5G Home" which gives a fixed wireless service inside of customer's homes).

33. Jameson Zimmer, *Municipal Broadband is Roadblocked or Outlawed in 20 States*, BROADBAND NOW (Apr. 3, 2018, 12:00 PM), <https://perma.cc/L462-NTM4>.

34. *Tennessee v. FCC*, 832 F.3d 597, 600 (6th Cir. 2016).

35. Zimmer, *supra* note 33.

36. Susan Crawford, *Google Fiber Was Doomed From the Start*, WIRED (Mar. 14, 2017), <https://perma.cc/E95Y-X8SM>.

incentivized to challenge the status quo, local governments are often unable to create and own their own networks, and the FCC is unable to intercede.

II. ECONOMICS OF THE INTERNET INFRASTRUCTURE: CAPITALISM AND THE FCC

Without competition, private organizations have no incentive to compete and strive to make their service better. Part II of this Note discusses how corporate law favors the deployment of wireless, despite the many advantages to a wired infrastructure.³⁷ Without a healthy competitive market for broadband, innovation is thwarted. This discussion will also examine how private corporations' focus on their bottom line leads to a disparity in access to broadband services.

The costs associated with laying fiber make fiber projects unappealing to private corporations. Despite its increased energy efficiency, security, and reliability, wired Internet sources are less favored by private corporations because of the tremendous associated investment costs. Laying new fiber lines can cost a company as much as \$80,000 per mile of cable laid.³⁸ Due to these high costs, it is hard to justify laying a second set of lines once a set already exists. Corporations are beginning to recognize that fiber infrastructures are a long-term investment with small returns. Google Fiber, which was once seen as the white-knight that would provide for the nation's infrastructure needs, is pulling out of plans to lay fiber due to the nature of fiber investments, political road blocks, and all-around lack of success and return in the industry.³⁹ Instead, Google will focus on wireless access solutions.⁴⁰

Corporate law is structured in a way that encourages corporations to maximize profit wherever possible. Therefore, a corporation's decision not to lay fiber lines should not come as a surprise. In fact, United States' corporate law makes it difficult for companies to justify such investments even if they wanted to participate in the market. *Dodge v. Ford Motor Co.* is a landmark case in corporate law that states that corporations must act primarily for the benefit of the shareholders.⁴¹ In this case, Ford wanted to lower the cost of its cars and pay employees more instead of issuing dividends to shareholders.⁴² Dodge, a minority shareholder, sought to stop Ford's actions arguing that it was not in the best interest of shareholders to withhold dividends and make these other changes.⁴³ Ford argued that it should have been protected by the business judgement rule, a rule which allows

37. Timothy Schoechle, NAT'L INST. FOR SCI., L., AND PUB. POL'Y, RE-INVENTING WIRES: THE FUTURE OF LANDLINES AND NETWORKS 15 (2018) (a fiber network is more energy efficient, secure, and reliable than a wireless network).

38. BroadbandNow Team, *How Much Does Data Really Cost an ISP?*, BROADBANDNOW (June 23, 2016), <https://perma.cc/2Z2N-6NCY>.

39. See Susan Crawford, *Google Fiber Was Doomed From the Start*, WIRED (Mar. 14, 2017), <https://perma.cc/E95Y-X8SM>.

40. *Id.*

41. See *Dodge v. Ford Motor*, 204 Mich. 459, 507 (Mich. 1919).

42. See *id.* at 465, 468.

43. See *id.* at 474.

considerable discretion to a corporation's board of directors and its officers, but the court held that the rule only protects lawful decisions made by the board of directors with shareholders as their primary focus.⁴⁴

Absent competition, corporations have few business reasons to incur the costs associated with upgrading their infrastructure. With the *Dodge* case in mind,⁴⁵ it is easy to imagine a scenario where a community's local Internet provider is faced with the decision of whether to upgrade their infrastructure to fiber, or to continue using the old copper systems already in place. Under the current system Internet providers will still have customers because Internet access is needed, and in most cases, providers can still charge a premium and have none of the high costs associated with upgrading their infrastructure to fiber. As a board member, or an officer of a corporation, it would be hard to justify the decision to invest in a fiber infrastructure to shareholders. Why upgrade when the corporation is making money, and any upgrades will only cut into the company's bottom line?

More recently, Delaware corporate law reinforced the idea that companies are beholden only to their shareholders. In *eBay v. Newmark*, the court held that directors cannot pursue social and community-based goals because it openly eschews shareholder wealth maximization.⁴⁶ This holding relates closely to the idea of upgrading to a fiber infrastructure because if consumers already have access to the Internet, and are already paying a premium, justifying goals that are social or community based would be difficult.

Competition could feasibly give corporations the incentive they need to invest in fiber infrastructure, but when one provider dominates the marketplace there is little incentive to improve their product. Competition in the marketplace fuels innovation, which provides consumers with new products and services at a cheaper price.⁴⁷ Unfortunately, in the broadband market there is little competition. Somewhat ironically, when the FCC repealed net-neutrality laws in 2017, the chairman of the FCC Ajit Pai claimed that net neutrality was stifling innovation and competition in the broadband space, without recognizing that in most areas of the country, there is already little or no competition.⁴⁸

44. *Id.* at 489–90, 507.

45. *See id.* at 507.

46. *eBay Domestic Holdings Inc. v. Newmark*, 16 A.3d 1, 34–35 (Del. Ch. 2010).

47. Jaana Woiceshyn, *The Value of Free-Market Competition*, CAPITALISM MAGAZINE (May 28, 2013), <https://perma.cc/5L4U-QZ5E>.

48. Laurel Wamsley, *FCC's Pai: 'Heavy-Handed' Net Neutrality Rules are Stifling the Internet*, NPR (Nov. 28, 2017), <https://perma.cc/H7SH-LHCX>. Net neutrality is the concept that the Internet should be regulated in a content neutral way, meaning, that providers cannot charge more for a user to stream, or access news media, than they can for any other content. In other words, the Internet is the means for transporting data, and the type of data transported should be irrelevant as far as regulation is concerned.

When companies are forced to compete, innovation follows and consumers benefit.⁴⁹ One third of Americans have the choice between two Internet providers.⁵⁰ Two choices is better than none when talking about private for-profit entities, and Masayoshi Son, the CEO of Softbank, claims that three competitors would lead to “a more massive price war, a technology war.”⁵¹ Softbank is the company which controls Sprint, one of the nation’s largest wireless providers.⁵² Son’s statement was made in a not-so-subtle campaign to convince regulators to allow a merger between Sprint and T-Mobile, which, he claims, would allow the new company to compete and put pressure on the nation’s two leading providers.⁵³ In the wake of the repeal of net neutrality rules, many Internet service providers are adding data caps, speed throttles, and other controls that they were unable to utilize while net neutrality rules were in place.⁵⁴ Data caps can go as low as 3 gigabytes a month, which Netflix says a user will consume after watching 1 hour of high-definition streaming.⁵⁵ In a more competitive market, it is unlikely that providers would have caps and throttles in order to keep their services competitive. The salient problem is that users do not have a choice; they comply with their provider’s rules, or they do not have access to high-speed Internet. Although not directly relevant to broadband, the issue is one of competition forcing technologies to develop and prices to drop; the same would happen for broadband.

When companies have effective monopolies over a market, a free market ceases to exist. In a free competitive market, no one organization can become more powerful than the market.⁵⁶ In contrast, in a monopoly, prices are declared by the controlling party rather than set by supply, demand, and competition.⁵⁷ Natural monopolies can occur because of high startup costs or barriers to entry in the industry.⁵⁸ Broadband, like utilities, is a natural monopoly because of the high

49. FTC, FTC FACT SHEET: HOW COMPETITION WORKS, <https://perma.cc/9AYS-FRPT> (last visited Oct. 28, 2019).

50. John McDuling, *Nearly one in three American households have no choice when it comes to their Internet*, QUARTZ (Mar. 12, 2014), <https://perma.cc/UG9F-3WC2>.

51. *Id.*

52. *Id.*

53. *Id.*

54. Kaleigh Rogers, *More than 100 Million Americans Can Only Get Internet Service from Companies That Have Violated Net Neutrality*, MOTHERBOARD (Sept. 21, 2019), <https://perma.cc/Q6HB-HV93>.

55. Tom McKay, *Here Are at Least 196 ISPs Which Put Caps on Their Customer’s Data Use*, GIZMODO (Aug. 7, 2017), <https://perma.cc/T95T-7XLK>.

56. Sam Yang, *Why Monopolies Are Bad for the Economy*, MEDIUM (Jan. 14, 2018), <https://perma.cc/DS7P-7EHD>.

57. *Id.*

58. Univ. of Hous. Downtown, *The Choices in Regulating a Natural Monopoly*, PRINCIPLES OF MICROECONOMICS, <https://perma.cc/345E-XJQ7>.

price to enter the market.⁵⁹ However, unlike utilities, broadband is no longer regulated by the government to ensure fair prices and access to all.⁶⁰

Competition aside, corporations' primary concerns are their bottom-line and shareholder profits. Since corporations look for good investments and are run for the benefit of their shareholders,⁶¹ it should come as no surprise that there is a huge wealth disparity in access to high-speed Internet. Approximately 50% of low-income households have no access to high-speed Internet.⁶² Further, 39% of Americans who live in rural areas have no access to high-speed Internet.⁶³ These statistics alone make the case; private companies are ill-equipped and unable to provide Internet access to everyone.

A purely capitalist approach to providing Internet has failed in the United States in many areas of the country, and its continued use should be questioned. The United Nations deemed Internet access a basic human right in 2015.⁶⁴ The United Nations has also classified access to clean water as a basic human right,⁶⁵ and made universal access to electricity a goal to be reached by 2030.⁶⁶ Yet in the United States, Internet access is the only utility run primarily through private corporations.⁶⁷ Despite the necessity of providing these services to all people, corporations are either unwilling or unable to provide service for customers when the expense of providing the service outweighs the potential for profit. "No utility would string all those lines for just a few customers," sums up the sentiment, and it's only natural for privately held corporations to hold this view due to the nature of corporate law.⁶⁸

The dilemma between privately held corporations not wanting to pay for non-profitable customers and the customers who still need access to key services was solved in the 1930s by the electric industry. Under former President Franklin Roosevelt's New Deal, the federal government created the Reconstruction Finance Corporation (RFC), which helped set-up and back loans to create jobs

59. *See Id.*

60. *See* Andrew Nusca, *Net Neutrality Explained: What It Means (and Why It Matters)*, FORTUNE (Nov. 23, 2017), <https://perma.cc/FGN5-27VY>.

61. *See generally*, *Dodge v. Ford Motor Co.*, 204 Mich. 459, 507 (Mich. 1919).

62. Jen Fifield, *Despite State Barriers, Cities Push to Expand High-Speed Internet*, PEW (Sept. 22, 2016), <https://perma.cc/5U6X-AKZS>.

63. FCC, 31 FCC RCD 699 (1), BROADBAND PROGRESS REPORT 2–3 (2016).

64. *Id.*

65. G.A. Res. 64/292, *The Human Right to Water and Sanitation* (Aug. 3, 2010).

66. *See* INT'L ENERGY AGENCY ET. AL., POLICY BRIEF #1: ACHIEVING UNIVERSAL ACCESS TO ELECTRICITY 2 (2018).

67. *See generally* NRECA, *America's Electric Cooperatives: 2017 Fact Sheet*, (Jan. 31, 2017), <https://perma.cc/5SEZ-BPF8> (56% of the United States power-grid is serviced by publicly owned, not-for-profit organizations); *see generally*, Andrea Kopaskie, *Public vs Private: A National Overview of Water Systems*, UNC ENVTL. FIN. CTR., (Oct. 19, 2016), <https://perma.cc/S2BJ-LQBZ> (88% of the United States' water utility companies are publicly owned).

68. Louis Hyman, *The New Deal Wasn't What You Think*, THE ATLANTIC (Mar. 6, 2019), <https://perma.cc/N2UZ-EJYU>.

and stimulate the economy.⁶⁹ The RFC worked with the Federal Housing Administration to help solve the housing crisis and put more than 750,000 Americans back to work.⁷⁰ This was done by the combination of privately owned organizations and public money, stimulating the economy with little to no risk to the private organizations, and allowing them to setup the infrastructure that would otherwise not have been a profitable endeavor.⁷¹

There are close parallels between today's deployment of a fiber broadband infrastructure and the United States' deployment of power lines back in the 1930s. In both cases, for profit corporations were not able to properly handle the deployment of a public utility and government assistance of some sort was, or will be, required to remedy the problem. There have been some efforts by governments to solve this issue in the broadband industry, with varying success.

III. INITIAL PUBLIC EXPERIMENTS AND THE TELECOMMUNICATIONS LOBBY

Many supporters of municipal broadband claim it is a strong solution to the problem this Note has presented, but there are many roadblocks that stop municipal fiber from being as viable an option as it could be. Part III will discuss federal, state, and local responsibilities when it comes to broadband. First, this section will highlight two instances where local governments took broadband problems into their own hands and created municipal fiber infrastructures. The next section will discuss state roadblocks to municipal fiber that were created at the behest of the cable lobby. Finally, the last section will examine the FCC's role in creating a broadband infrastructure.

A. A SPARK OF HOPE: THE INITIAL SUCCESS OF MUNICIPAL FIBER

Two cities are strong case studies of the possible benefits of municipal fiber. While most municipal broadband attempts have been blocked or stopped, one city has become the model of what municipal broadband should look like—Chattanooga, Tennessee. Another city, Wilson, North Carolina has also created its own municipal fiber network, but has had varied success. Both cities have publicly owned fully-fiber broadband that they provide to their customers at a low cost.⁷²

Chattanooga, Tennessee is the model for what municipal fiber networks could look like. Motherboard, a leading tech journal under the Vice news networks, calls Chattanooga, “The City That Was Saved by the Internet,”⁷³ and the city calls

69. *Id.*

70. *Id.*

71. *Id.*

72. Jason Koebler, *The City That Was Saved by the Internet*, MOTHERBOARD–VICE (Oct. 27, 2016), <https://perma.cc/TZM9-DMNH> (This article explores the success of Chattanooga's municipal broadband service and shows why it should be considered the model for all municipal broadband services).

73. *Id.*

itself, “Gig City.”⁷⁴ Chattanooga was the first city in the United States to build city-wide gigabit-per-second Internet, and it was built by the city government.⁷⁵ The city has seen a boom in startups, businesses, and job creation since establishing its fiber optic infrastructure.⁷⁶ The story of how Chattanooga became an Internet powerhouse started with the exact problem this Note addresses. Comcast, the cable and Internet provider, provided broadband downtown and in densely populated areas, but most rural areas of Chattanooga had little to no access to broadband Internet.⁷⁷ The cable company had little interest in expanding or improving its network and believed that the city did not need the upgrade. At the same time, the Chattanooga’s power supplier, Energy Power Board of Chattanooga (EPB), was planning to upgrade the city’s power infrastructure with fiber optics, but in doing so, realized it would be feasible to become an Internet service provider as well.⁷⁸ Because the city had little power over Comcast, and was regarded as a small and unimportant market, creating its own Internet was the only viable option.

Without other options, the city began to make plans to improve its infrastructure for itself. EPB made plans to improve the power-grid, adding plans to make the fiber connections Internet access points, and released them to the public.⁷⁹ Traditional Internet Service Providers (ISPs) were furious, and made claims such as, “no one needs the service you’re talking about here.”⁸⁰ Ron Littlefield, the town’s mayor at the time, was not so convinced.⁸¹ Despite the traditional Internet service providers’ refusal to expand or improve the network in Chattanooga, Littlefield offered them a deal—if they laid the fiber themselves, then the city’s power grid would contract out its use and the city would not lay their own fiber.⁸² The ISPs refused, stating they did not have the budget for the upgrades the city demanded.⁸³

It was clear to Chattanooga that if it wanted to improve its situation, it needed to do it itself. EPB proceeded with the plan to lay fiber and become an Internet provider, and since then, the network can be tied to the creation of somewhere between 2,800 and 5,200 new jobs.⁸⁴ In addition, the city has gained an estimated \$1 billion over the last five years.⁸⁵ Chattanooga’s unemployment rate has

74. *Id.*

75. *Id.*

76. *Id.*

77. Koebler, *supra* note 72.

78. *Id.*

79. *Id.*

80. *Id.*

81. *Id.*

82. Koebler, *supra* note 72.

83. *Id.*

84. BENTO J. LOBO, THE REALIZED VALUE OF FIBER INFRASTRUCTURE IN HAMILTON COUNTY, TENNESSEE 2–3 (2015).

85. *See* Koebler, *supra* note 72.

declined from over ten percent to less than five percent, and large multinational companies are returning to the city for the reliable Internet and power that EPB has established.⁸⁶

Municipal broadband networks can provide benefits beyond those which are easily quantifiable. While Wilson, North Carolina is not as wildly successful as Chattanooga, it has become a prominent voice in favor of municipal broadband and an example for others to follow.⁸⁷ The success of Wilson's fiber network is yet to be determined, as there are questions about its long-term sustainability.⁸⁸ Regardless of whether Wilson's Greenlight, the municipal broadband service, remains in the long-term, it has had a strong short-term effect of forcing competitors to upgrade their infrastructure and has forced price discipline on incumbent ISPs.⁸⁹ The biggest take-away from Wilson's municipal fiber is how the county combined the free market with a government run utility. In order to fund the fiber network, the City of Wilson sold certificates of participation to investors, that would use the infrastructure they were building as collateral and pay out similar to bonds.⁹⁰ This financing scheme allowed the city to bypass tax payer dollar reliance and blend a private and public utility.⁹¹

B. ROADBLOCKS TO MUNICIPAL BROADBAND

The initial success of municipal broadband was short-lived, as the telecom lobbies recognized the threat and began to fight back. The telecommunications industry exerted its influence over state legislatures and encouraged roadblocks to stop municipal fiber. In the midst of the two municipalities expanding their networks, the telecommunications industry donated massive amounts of money to state attorneys general⁹² and throughout North Carolina and Tennessee during the 2014 elections.⁹³ In North Carolina, the telecommunications industry contributed

86. *Id.*

87. See generally David Shepardson, *U.S. Court Blocks FCC Bid to Expand Public Broadband*, REUTERS (Aug. 10, 2016), <https://perma.cc/W7FQ-775F> (Wilson teamed up with Chattanooga to convince the FCC to attempt to pre-empt state laws forbidding municipal fiber networks); Charles M. Davidson & Michael J. Santorelli, *Understanding the Debate Over Government-Owned Broadband Networks: Context, Lessons Learned, and a Way Forward for Policy Makers*, ADVANCED COMM'NS L. & POL'Y INST. (June 2014), <https://perma.cc/H34W-RWU2> (Wilson's funding structure for their municipal fiber is a model example of how private funding and public management can work together, an inverse of New Deal cooperatives).

88. Charles M. Davidson & Michael J. Santorelli, *Understanding the Debate Over Government-Owned Broadband Networks: Context, Lessons Learned, and a Way Forward for Policy Makers*, ADVANCED COMM'NS L. & POL'Y INST. (June 2014), <https://perma.cc/H34W-RWU2>

89. See *id.*

90. See Christopher S. Yoo & Timothy Pfenninger, *Municipal Fiber in the United States: An Empirical Assessment of Financial Performance*, CTR. FOR TECH., INNOVATION & COMPETITION, <https://perma.cc/H34W-RWU2>.

91. ADVANCED COMM'NS L. & POL'Y INST., <https://perma.cc/R4AB-GY64> (last visited Mar. 23, 2019).

92. *Id.*

93. *Id.*

a total of \$870,000 to candidates in both parties.⁹⁴ Similarly, in Tennessee the telecommunications industry contributed a total of \$921,000 to candidates in both parties.⁹⁵ No imagination is required to divine why the telecommunications industry would shell out so much money to state elections—to encourage elected officials to craft laws that benefit its bottom line.

The telecommunications lobby was successful in exerting its power and in 2018 there were 20 states that either prohibited or restricted municipal broadband.⁹⁶ There are effectively five ways in which states can implement roadblocks to municipal broadband: bureaucratic barriers, no direct sale requirements, referendum or vote dependency, population caps, and excessive taxes.⁹⁷

Bureaucratic barriers are the most common way that states prohibit the establishment of publicly owned broadband services. States that utilize this approach require municipalities to jump through so many loop holes, that it is effectively impossible—or at least, improbable—that a municipal service will be established.⁹⁸ A prime example of bureaucratic barriers to prevent municipal broadband are §§160a-340-160a-340.6 of the General Statutes of North Carolina.⁹⁹ North Carolina has pricing requirements which add phantom costs to the price of locally owned Internet to make municipal broadband less competitive with privately owned broadband.¹⁰⁰ North Carolina also has financing barriers, where the state will not allow taxpayer money to be spent on creating such a network, and instead requires investment. Wilson, North Carolina properly funded their fiber through investments, but these investments are risky due to another provision in North Carolina law that requires municipal networks to stop operating if a private company enters the area.¹⁰¹ Last, North Carolina has lengthy and costly referendum requirements that give the telecommunications lobby multiple opportunities to intervene.

Another popular roadblock is the “no direct sale” approach. The no direct sale approach effectively makes it impossible for a publicly owned service to sell its packages, so while theoretically a state actor can create its own broadband service, it cannot sell it to the public—and thus it cannot exist.¹⁰² In Missouri, municipal networks are banned from selling or leasing any telecommunications

94. *Id.*

95. *Id.*

96. Zimmer, *supra* note 33.

97. *Id.*

98. *Id.*

99. *See generally*, N.C. GEN. STAT. §§ 160a-340 to –340.6 (2018) (These sections of the North Carolina statute provide for government owned communications services).

100. *Id.*

101. *Id.*

102. Zimmer, *supra* note 33.

service.¹⁰³ Although it is not illegal for a municipal actor to create its own network, they simply cannot sell it.

Excessive referendum and voting requirements provide another avenue for states to block municipal broadband networks. The referendum or vote requirement is precisely what it sounds like—it requires a referendum or vote before a local government can create its own Internet.¹⁰⁴ This particular requirement may not seem egregious, and in fact, it may seem to align with democratic ideals, but in some states the requirements for referendum are so egregious that they amount to a near outright ban. In Minnesota, for example, a supermajority of the community is required to vote in favor of establishing a municipal network. After obtaining a supermajority, the local government can order the establishment of a municipal network, but only if it will not compete with a private entity and no private entity will provide the service “within the foreseeable future.”¹⁰⁵ The last phrase, “within the foreseeable future,” is especially troubling, as it places no meaningful time constraint on private Internet service providers.

Population cap legislation is another roadblock to municipal broadband that is only used by the state of Nevada. Population caps act by only allowing areas with target populations to create publicly owned networks. In Nevada, only communities with fewer than 25,000 residents and counties with fewer than 50,000 residents are authorized to create their own networks.¹⁰⁶ While not ideal, this arrangement allows small communities that would likely be ignored by traditional Internet service providers to create their own networks. However, it ignores that fact that many urban and densely populated areas are also underserved. The biggest hinderance to the Nevada laws is that it stops cities from establishing “smart grids,” which often lead to innovation like that seen in Chattanooga, Tennessee.¹⁰⁷

Excessive taxes also limit municipalities. For example, Florida levies special taxes on municipal broadband providers.¹⁰⁸ These taxes make creating a municipal broadband network less cost efficient and put the government owned entities at a disadvantage compared to private entities. Florida also requires municipal

103. MO. ANN. STAT. § 392.410(7) (West, West Statutes are current through the end of the 2018 Second Regular Session and First Extraordinary Session of the 99th General Assembly.).

104. *See, e.g.,* Zimmer, *supra* note 33.

105. *See* MINN. STAT. ANN. §§ 237.19, 429.021 (West, Westlaw Current with legislation from the 2019 Regular Session, effective through Mar. 6, 2019). The statutes are subject to change as determined by the Minnesota Revisor of Statutes. These changes will be incorporated later this year.

106. *See* NEV. REV. STAT. ANN. §§ 268.086, 710.147 (West, Westlaw Current through Ch. 2 of the 80th Regular Session (2019) of the Nevada Legislature subject to change from the reviser of the Legislative Bureau).

107. *See, e.g.,* Zimmer, *supra* note 33.

108. FLA. STAT. ANN. §§ 350.81, 125.421 (West, Current with chapters from the 2019 First Regular Session of the 26th Legislature in effect through Mar. 18, 2019).

broadband projects to recoup their entire investment within four years—an unrealistic requirement for such a large undertaking.¹⁰⁹

C. THE FEDERAL COMMUNICATION COMMISSION'S ABILITY TO ACT

In response to appeals from Chattanooga, Tennessee and Wilson, North Carolina, the FCC sought to preempt state laws that blocked municipal broadband. The FCC claimed authority to act under Section 706 of the Telecommunications Act of 1996, claiming their broad role to encourage development of advanced communications equipment required them to preempt the challenged state laws.¹¹⁰ Section 706 lists an important mission statement for the FCC under the act, “The Commission and each State commission with regulatory jurisdiction over telecommunications services shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans”¹¹¹

The FCC voted 3-2 to preempt the state laws, stating that the laws halted investment and opportunity in states, and further, that Section 706 preempted the North Carolina and Tennessee laws, and that the municipal broadband should be allowed.¹¹² The FCC’s preemption order likely would have served as precedent to preempt all laws that blocked municipal broadband, allowing for any municipality to create their own broadband infrastructure.

This victory for Chattanooga’s EPB and Wilson’s Greenlight was short lived. The States of Tennessee and the North Carolina sued the FCC in response to the FCC’s preemption order, challenging the FCC’s authority to preempt state laws that regulated broadband Internet. In 2016, the Sixth Circuit held that in order for the FCC to have valid preemption authority, the statute authorizing such preemption must say so in a clear statement.¹¹³ Effectively, this decision crippled the FCC’s ability to make meaningful decisions about broadband infrastructure and help underserved regions, leaving most authority for these decisions to the individual states.

Under the Telecommunications Act of 1996, the FCC codified a distinction between two types of services: Title I (information services) and Title II (common carriers).¹¹⁴ How a service is classified under the Telecommunications Act decides how it can be regulated. A common carrier service is “generally subject to ‘dual state and federal regulation,’”¹¹⁵ while an information service

109. See, e.g., Zimmer, *supra* note 33.

110. In the Matter of City of Wilson, FCC 15-25 (2015).

111. 47 U.S.C.A. § 1302 (West, Westlaw through P.L. 116-5. Title 26 current through 116-9).

112. See David Shepardson, *U.S. court blocks FCC bid to expand public broadband*, REUTERS (Aug. 10, 2016), <https://perma.cc/W7FQ-775F>.

113. Tennessee v. FCC, 832 F.3d 597, 600 (6th Cir. 2016).

114. See generally, 47 U.S.C.A. § 153 (West, Westlaw through P.L. 116-5. Title 26 current through 116-9).

115. Louisiana Pub. Serv. Comm’n v. FCC, 476 U.S. 355, 375 (1986).

is not.¹¹⁶ In *Charter Advanced Services LLC v. Lange*, the Eighth Circuit affirmed a district court decision which stated Minnesota law which sought to regulate Voice-Over-Internet-Protocol (VoIP) was preempted by Telecommunications Act of 1996.¹¹⁷ In this case, the court held that VoIP communications were an information service, rather than a common carrier service, and thus were not subject to state regulation.¹¹⁸ In *Tennessee v. FCC*, however, the court held that because the FCC was relying on § 706 of the Telecommunications Act of 1996, and because § 706 lacked a clear statement authorizing preemption, the FCC's order was invalid.¹¹⁹

Today, the basis for preemption would be stronger because the classification of broadband has changed. In 2002, the FCC classified broadband Internet as Title I, an information service.¹²⁰ This solidified "... broadband's position as a largely unregulated industry."¹²¹ In 2015, following an onslaught of egregious behavior by ISPs,¹²² and a lost law suit between the FCC and ISPs where the ISPs challenged the FCC's authority to make rules for the Internet,¹²³ the FCC reclassified broadband under Title II of the Telecommunications Act.¹²⁴ This gave the FCC the teeth to enforce net neutrality rules, and the D.C. Circuit upheld their rules in a decision in 2016.¹²⁵ These decisions focused on net neutrality, but it is likely that they could have an impact on laws governing the broadband infrastructure. After political regime change in 2016, the FCC voted to return broadband services to a Title I information service.¹²⁶ In the 6th Circuit's preemption case, the preemption order was reversed because it relied upon § 706 and because there was no express authorization for preemption.¹²⁷ In *Charter Advanced Services*, however, the court held that information services, as classified under Title I, follow a national strategy of deregulation and therefore are generally not subject to state regulation.¹²⁸ Following this premise, the FCC should be able to preempt

116. *Charter Advanced Servs. v. Lange*, 903 F.3d 715, 718 (8th Cir. 2018).

117. *Id.* at 717.

118. *Id.*

119. See David Shepardson, *U.S. court blocks FCC bid to expand public broadband*, REUTERS (Aug. 10, 2016), <https://perma.cc/W7FQ-775F>; *Tennessee v. FCC*, 832 F.3d 597, 600 (6th Cir. 2016).

120. MEDIUM, <https://perma.cc/CDP8-2Y65> (last visited Mar. 23, 2019).

121. *Id.*

122. Ryan Singel, *Comcast Sued Over BitTorrent Blocking – Updated*, WIRED (Nov. 14, 2007), <https://perma.cc/FA96-Y8WL>; Grant Gross, *Study: Comcast, Cox slowing p2p traffic around the clock*, MACWORLD (May 15, 2008), <https://perma.cc/2HCQ-JYFP> (Both articles detail traffic clocking conducted by Comcast that discriminated against certain types of traffic over others).

123. *Verizon v. FCC*, 740 F.3d 623, 628 (D.C. Cir. 2014).

124. *Protecting and Promoting the Open Internet*, 81 Fed. Reg. 93638 (Dec. 21, 2016).

125. *U.S. Telecom Ass'n v. FCC*, 825 F.3d 674, 689 (D.C. Cir. 2016).

126. *Restoring Internet Freedom*, 83 Fed. Reg. 7852 (Feb. 02, 2018).

127. See David Shepardson, *U.S. court blocks FCC bid to expand public broadband*, REUTERS (Aug. 10, 2016), <https://perma.cc/W7FQ-775F>. See *Tennessee v. FCC*, 832 F.3d 597, 600 (6th Cir. 2016).

128. See generally, *Charter Advanced Servs. v. Lange*, 903 F.3d 715, 717 (8th Cir. 2018).

state laws of an information service because information services are not subject to dual state and federal regulation.

Despite the FCC's ability to preempt state laws, the political will to do so has changed. Ajit Pai, the current Chairman of the FCC, is commonly thought to be in the telecommunications lobby's pocket.¹²⁹ In 2018, an internal telecom lobby email was accidentally sent out, and somewhat humorously, those same talking points were soon published by Ajit Pai in his blog on the FCC's website.¹³⁰ More important than the telecommunications lobby's apparent control of the FCC, however, is the prevailing view of the current administration that the FCC should create a "regulatory free arena" for ISPs because they face competition from up and coming tech companies.¹³¹ Regardless of the reasons, the political will to preempt state laws that are in the best interest of ISPs has changed.

IV. THE ROAD AHEAD: UTILIZING HISTORY TO PAVE THE WAY FOR THE FUTURE

While there are many solutions to ensuring access to high-speed, energy efficient Internet throughout the nation, two solutions seem the most viable: (a) classifying broadband as a common carrier to allow the FCC to regulate broadband effectively, and (b) creating broadband cooperatives similar to electric cooperatives created in the 1930s to give the private industry no excuse for failing to create a sustainable, reliable, and energy efficient network.

A. RECLASSIFYING BROADBAND AS A COMMON CARRIER

Classifying broadband as a common carrier under Title II of the Telecommunication Act of 1996 would give the FCC the teeth it needs to enforce Internet rules and, with the help of Congress, could allow the FCC to preempt state laws when states violate the national strategy for broadband deployment. Theoretically, this approach would allow the FCC to preempt any state laws that violated guidance that the FCC set out under its rule-making authority. However, this approach is fickle and unlikely to last due to the nature of political change. The current administration's policy is one of "non-regulation," as made evident by reverting the classification of broadband from Title II back to Title I. Ironically, as noted in section III.C, classification as a Title I service should preclude states from regulating municipal broadband because Title I services are not subject to dual state and federal regulation, which would likely be the opposite effect desired by the FCC's current chairman. Under this structure, the FCC could stop states from preventing municipal broadband and ensure that competition fuels innovation in the nation's broadband infrastructure.

129. John Brodtkin, *Ajit Pai does ISPs' bidding, pushes for tighter rules on Google and Facebook*, ARSTECHNICA, (Sept. 6, 2018), <https://perma.cc/S8TZ-9PC4>.

130. *Id.*

131. Michael O'Rielly, *FCC Regulatory Free Arena*, FED. COMM. COMM'N (June 1, 2018), <https://perma.cc/XV2Y-GHAV>.

Services classified as a Title II telecommunications service are open to dual regulation by state and federal bodies. Dual regulation is one of the largest problems faced by municipal broadband. As predicted by Tim Wu, the professor who coined the term “net neutrality,” ISPs have acted in their short-term interest and have sought to squash competition at any turn rather than allow for a robust and competitive market.¹³² Due to this problem, classifying broadband as a Title II telecommunications services would only work if it received support from Congress by giving the FCC express authority to make rules regarding the broadband infrastructure. Ideally, a Title II classification of broadband with a new mandate from Congress would give the FCC the power it needs to preserve “a Darwinian competition among every conceivable use of the Internet so that the only the best survive.”¹³³

The future of broadband is currently unclear. The House of Representatives recently approved the “Save the Internet Act of 2019,” a bill which, among other things, will restore broadband back to its Title II classification.¹³⁴ The bill also highlights a need for reaching rural and low income areas, but offers little substance for how deploying infrastructure to areas in need will be accomplished.¹³⁵ If Congress added provisions to this bill that detail how the FCC should oversee the deployment of broadband to rural and low income areas, the FCC would have stronger grounds to preempt state legislatures that seek to block municipal broadband services. Regardless, the bill highlights making Internet available for all, but neglects to look at creating a broadband network that is energy efficient.

The need for political good-will makes this approach unappealing. As seen in the FCC regime change in 2016, the party that currently controls the White House has the power to undo policies passed under previous administrations due to the president’s broad appointing power of officials in regulatory agencies. The nature of the political system allows for the overhaul and changes of national strategy, and these failings make it unappealing for a service that should be available to all people.

B. CREATING BROADBAND COOPERATIVES

To address many of the problems discussed, Internet service providers should be classified as public utilities in the United States much like electricity and clean

132. Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH. L. 141, 142 (2003); Kaleigh Rogers, *More than 100 Million Americans Can Only Get Internet Service from Companies That Have Violated Net Neutrality*, MOTHERBOARD (Sept. 21, 2019), <https://perma.cc/AKH3-BXLK> (Tim Wu posited that ISPs would not likely act in their best long-term interests and preserve an open and competitive market that would create innovation and new products. As predicted, ISPs have squeezed out the competition and rarely work to upgrade existing infrastructure when they have no competition inspiring them to do so.).

133. Wu, *supra* note 132, at 142.

134. Save the Internet Act of 2019, H.R. 1644, 116th Cong. § 1 (2019).

135. *Id.*

water. The United Nations has deemed access to the Internet to be a basic human right.¹³⁶ Unlike Internet access, utilities in the United States such as clean water and electricity are considered basic human rights and are often publicly owned.¹³⁷ In the United States, 56% of the country's electricity is serviced by publicly owned, not-for-profit organizations called co-ops.¹³⁸ Likewise, 88% of the United States' water utility companies are publicly owned.¹³⁹ Despite Internet, power, and water all being regarded as essential human rights, only Internet access is not subject to the rules, regulations, and public control that other utilities are beholden to.

If broadband were classified as a public utility, the government would have some duty to ensure that it is made available to everyone.¹⁴⁰ In the United States, both the federal and local levels of government have programs which aim to ensure that water remains affordable to all people. The government uses a blend of programs from customer assistance programs, which help low-income households pay their water bills, to direct government supplementing to help utility companies upgrade and maintain their systems without having to raise prices, which would adversely affect the customers in the region.¹⁴¹ The Environmental Protection Agency (EPA) is the primary agency in the United States to help ensure that all Americans have access to clean water. The United States' system is not perfect and is subject to a lot of criticism, especially in the wake of the Flint water crisis.¹⁴² The point is not that the system is effective, but that it exists, and that our government recognizes that water is an essential resource that should not be left completely in the private domain.

Access to electricity in the United States has a robust history with close parallels to broadband Internet access. In 1935, 90% of rural homes did not have electricity because it was too expensive for utility companies to wire low population areas.¹⁴³ Realizing that this was an impediment to housing expansion and to the nation as a whole, the federal government created the Rural Electrification

136. James Vincent, *UN Condemns Internet Access Disruption as a Human Rights Violation*, VERGE, (July 4, 2016), <https://perma.cc/3UTD-LSJJ>.

137. G.A. Res. 64/292, *The Human Right to Water and Sanitation* (Aug. 3, 2010).

138. NRECA, *America's Electric Cooperatives: 2017 Fact Sheet* (Jan. 31, 2017), <https://perma.cc/5SEZ-BPF8> (56% of the United States power-grid is serviced by publicly owned, not-for-profit organizations).

139. See generally, Andrea Kopaskie, *Public vs Private: A National Overview of Water Systems*, UNC ENVIRONMENTAL FINANCE CENTER, (Oct. 19, 2016), <https://perma.cc/S2BJ-LQBZ>.

140. BRETT M. FRISCHMANN, *INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES* 92-93 (Oxford University Press, 2012).

141. Joseph Kane, *Water Affordability Is Not Just a Local Challenge, But a Federal One Too*, BROOKINGS INST. (Jan. 25, 2018), <https://perma.cc/2X92-8Y77>.

142. Merit Kennedy, *Lead-Laced Water In Flint: A Step-By-Step Look At The Makings Of A Crisis*, NPR (Apr. 20, 2016), <https://perma.cc/4NXV-9BLQ> (The Flint water crisis occurred after local government officials made decisions regarding the cities' water supply that escalated into a city-wide crisis. This event spurred criticism and was out of the purview of the federal government).

143. *Id.*

Administration, which provided government loans at a low interest rate to new cooperatives, a mixture of government money and private corporations.¹⁴⁴ This program allowed the new cooperatives to extend electricity wires to areas that did not have access, and by 1950, 90% of rural America had electricity in their homes.¹⁴⁵ This mixture of public investment and private sector cooperation allowed for private corporations to provide a service they would not otherwise have provided, and filled a gap in access to electricity in rural America.

The United States should explore similar alternatives for broadband Internet. While some may argue that Internet access it is not essential but clean water and electricity are, Internet is becoming increasingly important to meaningfully participate in today's society. To that end, the Supreme Court recently recognized that access to a cell phone, is "such a pervasive and insistent part of daily life" that carrying one is indispensable to participation in modern society."¹⁴⁶ The same is true with access to the Internet, so while it is not essential to live, it is essential to participate in an exceedingly technology-based society.

Creating new broadband cooperatives is a strong approach to fix the nation's Internet infrastructure problems with historical success. The success of the New Deal and power cooperatives speaks for itself. Within fifteen years of establishing the Rural Electrification Administration, the country went from having 90% of Americans in rural areas not having access to electricity, to 90% of rural Americans having access to electricity.¹⁴⁷ This solution allows for a semi-capitalist approach to providing broadband to the nation, promotes competition, and brings Internet access to many areas of the country that do not have it. Low-interest government loans would allow private entities to complete low return on investment work without worrying about corporate law barriers, or an entirely government owned entity providing the service. Broadband cooperatives would allow the backbone of the nation's Internet infrastructure to be faster, more secure, and, more importantly, energy efficient; thus, satisfying the seventh sustainable development goal. Further, a fiber broadband infrastructure will, by its nature, create a secure and reliable infrastructure which will satisfy the ninth sustainable development goal. Last, innovation drives employment, and an innovative and high-tech network would go a long way towards satisfying the eighth sustainable development goal.

144. *Id.*

145. Louis Hyman, *The New Deal Wasn't What You Think*, THE ATLANTIC (Mar. 6, 2019), <https://perma.cc/D9CC-EZAF> (last visited Mar. 23, 2019).

146. *Carpenter v. United States*, 138 S. Ct. 2206, 2210 (2018) (citing *Riley v. California*, 573 U.S. 373, 385 (2014)).

147. Hyman, *supra* note 145.

CONCLUSION

“America is quickly dividing into two segments: Those who have fast Internet and those who do not. Jobs—in any meaningful number, at least—will not continue to exist in towns and rural areas that lack fast, accessible Internet access.”¹⁴⁸ The need for Internet in the United States should be undisputed, but few consider the power consumption association with Internet access in the United States. Under the current national strategy, the FCC aims to push for fast development of 5G networks that are not energy efficient and require several times more power than wired alternatives. Many households in the United States have no access to high speed Internet, and the national solution seems to be to give them access to high speed wireless networks. This is insufficient. In areas where private companies cannot, or will not, provide high quality and high-speed Internet service, public entities should be free to create their own fiber infrastructure that will provide service to their customers in an energy efficient manner. In lieu of municipal broadband services, the federal government should help establish broadband cooperatives to rapidly deploy a sustainable, efficient, and reliable infrastructure throughout the nation. Areas with access to high speed Internet see a rise in employment and business. The Internet is needed for meaningful participation in today’s society and the government should shepherd its development to ensure that all have access to an energy efficient Internet.

148. Koebler, *supra* note 72.