

**Universal Service Fund (USF) Working Group**  
United State Senate  
Washington, DC 20510

**Faculty of IT & Design**  
Department of Electronic Systems  
Centre for Communications, Media  
and Information Technologies  
Aalborg University  
AC Meyers Vaenge 15  
2450 Copenhagen SV Denmark

August 25, 2023

**Re: Universal Service Fund Working Group Request for Comment**

Dear Senators Luján, Thune, Klobuchar, Capito, Peters, and Moran:

Thank you for your leadership to review America’s policy for the Universal Service Fund (USF). This comment is offered from an academic perspective to provide authoritative references to the record and insight from the policy research domain. I make these comments as an American citizen and taxpayer and in my capacity as a Visiting Researcher<sup>1</sup> at the Centre for Communications, Media and Technologies where we seek to develop ICT infrastructures and solutions that are sustainable socially, economically and environmentally.<sup>2</sup> I applaud the focus of the working group on this critical public policy issue and the opportunity for public comment. These comments reflect my views based on my research and should not be construed as the opinion of Aalborg University or its affiliates. Key points are outlined as follows:

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Why financial contributions from Big Six edge providers would be equitable, ethical and effective to deliver broadband goals ..... 11

Thank you for your attention. Please be in touch should you have further questions.

Sincerely,



Roslyn Layton, PhD  
Visiting Researcher

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<sup>1</sup> Roslyn Mae Layton, Aalborg University Knowledge Base (VBN) and research portal.  
<https://vbn.aau.dk/en/persons/roslyn-mae-layton/publications/> Accessed August 25, 2023

<sup>2</sup> “CMI - Communication, Media & Information Technologies,” Aalborg University, accessed August 24, 2023,  
<https://www.en.tech.aau.dk/research/research-groups/cmi-communication-media-information-technologies>.

## The need for broadband policy

Broadband enables the larger US digital economy, one-tenth of America's gross domestic product of \$25 trillion, some 8 million direct jobs, and about 5 percent of US total employment.<sup>3</sup> The digital economy grows more than twice the rate of the overall economy.<sup>4</sup> Digital goods and services account for one of the largest categories of export.<sup>5</sup> The digital economy would not exist if not for broadband. Yet the market size of broadband, an estimated \$228 billion, pales in comparison to the revenue and market cap of a handful of the largest edge providers \$9 trillion.

The United States is a robust broadband market with some 3600 broadband providers.<sup>6</sup> The market success reflects bi-partisan, light-touch regulatory policy which encourages private investment and facilities-based competition.<sup>7</sup> The Federal Communications Commission (FCC) observes technological competition by the presence of multiple and emergent access technologies (fiber, coax, cellular mobile, fixed wireless, satellite etc.).<sup>8</sup> As the end of 2022, the FCC observed that fixed terrestrial residential connections capable of meeting a download speed threshold of 100 Mbps increased from approximately 66.4 million to 82.9 million, an 25% increase from the report two years before.<sup>9</sup>

In addition to technology competition, there is fierce price competition among broadband providers.<sup>10</sup> The FCC notes continued improvement in broadband speed, throughput, and quality in both fixed and wireless technology.<sup>11</sup> Moreover broadband investment is high, effectively \$88 billion in 2021 by actual, FCC-registered broadband providers.<sup>12</sup> Wireless investment has enjoyed the highest year on record, \$39 billion, a 12% improvement over the prior year as well as throughput of 73 trillion megabytes in mobile cellular networks, the biggest year-over-year increase in US history.<sup>13</sup>

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<sup>3</sup> Tina Highfill and Christopher Surfield, "New and Revised Statistics of the U.S. Digital Economy, 2005–2021" (Bea, November 2022), <https://www.bea.gov/system/files/2022-11/new-and-revised-statistics-of-the-us-digital-economy-2005-2021.pdf>. See estimate at <https://tradingeconomics.com/united-states/gdp>

<sup>4</sup> Ibid

<sup>5</sup> "Digital Trade and U.S. Trade Policy" (Congressional Research Service, December 9, 2021), <https://sgp.fas.org/crs/misc/R44565.pdf>.

<sup>6</sup> "Number of ISPs" (FCC, January 2022), [https://www.fcc.gov/sites/default/files/ebb.provider.list\\_.xlsx](https://www.fcc.gov/sites/default/files/ebb.provider.list_.xlsx)

<sup>7</sup> Horney, Michael and Layton, Roslyn, Innovation, Investment and Competition in Broadband and the Impact on America's Digital Economy (March 29, 2014). 2014 TPRC Conference Paper, Available at SSRN: <https://ssrn.com/abstract=2417777> or <http://dx.doi.org/10.2139/ssrn.2417777>

<sup>8</sup> 2022 Communications Marketplace Report. FCC, December 30, 2022, <https://www.fcc.gov/document/2022-communications-marketplace-report>.

<sup>9</sup> Ibid

<sup>10</sup> "2022 Broadband Forecast Shifts to Market Share Battle with Intense Competition," S&P Global Market Intelligence, May 11, 2022, <https://www.spglobal.com/marketintelligence/en/news-insights/blog/2022-broadband-forecast-shifts-to-market-share-battle-with-intense-competition>.

<sup>11</sup> "Measuring Fixed Broadband - Twelfth Report," FCC, January 6, 2023, <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-twelfth-report>.

<sup>12</sup> Mark Rebholz, "America's Broadband Providers Invested \$86 B In Networks In 2021," *USTelecom* (blog), July 18, 2022, <https://www.ustelecom.org/2021-infrastructure-investment/>

<sup>13</sup> "2023 Annual Survey Highlights," CTIA, July 25, 2023, <https://www.ctia.org/news/2023-annual-survey-highlights>.

Importantly the C-band spectrum auction (2020-21) brought the US Treasury record revenue, \$81 billion for just 280 MHz of frequencies.<sup>14</sup> As a result of the FCC enabling the auction in record time and allowing for accelerated payments in exchange for parties to vacate the band, those frequencies are used today. By the end of 2023, the US is projected to take the global lead in 5G adoption at 59%, just edging past the reigning champion South Korea at 53%.<sup>15</sup> 5G has also demonstrated greater spectral efficiency than CBRS.<sup>16</sup> Exclusive, licensed 5G in the 3 GHz band compared to the unlicensed 1200 MHz in the 6 GHz, drives 4.5 more value to the American economy.<sup>17</sup>

In a time of fiscal deficit, Congress should take note of this trade-off which amounted to a \$20 billion giveaway of free spectrum access to the leading edge providers.<sup>18</sup> Given the importance of spectrum to Americans and the economy, reauthorization the FCC's lapsed spectrum authority should be an immediate priority.<sup>19</sup> Building upon the success of 5G in the upper 3 GHz band, enabling 150 MHz for 5G in the lower 3G is a no-brainer. Indeed, military experts suggest that this could improve security with efficiency enhancements and technological upgrade.<sup>20</sup> A new report notes that already U.S. military systems successfully coexist with full-power 5G networks in the lower 3 GHz band in over 30 countries.<sup>21</sup>

In any event, broadband has improved meaningfully for consumers since 2016. Broadband subscription prices have plummeted, falling 42% in the last 7 years.<sup>22</sup> Broadband is one of a rare kind of service that has improved in quality even while decreasing in price. Indeed, the share of income spent on broadband access has decreased as percentage of spending. People spend more as a percentage each on housing, transportation, education, clothing, food, and vacation than for broadband.<sup>23</sup>

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<sup>14</sup> FCC Auction 107. <https://www.fcc.gov/auction/107> Accessed August 25, 2023

<sup>15</sup> Pablo Iacopino. GSMA Intelligence. 5G Adoption and Mobile ARPU: Is there a connection? June 2023. <https://data.gsmainelligence.com/research/research/research-2023/5g-adoption-and-mobile-arpu-is-there-a-connection->

<sup>16</sup> CTIA. CBRS Spectrum Occupancy Measurements. January 28, 2022. <https://www.ctia.org/news/cbrs-spectrum-occupancy-measurements>

<sup>17</sup> Roslyn Layton and David Witkowski, "5G Versus Wi-Fi: Challenges for Economic, Spectrum, and Security Policy," *Journal of Information Policy* 11, no. 1 (2021): 523–61, <https://doi.org/10.5325/jinfopoli.11.2021.0523>.

<sup>18</sup> Ibid

<sup>19</sup> Roslyn Layton, "Winging It On Spectrum And Auction Authority, Congress Needs A Mobile Wireless Comeback," *Forbes*, accessed August 24, 2023, <https://www.forbes.com/sites/roslynlayton/2022/11/29/winging-it-on-spectrum-and-auction-authority-congress-needs-mobile-wireless-comeback/>.

<sup>20</sup> Jeffrey Wells, "Spectrum Showdown: Can the U.S. Tune into Global Leadership?" *Thescif.org*. August 2023 forthcoming

<sup>21</sup> "Successful Military Radar and 5G Coexistence in the Lower 3 GHz Band: Evidence from Around the World," CTIA, August 15, 2023, <https://www.ctia.org/news/successful-military-radar-and-5g-coexistence-in-the-lower-3-ghz-band-evidence-from-around-the-world>.

<sup>22</sup> Roslyn Layton, "New Study: US Broadband Prices Fell 42% Since 2016," *Forbes*, February 28, 2022, <https://www.forbes.com/sites/roslynlayton/2022/02/28/new-study-us-broadband-prices-fell-42-since-2016/>.

<sup>23</sup> "Measuring the Information Society Report". International Telecommunications Union. 2017. <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2017.aspx>

In the USA, broadband networks were available and resilient during the pandemic when they were needed most.<sup>24</sup> Contrary to some assertions, during the pandemic broadband providers did not block or throttle service, nor did they increase prices arbitrarily or decrease quality.<sup>25</sup> Broadband providers expanded availability, lowered broadband prices, and made more networks available, frequently without customer charge.<sup>26</sup>

While these successes in the broadband market should be recognized, there are important areas for improvement.

From the broadband providers' perspective, competition has driven down average revenue per user (ARPU) both on cable and fixed networks<sup>27</sup> as well as mobile. While consumers overall are getting more broadband value for less, broadband providers have less revenue to invest in network upgrade and expansion.

Rural areas remain challenged because they have a limited number of (or declining number of) subscribers, higher infrastructure costs per subscriber, and subscriber's monthly budget constraints. While broadband is supposed to be a two-sided market, broadband providers essentially and primarily, if not exclusively, earn revenue from subscribers. This means that an important source of revenue from the other side of the market, namely content providers, is not earned and thus those revenues cannot support infrastructure investment and affordability efforts. Unsurprisingly, gaps result, a pain felt particularly in rural areas.

The US is the world's third-largest country at 340 million people.<sup>28</sup> It is expected to grow by 1 million people annually.<sup>29</sup> Indeed the digital divide has narrowed. The FCC reports that since the end of 2016, the number of Americans lacking access to 25/3 Mbps service has decreased by more than 44%, and the urban–rural divide has decreased by over 46%.<sup>30</sup>

While important policy efforts are underway to narrow the digital divide further, US population will continue to increase. While this may improve broadband economics in that some networks may gain more subscribers, the distribution, usage, and subscription revenue from new subscribers are not equal or evenly distributed.

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<sup>24</sup> Layton, Roslyn, "Networks Owners Rise to the Occasion Even in a Pandemic" (2020). *The Regulatory Review*. 333. <https://scholarship.law.upenn.edu/regreview-opinion/333>

<sup>25</sup> Layton, Roslyn, and Mark Jamison. "Net Neutrality in the USA During COVID-19." *Beyond the Pandemic? Exploring the Impact of COVID-19 on Telecommunications and the Internet*. Emerald Publishing Limited, 2023. 195-214.

<sup>26</sup> Ibid

<sup>27</sup> Jeff Baumgartner, "Spotlight Turns to ARPU in US Broadband Battle," Light Reading, March 9, 2023, <https://www.lightreading.com/broadband/spotlight-turns-to-arpu-in-us-broadband-battle/d/d-id/783742>.

<sup>28</sup> Manveena Suri Mackintosh Diksha Madhok, Eliza, "India Will Surpass China as World's Most Populous Country by Mid-Year, UN Says," CNN, April 19, 2023, <https://www.cnn.com/2023/04/19/asia/india-china-population-intl/index.html>.

<sup>29</sup> Abby Budiman, "Key Findings about U.S. Immigrants," *Pew Research Center* (blog), 2020, <https://www.pewresearch.org/short-reads/2020/08/20/key-findings-about-u-s-immigrants/>.

<sup>30</sup> "Fourteenth Broadband Deployment Report," FCC, January 19, 2021, <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/fourteenth-broadband-deployment-report>.

Underserved areas still need to be addressed, and network upgrades are a constant investment priority. This all means that there will be a shortfall of funding in rural areas. Hence broadband policy will remain salient.

While the overall picture of US broadband is an important policy accomplishment, this does not mean that the unserved and underserved should be dismissed. Indeed, many nations experience similar challenges and seek solutions. Shortfalls in broadband investment and adoption have been documented at a global, national, and local levels by multiple sources. The 2021 report from the International Telecommunications Union and UNESCO suggests a global broadband network investment gap of USD \$428 billion-\$2 trillion and calls for financial contributions from the largest online platforms.<sup>31</sup> Such efforts to remedy infrastructure shortfalls and improve affordability are underway in the South Korea,<sup>32</sup> European Union,<sup>33</sup> the Caribbean,<sup>34</sup> Brazil,<sup>35</sup> India,<sup>36</sup> and others. These nations attempt to address challenges from growing traffic from edge providers.

Notably edge providers have attempted to downplay this growth, to say that is it not exponential, only linear. However, even linear growth entails a doubling, if not tripling of traffic in the next 2-4 years.<sup>37</sup>

The United Nations Digital Inclusion report observes that broadband enables people to access essential services for health care, employment, education, emergency, and other human needs.<sup>38</sup> The Covid pandemic increased the urgency for universal broadband as people had to learn, work, and receive healthcare from home.<sup>39</sup> Despite broadband being more

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<sup>31</sup> Broadband Commission "21st Century Financing Models for Bridging Broadband Connectivity Gaps," *Broadband Commission* (blog), October 29, 2021, <https://broadbandcommission.org/publication/21st-century-financing-models/>.

<sup>32</sup> "[간담회] 망 이용대가 입법 논의 재점화를 위.. : 네이버블로그," June 12, 2023, <https://blog.naver.com/yyc8361/223126781150>.

<sup>33</sup> "The Future of the Electronic Communications Sector and Its Infrastructure | Shaping Europe's Digital Future," EU, February 23, 2023, <https://digital-strategy.ec.europa.eu/en/consultations/future-electronic-communications-sector-and-its-infrastructure>.

<sup>34</sup> Andy Bax, "Connecting the Caribbean's Unconnected," *Broadband Communities*, September 2021, <http://www.bbcmag.com/technology/connecting-the-caribbeans-unconnected>.

<sup>35</sup> "SEI/ANATEL - 10020173 - Tomada de Subsídios," Anatel, March 28, 2023, [https://sei.anatel.gov.br/sei/modulos/pesquisa/md\\_pesq\\_documento\\_consulta\\_externa.php?8-74Kn1tDR89f1Q7RjX8EYU46Iz-CFD26Q9Xx5QNDbqYiJNH7rwkhXeXo3WfvrhUb0PHMGw8p5aR24P0OlwCDUyM1xwmW482e3ugs0--XO-xywVYs1nVv14z49I3MOGWZm](https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?8-74Kn1tDR89f1Q7RjX8EYU46Iz-CFD26Q9Xx5QNDbqYiJNH7rwkhXeXo3WfvrhUb0PHMGw8p5aR24P0OlwCDUyM1xwmW482e3ugs0--XO-xywVYs1nVv14z49I3MOGWZm).

<sup>36</sup> "Indian Telecommunication Bill, 2022 | Department of Telecommunications | Ministry of Communication | Government of India," 2022, <https://dot.gov.in/relatedlinks/indian-telecommunication-bill-2022>.

<sup>37</sup> "Operators and Vendors Need to Plan for More Conservative Mobile Data Growth in the near Future," *Analysis Mason*, August 1, 2023, <https://www.analysismason.com/research/content/articles/cellular-data-traffic-rdnt0/>.

<sup>38</sup> "Digital Inclusion" (Roundtable of Digital Inclusion, n.d.), [https://www.un.org/techenvoy/sites/www.un.org.techenvoy/files/general/Definition\\_Digital-Inclusion.pdf](https://www.un.org/techenvoy/sites/www.un.org.techenvoy/files/general/Definition_Digital-Inclusion.pdf).

<sup>39</sup> Whalley, Jason, Volker Stocker, and William Lehr, eds. "Beyond the Pandemic? Exploring the Impact of COVID-19 on Telecommunications and the Internet." (2023).



important and necessary than ever, adoption efforts have stalled at 3.7 billion people, half of the world's population for lack of access and affordability.<sup>40</sup>

The FCC reports that 17 percent of Americans in rural areas and 21 percent of Americans in tribal areas lack access under the current 25/3 Mbps broadband benchmark.<sup>41</sup> Some 20 million Americans lack access to high-speed broadband service, according to the Commission's 14th Broadband Deployment Report<sup>42</sup> and further suggested by the FCC's Broadband Map<sup>43</sup> notes underserved 8.3 million locations.<sup>44</sup> FCC Chairwoman Jessica Rosenworcel has suggested that additional investment and affordability efforts are necessary for successful advancement of broadband services.<sup>45</sup> Moreover, the ongoing operating costs of networks have emerged as a key policy issue.<sup>46</sup>

The European Commission's consultation on the *future of electronics communications networks and their infrastructures* notes<sup>47</sup> an EUR €174 billion investment gap.<sup>48</sup> To reach similar goals for the United Kingdom, the Digital Connectivity Forum estimates a GBP £25 billion gap in investment must be addressed.<sup>49</sup>

Many people struggle financially to afford broadband, whether in rural or Tribal areas, disadvantaged communities, the elderly, those with disabilities, and other groups. Some 20 million households have taken advantage of the Affordable Connectivity Program (ACP).<sup>50</sup> A forthcoming report from Connected Nation suggest that at least 15 million more are eligible, but which have not subscribed for lack of knowledge of the program. This suggests Congress should extend the ACP and find a sustainable source of revenue to fund it. The GAO has

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- <sup>40</sup> "WSIS Forum 2023: Digital must be leveraged to put sustainable development back on track." ITU.com. March 13, 2023 <https://www.itu.int/hub/2023/03/wsis-forum-2023-digital-must-be-leveraged-to-put-sustainable-development-back-on-track/>
- <sup>41</sup> "Fourteenth Broadband Deployment Report," FCC, January 19, 2021, <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/fourteenth-broadband-deployment-report>.
- <sup>42</sup> *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 20-269, Fourteenth Broadband Deployment Report, 36 FCC Rcd 836, 857, Fig. 3b (2021) (reporting that 19.2 million Americans did not have access to both 25/3 Mbps fixed broadband as well as 10/3 Mbps mobile broadband).
- <sup>43</sup> "FCC National Broadband Map," FCC National Broadband Map, accessed June 16, 2023, <https://broadband-map.fcc.gov>.
- <sup>44</sup> "National Broadband Map: It Keeps Getting Better," accessed June 16, 2023, <https://www.fcc.gov/national-broadband-map-it-keeps-getting-better>.
- <sup>45</sup> "Chairwoman Rosenworcel Proposes to Increase Minimum Broadband Speeds," FCC, July 15, 2022, <https://www.fcc.gov/document/chairwoman-rosenworcel-proposes-increase-minimum-broadband-speeds>.
- <sup>46</sup> Federal Communications Commission. "FCC Reports to Congress on Future of the Universal Service Fund." August 15, 2022. <https://www.fcc.gov/document/fcc-reports-congress-future-universal-service-fund>
- <sup>47</sup> "The Future of the Electronic Communications Sector and Its Infrastructure | Shaping Europe's Digital Future," February 23, 2023, <https://digital-strategy.ec.europa.eu/en/consultations/future-electronic-communications-sector-and-its-infrastructure>.
- <sup>48</sup> "The Future of the Electronic Communications Sector and Its Infrastructure | Shaping Europe's Digital Future."
- <sup>49</sup> "THE INVESTMENT GAP TO FULL 5G ROLLOUT" (Frontier Economics, September 7, 2022), <https://www.connectivityuk.org/wp-content/uploads/2022/09/The-Investment-Gap-to-Full-5G-Rollout.pdf>.
- <sup>50</sup> "ACP Enrollment and Claims Tracker," *Universal Service Administrative Company* (blog), accessed August 24, 2023, <https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/>.

recognized the FCC's sound management of the program with the Universal Service Administrative Company (USAC).<sup>51</sup>

Grants from the Infrastructure Investment and Jobs Act (IIJA), however welcome, are insufficient to resolve the gaps. For one, IIJA monies face hurdles to be effective. Notably, the money is distributed across too many organizations,<sup>52</sup> creating headaches for oversight, administrative overlap, and confusion among potential grantees. In future, Congress should focus broadband subsidies through a single agency and leverage the skill and expertise of the FCC. While the IIJA monies will likely fund the fixed costs of some new builds, operating costs of broadband networks are growing on account of video traffic. In some networks, these operating costs exceed fixed costs.

Unfortunately, IIJA grants are based on deficit spending and are not financially sustainable. The US, like many nations, engaged in Covid-19 spending and now suffers the consequences of inflation, depleted savings, and shortages for many social programs.<sup>53</sup> In addition, the US had been growing its debt long before Covid-19, and today at \$32 trillion,<sup>54</sup> US fiscal deficit amounts to some \$10 million for every American. The US credit worthiness was recently downgraded as a result of profligate spending<sup>55</sup> and various programs, like the USF itself, are on track to insolvency.<sup>56</sup>

In any event, it is not logical or supportable that the digital economy be subsidized by deficit spending. There is enough cash flow in the market to fund the needed investment and affordability efforts. However, the relevant parties, namely edge providers, refuse to come to the table.

### **Big Six edge providers should contribute financially and systematically**

Alphabet, Meta, Amazon, Microsoft, and Apple together earn \$1.5 trillion in annual revenue and enjoy some \$9 billion in market capitalization.<sup>57</sup> These companies are key users of America's broadband networks, and indeed their traffic (with Netflix and TikTok included)

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<sup>51</sup> Roslyn Layton, "GAO Highlights \$14 Billion Broadband Subsidy Program's Success And How To Improve," *Forbes*, January 31, 2023, <https://www.forbes.com/sites/roslynlayton/2023/01/31/gao-highlights-14-billion-broadband-subsidy-programs-success-and-how-to-improve/>.

<sup>52</sup> "IIJA Guidebook" (GFOA, May 2022), [https://gfoaorg.cdn.prismic.io/gfoaorg/0727aa5a-308f-4ef0-addf-140fd43acfb5\\_BUILDING-A-BETTER-AMERICA-V2.pdf](https://gfoaorg.cdn.prismic.io/gfoaorg/0727aa5a-308f-4ef0-addf-140fd43acfb5_BUILDING-A-BETTER-AMERICA-V2.pdf).

<sup>53</sup> "Closing the SDG Financing Gap in the COVID-19 Era" (OECD, n.d.), <https://www.oecd.org/dev/OECD-UNDP-Scoping-Note-Closing-SDG-Financing-Gap-COVID-19-era.pdf>.

<sup>54</sup> "Fiscal Data Explains the National Deficit," *Fiscal Data*, accessed April 25, 2023, <https://fiscaldata.treasury.gov/americas-finance-guide/national-deficit/>.

<sup>55</sup> "Fitch Downgrades the United States' Long-Term Ratings to 'AA+' from 'AAA'; Outlook Stable," *Fitch Ratings*, August 1, 2023, <https://www.fitchratings.com/research/sovereigns/fitch-downgrades-united-states-long-term-ratings-to-aa-from-aaa-outlook-stable-01-08-2023>.

<sup>56</sup> "The Future of the Universal Service Fund and Related Broadband Programs" (CRS, July 11, 2023), <https://crsreports.congress.gov/product/pdf/R/R47621>.

<sup>57</sup> Author calculation based upon publicly available data.

comprises more than half of all US broadband network traffic.<sup>58</sup> These companies, the so-called “Big Six”,<sup>59</sup> should be forthright financial partners to ensure broadband access and affordability to all Americans. Instead, they feign responsibility, like innocent bystanders on the information super highway.

Hardly disinterested or non-interventionists players, Big Six business models are predicated on maximizing the number of “users” and their access to broadband networks. There is a world of difference between the “Big 6” and the “long tail” of millions of “edge providers”, e.g. online businesses, websites, apps, digital services, and so on. The term generic term “edge provider” distorts substantial differences among internet companies in size, scale, revenue, users, and power, whether market or political.

In any event, the economics literature of two-sided markets suggests that in a *competitive market*, edge providers would willingly and financially engage with broadband providers to ensure networks are built and to maximize network access. Indeed, the idea is getting everyone “on board” at a range of competitive price points and bundles presumably maximizes revenue for edge providers and broadband providers.<sup>60</sup>

Indeed, edge providers have strategic business models that are largely based on services which come at no cost to the consumer; rather third parties—advertisers—underwrite many edge providers’ services. In the same way, edge providers should underwrite the cost of data on broadband providers’ networks, notably the advertising data which can devour 25% or more of a mobile subscription.<sup>61</sup> For fixed subscriptions, video consumes at least two-thirds of total data, if not more.<sup>62</sup>

However, the Big 6 edge providers do not come to table with most broadband providers to negotiate. Moreover, in many cases, they have torpedoed pricing innovations which would help make broadband more affordable and accessible and help to recover revenue for network investment.<sup>63</sup>

Persistent gaps in investment and adoption show that the status quo is not working. Suggested explanations for market and government failure include policy choices or failure to evolve policy (e.g. broadband pricing optimized for streaming video entertainment, not essential social services<sup>64</sup>), inability for broadband providers to recover costs from streaming

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<sup>58</sup> Sandvine. Global Internet Phenomena Report 2023. <https://www.sandvine.com/global-internet-phenomena-report-2023> Accessed August 25, 2023

<sup>59</sup> Ibid

<sup>60</sup> Rochet, Jean-Charles, and Jean Tirole. "Platform competition in two-sided markets." *Journal of the european economic association* 1.4 (2003): 990-1029.

<sup>61</sup> “Adblock Plus Efficacy Study,” 2015, <http://www.sfu.ca/content/dam/sfu/snfchs/pdfs/Adblock.Plus.Study.pdf>.

<sup>62</sup> Ibid Sandvine

<sup>63</sup> Roslyn Layton, “Zero Rating is the free sample in the internet ice cream store.” ProMarket.org. June 21, 2023. <https://www.promarket.org/2023/06/21/zero-rating-is-the-free-sample-in-the-internet-ice-cream-store/>

<sup>64</sup> Justin (Gus) Hurwitz & Roslyn Layton, Debatable Premises in Telecom Policy, 31 J. Marshall J. Info. Tech. & Privacy L. 453 (2015)



services,<sup>65</sup> lack of affordability,<sup>66</sup> overly strict policy on consolidation,<sup>67</sup> misguided price regulation or other network regulation, unrealistic expectations by policymakers, and so on.

The bulk of broadband traffic today consists of streaming media content that is delivered by a small number of global firms. Edge providers have developed a myriad of ways to monetize the content, be it through advertising, paid content bundles, image quality, tolerating or (alternately) cracking down on password sharing, etc. Broadband providers have only started to find ways to monetize the consumer demand for streaming media traffic and are constrained (in most markets) by long-standing pricing practices, affordability concerns as well as by regulation.<sup>68</sup>

Broadband access and content are industries with high sunk cost and low marginal cost. Network access providers, however, have higher ongoing costs. Markets are driven by consumer valuations, product differentiation and bundling. Simulations show it is very unlikely that simply repricing the network access in reaction to the introduction of the content product to be optimal for firms or for consumers.<sup>69</sup>

So, the question emerges to what degree should policy evolve to reach its stated goals and how should business models adapt given the changing economics of the internet. To date, edge providers engage robustly to bundle and price their products competitively and compellingly. The consumers realize these benefits with a vast array of content and streaming providers. However, when it comes to broadband, it is plain vanilla. Consumers have the *de facto* or *de jure* choice of flat rate data packages based on speed tiers. The model essentially puts the full cost of broadband on the consumer; whereas other business models engage third parties so that the end user can access the service at a free or reduced price. Broadband providers are limited not only in their ability to offer broadband in consumer-centric bundles, but in their ability to recover costs from content providers to address network investment shortfalls and where possible, lower costs to end users.

The UN report on 21<sup>st</sup> century financing suggests that edge providers must be incorporated into broadband policy in a systematic and realistic way. It notes an urgency to address the gap should nations want to achieve their connectivity goals; and there is a need to augment

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<sup>65</sup> Layton, Roslyn and Potgieter, Petrus H., Rural Broadband and the Unrecovered Cost of Streaming Video Entertainment (June 11, 2021). ITS Gothenburg June 2021, Available at SSRN: <https://ssrn.com/abstract=3820644>

<sup>66</sup> John Horrigan, "Reimagining Lifeline: Universal Service, Affordability, and Connectivity," Benton Foundation, February 22, 2022, <https://www.benton.org/publications/reimagining-lifeline>.

<sup>67</sup> Potgieter, Petrus H. and Howell, Bronwyn, Cardinality Bundling Under Oligopoly – a Simulation Model (August 2, 2021). TPRC49: The 49th Research Conference on Communication, Information and Internet Policy, Available at SSRN: <https://ssrn.com/abstract=3897641> or <http://dx.doi.org/10.2139/ssrn.3897641>

<sup>68</sup> Howell, Bronwyn E. and Potgieter, Petrus H., The Profitability of Flat-Price Broadband with An Over-The-Top Subscription Content Product – Benefits from Cooperation (August 1, 2022). Available at SSRN: <https://ssrn.com/abstract=4179037> or <http://dx.doi.org/10.2139/ssrn.4179037>

<sup>69</sup> Howell, Bronwyn E. and Potgieter, Petrus H., Content and Access Bundling: Simulating Complex Scenarios (July 26, 2019). TPRC47: The 47th Research Conference on Communication, Information and Internet Policy 2019, Available at SSRN: <https://ssrn.com/abstract=3427022> or <http://dx.doi.org/10.2139/ssrn.3427022>

and expand financing and investment models for broadband.<sup>70</sup> These new approaches include broadening the base of contributors, ensuring that those which derive financial benefits from the network, also contribute financially, particularly to “connect the unconnected”; that the contributions should be sustainable and predictable; and that they should be managed efficiently and disbursed in a timely and prioritized manner.”<sup>71</sup> In other words, neither should consumers nor taxpayers bear the entire burden of the cost of broadband networks; enterprises, namely edge providers, should participate. Moreover, those with resources have the social responsibility to help connect those who don’t.

However, negotiation to recover infrastructure costs between broadband providers and edge content providers is limited or nonexistent. The market is governed by a purported settlement free exchange of traffic.<sup>72</sup> It is difficult to determine whether this is optimal as it is little studied.

The lack of contract negotiations could be indicative of larger problems of market power. Big Six edge providers could be refusing to negotiate or broadband providers, feeling powerless, never try to engage. There are other issues of asymmetric information and relative bargaining power to overcome as well. The Nobel economist George Akerlof suggested that the problem is not that one side gets a bad deal in negotiation, but that the negotiation does not happen at all.<sup>73</sup> In other words, trades which should happen, don’t. This may in part explain the gap in infrastructure investment.

In any event, the dearth of contracts for data delivery in a world with petabytes of data exchange is suspicious. In such situations in which a market actor engages anti-competitively, government intervention is needed to stop abuse and restore competition.

A legal audit should be performed to review whether and which certain edge providers should contribute to USF today, but don’t. It may be the case that the relevant edge providers are already covered under existing statutes. For example, Big Six edge providers could be exercising (excessively) self-provision exemptions and hence do not contribute to universal service but should. It could also be that cloud computing services already satisfies the statutory interexchange service conditions for USF contributions.

USF is not the only means to achieve broadband goals. Indeed some of the most important advances have been achieved outside of regulated and legislated efforts, notably Comcast’s Internet Essentials program, which until the ACP, was likely the most successful broadband adoption program in the US.<sup>74</sup> Indeed Congress should encourage such voluntary, bottom up

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<sup>70</sup> Ibid "21st Century Financing Models for Bridging Broadband Connectivity Gaps."

<sup>71</sup> Ibid

<sup>72</sup> John Hjembo. "Understanding Peering." *Telegeography*. November 22, 2019 <https://blog.telegeography.com/settlement-free-paid-peering-definition>

<sup>73</sup> George A. Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *The Quarterly Journal of Economics* 84, no. 3 (1970): 488–500, <https://doi.org/10.2307/1879431>.

<sup>74</sup> Roslyn Layton. 8 Million Low Income Households Connected in 8 Years. August 19, 2019. *Forbes*. <https://www.forbes.com/sites/roslynlayton/2019/08/07/8-million-low-income-households-connected-in-8-years-policy-takeaways-from-comcasts-internet-essentials/>

solutions where providers engage to meet the needs of their customers. Such programs likely require scale economies and are not necessarily solutions for rural areas. In any event, Congress should take stock of the benefits and advantages of USF, which include it being a recognized, established, and legitimate federal program with reliable expertise from the FCC. It makes sense to build upon proven elements of the USF at the FCC rather than reinvent the wheel with a smattering of subsidy programs across the federal government.

### **Why financial contributions from Big Six edge providers would be equitable, ethical and effective to deliver broadband goals**

The Working Group poses important questions about USF. While there is bipartisan commitment to connectivity and to help key stakeholders like schools, hospitals, libraries, and rural broadband providers, there is a similar bipartisan desire to improve the program design and execution. For example, Members from both parties seek to reduce the financial burden of cost on consumers and to improve oversight and efficiency at USAC. Could universal service ever be realized without the USF?

Naturally, market-based approaches are first-best.<sup>75</sup> But they are not always politically palatable. For example, for the US to allow pure market approach to broadband, Big Six edge providers would need to be forced to the table to negotiate pricing with thousand of providers, and there some FCC regulations would have to be eliminated or changes in order to allow consumers the freedom to bargain for different prices for data and services.

A second-best option of a lightly regulated solution involving the Big Six can also deliver broadband goals. So how to deliver the USF goals with a light touch on the USF? For one, having assessment methods which can't be passed on to consumers is key. Secondly, the program should involve minimal administration/paperwork and rely on methods which are transparent, based on market conditions, and require minimal accounting. Could there be less administrative and political angst and more collaboration to close the digital divide?

As for minimal administration, Congress should consider that it is far more efficacious to focus on a handful of large edge providers for contributions rather than 3,600 broadband providers. Assessments on the Big Six could deliver more revenue at far lower percentages (single digit or even fractional percentages) than what can be collected from broadband providers. Moreover, advertising platforms run by Alphabet and Meta do not have customer relationships with end users which prohibits those entities from simply passing through fees to consumers. Alternatively, large edge providers could pay flat fees based upon the new users and new revenue which they receive as a result of the public investment made by the government in its broadband and internet affordability programs. Another method is to place a modest surcharge on the businesses that own and operate the cloud. These cloud computing contracts are not connected to end users, so fees could be passed through. These kinds

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<sup>75</sup> Blackman, Colin, and Lara Srivastava. *Telecommunications regulation handbook*. World Bank and the International Telecommunication Union, Washington, DC, 2011.

of business-to-business assessment strategies could potentially deliver as much as \$9 billion in the USF today, and indeed the \$17 billion which runs the ACP currently for 20 million households. This works out to be \$850 per year per ACP household, the average of the current program for all households.<sup>76</sup>

Beyond the important legal and statutory discussion, the provision of USF and broadband subsidies involve three key questions: What is equitable? What is ethical? And what is effective?

Broadband policy is evolving to include the notion of equity, which imagines broadband beyond purely technical measures of speed and deployment, but how broadband is used to enable social goals for health, education, work.<sup>77</sup> Equity takes into account that which is fair and impartial. Notably, the FCC poses this question in its review of the Future of Universal Service, and it posits how to change and update the programs to meet the USF mission and goals. As such, most of the cost of USF contributions is borne by voice subscribers today. That is hardly equitable from the point of view of service or subscriber.

The next question is an ethical or moral one as to which parties should participate in USF. Who should receive USF funds? Who should contribute? For example, the ACP demonstrates the value of vouchers to individual end users who can choose their preferred technology. However, it could also be that it is important for certain entities like schools, hospitals, and rural broadband providers to receive funds directly from the USF because they may be the only service provider in the region.

Similarly, what is ethical for contributions? Firms which should participate in USF, notably the large edge providers, advocate to increase fees on telecom providers, while eschewing all responsibility for contributing themselves. In fact, the Big Six purport to be broadband infrastructure investors as a strategy to avoid making contributions. This communication is unethical and misleading, and it should stop.

Finally, there are contribution questions: What is effective? what will succeed to produce desired result? While contributions on voice subscriptions deliver funds to USF, the method is not equitable, ethical, or sustainable. That can't be effective for long-term success. Nor are USF assessments on broadband providers or subscriptions effective because these fees can be passed on to subscribers, so such a system will likely result in lost subscribers. The rationale of assessing the advertising platforms is that the fees cannot be passed on to end users, at least not in the same way. Moreover, online advertising has great growth potential in the US and is on track to devour traditional, offline advertising. So, the largest online advertising platforms are a growing source of revenue unlike voice subscriptions today which are declining rapidly.

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<sup>76</sup> Author's calculation.

<sup>77</sup> Lee, Nicol Turner, et al. "Why the federal government needs to step up efforts to close the rural broadband divide, Report# 1 of the Rural Broadband Equity Project." (2022).

The experience of Australia’s News Media Bargaining Code is instructive.<sup>78</sup> Once the Act was passed the two largest platforms, Alphabet and Meta, started serious commercial negotiations with the news media businesses. Commercial agreements estimated to be valued at AUS\$200 million per annum were agreed with Australian news media businesses. As a result, the Minister has not to date taken action against, e.g. “designated” either platform. As such the threat of “designation” may have been more powerful than the threat of contract arbitration. Simply put, Congress could either give the FCC authority to assess large edge providers or Congress could require the largest edge providers to come to the table and negotiate with the broadband providers to negotiate cost recovery for the delivery of their data which today is delivered for free.

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<sup>78</sup> Sims, Rod, Instruments and Objectives; explaining the News Media Bargaining Code (May 23, 2022). Available at SSRN: <https://ssrn.com/abstract=4116964>