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I. INTRODUCTION

A. QUALIFICATIONS

1. My name is Susan M. Baldwin. I am located at 45 Acorn Path, Groton, Massachusetts, 01450. I am an independent consultant specializing in the economics, regulation and policy of telecommunications and broadband markets since 1984, with a more recent focus that also includes consumer issues in electric and gas markets. During the past 37 years, I was the Director of Publications and Tariff Research, and later, Senior Vice President of Economics and Technology, Inc., a firm which specializes in the economics and regulation of telecommunications, and also served as the Director of the Telecommunications Division for the Massachusetts Department of Public Utilities, where I advised the then three-member commission on all matters relating to the intrastate and interstate regulation of the Massachusetts telecommunications industry. Since 2001, I have been an independent consultant, often collaborating with other independent consultants.
2. In my capacity as an independent consultant, I have and continue to prepare testimony, reports, declarations, and affidavits on behalf of the National Association of State Utility Consumer Advocates (“NASUCA”) and many of its member organizations,¹ the Communications Workers of America, the International Brotherhood of Electrical Workers, and various state tax agencies. I have testified in more than 75 state regulatory proceedings before 24 state public utility commissions. I have also submitted numerous

¹ These have included engagements separately with each of the following NASUCA members: AARP, Arkansas Office of the Attorney General, Connecticut Office of Consumer Counsel, District of Columbia Office of the People’s Counsel, Office of the Illinois Attorney General, Illinois Citizens Utility Board, Iowa Office of Consumer Advocate, Maryland Office of People’s Counsel, Massachusetts Office of Attorney General, New Hampshire Office of Consumer Advocate, New Jersey Division of Rate Counsel, Pennsylvania Office of Consumer Advocate, The Utility Reform Network, Utah Office of Consumer Services, and Washington Office of Attorney General.

declarations to the Federal Communications Commission (“FCC” or “Commission”) and assisted with comments submitted in dozens of FCC proceedings.

3. I received a Bachelor of Arts in Mathematics and English from Wellesley College, a Master of Public Policy from the Harvard School of Government, and a Master of Economics from Boston University. Attachment A to this declaration includes more detailed information about my qualifications.

B. ASSIGNMENT

4. The FCC has invited comments to refresh the record on issues raised by NASUCA in its 2016 Petition for Reconsideration of the FCC’s Third Report and Order re Lifeline Reform.² NASUCA requested that I assist with refreshing the record.

II. BACKGROUND

5. In the 2016 Lifeline Modernization Order,³ the FCC set forth a transition in the Lifeline program away from voice services and toward broadband services. Under the FCC’s time line, support for voice-only services are scheduled to end on December 1, 2021, with an exception in the amount of \$5.25 per subscriber per month, for qualifying voice-only services provided to Lifeline eligible subscribers in Census blocks where there is only one Lifeline provider. The Commission directed the Wireline Competition Bureau to identify Census blocks where there is only one Lifeline provider and to announce those Census blocks by June 1 of each year.⁴

² *Wireline Competition Bureau Seeks to Refresh the Record on a Petition for Reconsideration Filed by the National Association of State Utility Consumer Advocates*, Public Notice, DA 21-641 (WCB June 1, 2021). The Commission subsequently granted an extension of time for submitting comments. DA 21-762, *In the Matter of Lifeline and Link Up Reform and Modernization*, Order, June 25, 2021.

³ *Lifeline and Link Up Reform and Modernization et al.*, WC Docket No. 11-42, Third Report and Order, Further Report and Order, and Order on Reconsideration, 31 FCC Rcd 3962 (2016) (“*Lifeline Modernization Order*”).

⁴ The FCC released its most recent list of such census blocks on June 1, 2021, and, among other things, stated: “This Public Notice is not intended to prejudice the pending Petition for Reconsideration from the National Association of

6. Also, the *Lifeline Modernization Order* required the Wireline Competition Bureau to issue a “Report on the State of the Lifeline Marketplace” in the summer of 2021, which was issued, and which I reviewed as part of my preparation for this declaration.⁵
7. On June 23, 2016, NASUCA filed a petition for reconsideration of the following four issues:
 - a. The decision to eliminate Lifeline support for stand-alone voice services;
 - b. The failure to adopt regulations so that those participants who cannot afford bundled service can still purchase basic voice service;
 - c. The failure to require providers to offer payment arrangements for back-up power for Lifeline customers; and
 - d. The failure to reform the universal service contribution mechanism to require contribution from broadband services.⁶
8. In this declaration, I focus primarily on the first and fourth issues. I demonstrate that the FCC should reinstate full subsidies for voice-only Lifeline participants, consistent with universal service principles,⁷ and to avoid unnecessary consumer harm, especially to older

State Utility Consumer Advocates (NASUCA), which requested that the Commission reconsider the phase down in Lifeline support for voice-only services.” DA 21-640, Wireline Competition Bureau Announces Census Blocks in which Eligible Lifeline Consumers Can Continue to Receive Discounted Voice-Only Lifeline Services, WC Docket Nos. 11-42, 09-197, 10-90, Released: June 1, 2021, stating (cite omitted): “Today, the Wireline Competition Bureau (Bureau) announces those Census blocks where Lifeline support for voice-only service will continue at \$5.25 per month from December 1, 2021 through November 30, 2022.” For a list of these census blocks, see the Universal Service Administrative Company’s (USAC) website here: https://www.usac.org/wpcontent/uploads/lifeline/documents/Data/voice_CB_blocks.zip.

⁵ “Report on the State of the Lifeline Marketplace, WC Docket No. 09-197, WC Docket No. 11-42, WC Docket No. 20-437, Prepared by the Wireline Competition Bureau, Submitted to the: Federal Communications Commission, June 2021 (“*Lifeline Marketplace Report*”).

⁶ National Association of State Utility Consumer Advocates Petition for Reconsideration, WC Docket Nos. 11-42, 09-197, 10-90 (filed June 23, 2016) (“NASUCA Petition”), pp. 1-2, citing Order, ¶¶ 117, 282, and 395.

⁷ “Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided

adults who disproportionately subscribe to voice-only services. Voice connections are essential for public safety and welfare, and not all customers can afford (or necessarily want) broadband service. The fact that the current universal service fund (“USF”) contribution mechanism is broken has been well-established. I demonstrate that voice revenues are declining and the USF surcharge is increasing, and that the FCC should include broadband revenues in the base upon which the USF surcharge is assessed. The USF supports broadband services and deployment, and it is fair and appropriate that revenues from those services contribute to USF programs.

III. SUPPORT FOR VOICE-ONLY SERVICES

A. The FCC should reinstate and continue full subsidies for voice-only Lifeline participants.

9. Discontinuing subsidies for voice-only service will harm consumers. Older adults are among those disproportionately harmed if the Commission does not grant NASUCA’s Petition and restore full Lifeline support for voice only services. As I discuss in Section IV, below, older adults are less likely to have smartphones, and, so disproportionately rely on voice-only services, whether offered over “no-frills” cell phones or over landlines.
10. With respect to landline connections, 35 percent of adults 65 and over continue to rely on landlines, meaning that only 65% of adults 65 and older are wireless only.⁸ In sharp contrast, four in five adults aged 25–29 (80.4%) and aged 30-34 (83.0%) are wireless-only;

in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas.” 47 USC § 254(b)(3).

⁸ “Wireless Substitution: Early Release of Estimates From the National Health Interview Survey,” January-June 2020, Stephen J. Blumberg, Ph.D., and Julian V. Luke, Division of Health Interview Statistics, National Center for Health Statistics (“Wireless Substitution Report”), p. 3.
<https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless202102-508.pdf>

and for adults aged 18–24, 72.6%. (The percentage of adults who are wireless-only decreases as age increases beyond 35 years: 74.5% for those 35–44; 58.5% for those 45–64; and 35.0% for those 65 and over. ⁹)

11. Moreover, 16.5 percent of adults 65 and over rely mostly on landline and 10.4 percent rely solely on landlines. ¹⁰

12. Since older persons are less likely to subscribe to broadband service than are other adults¹¹ and since the vast majority of VoIP subscriptions are provided as part of a bundle with broadband service,¹² older persons are likely to comprise a disproportionate percentage of the 30 percent of residential fixed voice connections that were switched access as of December 2019.¹³

13. Regarding wireless voice, the Pew Center research shows that older adults are more likely to subscribe to wireless voice without broadband:

While the share of adults ages 65 and older who have a smartphone has increased from 53% to 61% in the past two years, this age cohort remains far less likely than younger groups to report having this type of mobile device. As was the case in 2019, ownership rates also vary among the oldest

⁹ *Wireless Substitution Report*, p. 5. Adults living in poverty (69.7%) and near poverty (66.8%) are more likely than higher income adults (61.1%) to be wireless-only. *Id.* This is consistent with the data I discuss later showing that low-income people are more likely to depend on smartphones for voice and broadband (because they cannot afford both).

¹⁰ *Wireless Substitution Report*, p. 3.

¹¹ “Internet Broadband Fact Sheet,” Pew Research Center Internet & Technology, April 7, 2021 (“Pew Internet/Broadband Fact Sheet”) available at <https://www.pewresearch.org/internet/fact-sheet/internet-broadband/>

¹² “Voice Telephone Services: Status as of June 30, 2019,” FCC Industry Analysis Division, Office of Economics and Analytics, April 2021. As of June 30, 2019, there were 2,227,000 residential over-the-top VoIP services, and 35,124,000 interconnected residential VoIP lines. *Id.*, p. 5, Figure 3. Including residential and business customers, 50,530,000 interconnected VoIP subscriptions were sold with internet and only 5,213,000 interconnected VoIP subscriptions were sold without internet, which means that 91 percent of all interconnected VoIP subscriptions are sold *with* internet access. *Id.*, p. 6, Figure 4.

¹³ *Lifeline Marketplace Report*, p. 12. As a separate matter, households’ increasing reliance on VoIP underscores the importance of ensuring that Lifeline customers have affordable options for back-up power when they subscribe to bundled broadband-VoIP offerings. Such offerings could include payment plans, or, at a minimum, requirements that providers offer back-up power at cost, i.e., without marking up the price.

adults: 71% of adults ages 65 to 74 say they are smartphone owners, but that share falls to 43% among those 75 and older.¹⁴

14. US Telecom’s filing with the FCC earlier this year is consistent with these trends showing that older adults would be disproportionately harmed by premature elimination of voice-only subsidies for Lifeline participants. US Telecom stated:

With respect to current Lifeline subscriptions, USTelecom members have varying levels of voice-only versus voice and data subscriptions dependent upon where they provide service. The percentage of current Lifeline customers that are voice-only ranges from 50 percent to 80 percent. In the wireline telecommunications space, the typical Lifeline customer is a voice-only, elderly customer for whom a broadband connection is not a priority. Ultimately, what this means is that as the support for standalone voice continues to decrease there will be a large number of customers for whom support will be removed. As such, the Commission should delay the phase out of standalone voice support until December 1, 2022 to allow more time to gather more data on the connectivity needs of low-income individuals and families – data that can be gleaned from the implementation of the Emergency Broadband Benefit (EBB) program.¹⁵

15. Bundles of broadband and voice are expensive, and so those who choose to subscribe to voice-only services should be allowed to do so and still participate fully in the Lifeline Program. While I fully support measures to encourage, facilitate, and enable all Americans to subscribe to reliable, affordable high-speed internet access, it would be entirely unfair to require those with the least financial resources to subscribe to broadband in order to participate in the Lifeline program.

¹⁴ Pew Research Center, *Mobile Technology and Home Broadband 2021*, (June 3, 2021) (“June 2021 Pew Report”). <https://www.pewresearch.org/internet/2021/06/03/mobile-technology-and-home-broadband-2021/>

¹⁵ Comments of US Telecom – The Broadband Association, WC Docket No. 11-42, April 19, 2021, p. 2 (cite omitted).

16. The FCC has included data collection and analysis as an integral element of the EBB Program.¹⁶ Based on data collected, the FCC will be better-positioned to assess the timing and merits of discontinuing voice service for Lifeline participants.
17. Although broadband service offers many benefits, phasing out Lifeline support for voice-only services would unnecessarily burden low-income households with higher prices for voice services, or worse lead to disconnections. Affordable voice connectivity is essential to public safety and welfare. Adequate voice-only subsidies are consistent with and necessary for universal service.
18. Moreover, copper landlines function during power outages, and 9-1-1 is more reliable with landlines than over-the-top VoIP. Moreover, as NTCA noted:

As an initial matter, the phase-down of support for standalone voice in the Lifeline proceeding is particularly perplexing as it comes less than one year after the Commission adopted battery backup power rules applicable to providers of facilities-based, fixed, non line powered voice service. These rules were adopted in significant part due to a recognition of the importance of consumers' access to emergency services and the recognition that access to a voice service could be the difference between life and death. Yet, the Commission's action in this proceeding threatens to leave a number of low-income consumers that cannot afford a bundled voice and broadband service without access to a voice service at all.¹⁷

¹⁶ The FCC stated:

However, we agree that more information about the communities the EBB Program serves could help the Commission evaluate the success of this program and could inform future broadband-related initiatives. Therefore, to be transparent about participation in the EBB Program, we direct USAC to submit a report to the Commission that provides information about how households qualified for the EBB Program, the claimed support amounts for connected devices and services, the geographic locations of consumers at the county level, and other information that the Bureau, in consultation with USAC, believes would be essential for evaluating the program. This report shall be filed with the Bureau no more than six months after the initiation of the EBB Program, with updates submitted as necessary to capture additional information about the EBB Program and participating households obtained after the submission of the report.

In the Matter of Emergency Broadband Benefit Program, WC Docket No. 20-445, Report and Order, FCC 21-29, released February 26, 2021, ¶ 113.

¹⁷ Petition for Reconsideration / Clarification of NTCA – The Rural Broadband Association and WTA – advocates for Rural Broadband, June 23, 2016, WC Docket No. 11-42, p. 7, citing Ensuring Customer Premises Equipment

19. Consumers are in the best position to choose the services that meet their particular needs and income constraints. There is little benefit to be gained and much harm to result if the FCC denies NASUCA's Petition on this point. In sum, I recommend that the Commission reinstate full Lifeline support for voice-only services, and continue to gain a more detailed understanding of the potential harm to those individuals who continue to rely on the Lifeline Program to stay connected to the telecommunications network, if such subsidies were to expire.

IV. FUNDING MECHANISM FOR USF PROGRAMS

A. The funding mechanism for USF programs is not sustainable, nor is it fair

20. As I demonstrate below, consumers that rely on the Lifeline Program (and indirectly on other USF programs) are harmed because the USF is not sustainable, which, in turn jeopardizes the viability of the various programs. Consumers that pay contribution surcharges are harmed by an ever-increasing surcharge on their phone bills, which makes essential services less affordable, thwarting the goal of universal service.

21. The FCC most recently proposed a USF surcharge of 31.8 percent for the third quarter of 2021.¹⁸ This is more than *five times* the USF surcharge of 5.7101 percent proposed by the FCC for the second quarter of 2000.¹⁹

Backup Power for Continuity of Communications, PS Docket No. 14-174, FCC 15-98, Report and Order (rel. Aug. 7, 2015).

¹⁸ FCC Public Notice, DA 21-676, "Proposed Third Quarter 2021 Universal Service Contribution Factor," CC Docket No. 96-45, released: June 10, 2021. See also <https://www.fcc.gov/general/contribution-factor-quarterly-filings-universal-service-fund-usf-management-support>

¹⁹ FCC Public Notice, DA 00-517, "Proposed Second Quarter 2000 Universal Service Contribution Factor" CC Docket No. 96-45, released: March 7, 2000.

22. Voice revenues for the third quarter 2016, shortly after the FCC issued the *Lifeline Modernization Order*, were \$14,555,855,000 to support program needs of \$2,184,160,000 (for a contribution factor of 17.9 percent).²⁰ Most recently, they were projected to be \$9,665,944,000 for the third quarter of 2021, *approximately one-third less* (to support an approximate six percent increase in program needs, that is, \$2,313,400,000).²¹
23. The pool of contributors is shrinking and so the cost to the remaining base of contributors continues to increase, which jeopardizes the achievement of universal service.
24. The Commission's decisions in this proceeding affect the consumers who benefit from USF programs as well as those consumers who contribute through surcharges on their retail bills to support the USF programs. As the surcharge increases, phone service becomes less affordable.
25. A balanced approach is called for. The current mechanism is out-of-balance and based on a backward-looking mechanism. Providers of telecommunications services should make "equitable and nondiscriminatory contribution to the preservation and advancement of universal service."²²
26. The problem is dwindling voice revenues (which are the base upon which the surcharge is calculated), a trend that will continue.
27. As a separate, but related matter, Lifeline participation is low for many reasons that are beyond the scope of this declaration. But assuming that the FCC takes steps to make the application process less onerous, and to expand its outreach for this program, Lifeline

²⁰ FCC Public Notice, DA 16-658, "Proposed Third Quarter 2016 Universal Service Contribution Factor," CC Docket No. 96-45, Released: June 14, 2016.

²¹ FCC Public Notice, DA 21-676.

²² 47 U.S.C. § 254(b)(4).

participation rates may increase, which would be a positive outcome, furthering the intended goal of universal service. But increased participation places yet additional pressure on the USF monies. Revising the USF contribution mechanism to broaden the contribution base will greatly lessen this tension between improving the program's participation levels and causing an increase in the contribution factor. The FCC should be seeking to increase participation in the Lifeline Program, which, if such efforts are successful, will increase yet further the size of the funds necessary for the USF.

28. The current method is unsustainable and unfair. As stated in NASUCA's Petition:

With the Order, all of the universal service funds support broadband and, ultimately, only broadband. Yet only voice services provide the funding to support these broadband efforts. The Commission should have acted on reform of the USF contribution in the Order. Broadband services must share in contributing to their own support.²³

29. This concern was apt five years ago, and the situation has become worse since then.

Reforming the USF contribution base is long overdue and should be addressed expeditiously. Assessing broadband service revenues in order to support broadband services is sensible, and fair.²⁴ Broadband services should contribute to broadband subsidies -- the Commission should impose a surcharge on broadband revenues. Long after a ubiquitous broadband infrastructure has been built, in part as a result of federal agencies' (and states') high-cost subsidies, subsidies for the price of broadband services will continue to be needed to ensure that high-speed internet access is affordable for all. A more tenable contribution method is long overdue.

²³ NASUCA Petition, p. 3. See also, *id.*, 5-6.

²⁴ Monies for broadband programs that may become available through the pending federal infrastructure legislation may affect the calculation of the required USF surcharge for the FCC's broadband programs, but the need for reform of the surcharge will continue.

B. Lifeline Program as a Transition to Broadband Service

30. The *2016 Lifeline Modernization Order* sought to enable low-income households to subscribe to broadband service, an important and still pressing need. It is widely acknowledged that broadband service is essential in today's society and economy. The COVID-19 spotlighted the entrenched disparities in high-speed internet access among Americans, which the Lifeline Program, in part, addresses.
31. Older persons are less likely to adopt broadband than are their younger counterparts – whereas the adoption rate for adults between 18 and 64 years of age is between 70 percent and 79 percent, only 64 percent of adults 65 years of age and older adopt high-speed internet access in the home.²⁵
32. In comparison with the 80 percent of white adults who have broadband high-speed internet access in the home, only 71 percent of Blacks and 65 percent of Hispanic/Latinos have access in the home.²⁶
33. Residents of rural areas are less likely to adopt high-speed internet access: 77 percent and 79 percent of urban and suburban households, respectively, have adopted high-speed internet access, in stark comparison with the 72 percent of rural households that have high-speed internet access in the home.²⁷

²⁵ *June 2021 Pew Report*.

²⁶ *Id.*

²⁷ *Id.* See, also, *Lifeline Marketplace Report*, pp. 13-15 (comparing adoption rates in urban, non-urban, and Tribal urban, and Tribal non-urban areas, as well as by areas' poverty rates). See also, "Digital gap between rural and nonrural America persists," Andrew Perrin, Pew Research Center, May 31, 2019, <https://www.pewresearch.org/fact-tank/2019/05/31/digital-gap-between-rural-and-nonrural-america-persists/>; "BroadbandNow Estimates Availability for All 50 States; Confirms that More than 42 Million Americans Do Not Have Access to Broadband," BroadbandNow, John Busby, Julia Tanberk, and Tyler Cooper, May 27, 2021 ("BroadbandNow Report"). <https://broadbandnow.com/research/fcc-broadband-overreporting-by-state/>; and "NTIA Creates First Interactive Map to Help Public See the Digital Divide Across the Country," NTIA, June 17, 2021. <https://www.ntia.gov/press->

34. As income declines, so too do levels of high-speed internet access adoption.²⁸
35. Yet, high-speed internet access is essential to participate in today's society and economy.

For these reasons, subsidizing broadband service for those least able to afford it is essential. The FCC's 2016 decision to expand the Lifeline program to encompass broadband service was a visionary and important first step, albeit insufficient to make broadband widely affordable,²⁹ and flawed because of the premature abandonment of subsidies for voice services.

36. The financial foundation for the *2016 Lifeline Modernization Order* was and is unstable. Although the FCC set the program on a path to transition to broadband subsidies, the contribution mechanism remained based on voice services. This fundamental mismatch between the services that are assessed and the services that are subsidized has created an untenable situation.

[release/2021/ntia-creates-first-interactive-map-help-public-see-digital-divide-across-country](#). As described by NTIA:

The map also puts poverty and lack of broadband access on the same page. The dataset allows you to see where high-poverty communities are located and how that relates to internet usage patterns, as well as to a lack of computers and related equipment. The map also shows usage patterns in tribal communities, which have historically suffered from lack of internet access. Users can toggle the separate data sets on and off to compare information, and search for specific locations, including Tribal lands and minority-serving institutions, to gain a better understanding of where broadband needs are greatest.

Id.

"A Rural-Urban Broadband Divide, but Not the One You Think Of," *New York Times*, Eduardo Porter, June 1, 2021. <https://www.nytimes.com/2021/06/01/business/rural-urban-broadband-biden.html>

²⁸ *Pew Internet/Broadband Fact Sheet; June 2021 Pew Report*.

²⁹ With the COVID-19 pandemic demonstrating the digital divides across the country, and recognizing the importance of broadband service, Congress established the Emergency Broadband Benefit ("EBB") Program. In the Consolidated Appropriations Act of 2021, Congress appropriated \$3.2 billion in funding to make broadband access more affordable to low-income consumers during the pandemic through the EBB Program. Of course this is a stop gap measure, and one which many hope will serve as a stepping stone to a permanent program with adequate subsidies to ensure that all Americans can afford to subscribe to broadband service (and purchase the necessary equipment to use high-speed internet access).

37. Market forces have proven insufficient to yield ubiquitous deployment of affordable, reliable high-speed internet access. Just as society would not depend on market forces to ensure that all Americans have adequate, affordable electricity, water, and roadways, similarly, we should not rely on imperfect broadband markets to yield ubiquitous, reliable, and affordable broadband service. Therefore the Lifeline Program (combined with more substantial subsidies such as those provided through the Emergency Broadband Benefit (“EBB”) program) are essential so that all Americans can have reliable, affordable, high-speed internet access.³⁰

C. Migration by Lifeline Participants to Broadband Services

38. As I demonstrate earlier, retaining support for voice-only services continues to be critically important for many consumers. In assessing the role of the Lifeline Program in supporting consumers’ migration to broadband services, it is important to consider the role of mobile services in meeting consumers’ diverse connectivity needs.

39. As was directed by the *2016 Lifeline Modernization Order*, the Wireline Competition Bureau released its report on the state of the Lifeline marketplace on July 2, 2021. The report is comprehensive, summarizes consumers’ use of voice and broadband service, addresses Lifeline minimum standards, and also addresses the interconnections between the Lifeline program and the EBB Program.

40. The *Lifeline Marketplace Report* describes the various measures undertaken by the Commission and USAC to protect the Lifeline Program against waste, fraud, and abuse.³¹

³⁰ See *Lifeline Marketplace Report*, pp. 24-25, discussing the intersection between the Lifeline Program and EBB Program.

³¹ *Lifeline Marketplace Report*, pp. 2-3.

Minimizing waste, fraud and abuse in all USF programs – whether concerning subsidies for consumers to enable them to purchase broadband service or subsidies to providers to enable them to deploy broadband service – is of course important. However, it is equally important to encourage Lifeline participation, especially to help close the digital divide that the pandemic has spotlighted. The EBB program is likely to provide useful information about how to improve the Lifeline program, to increase participation and ensure that eligible households have meaningful access to robust services which meet their household needs on more affordable terms.³²

41. The *Lifeline Marketplace Report* indicates that approximately 94 percent of the approximate 6.9 million Lifeline subscribers are enrolled in a mobile Lifeline offering.³³ The transition in Lifeline support is causing a migration away from voice only services. As of December 2019, only approximately 1.4 percent of Lifeline participants subscribed to bundled voice plans.³⁴ As of May 2021, voice-only services comprised 8 percent of Lifeline subscribers; 0.37% subscribed to broadband only; and more than 52 percent subscribed to bundled voice and broadband services.³⁵
42. The Wireline Competition Bureau reports that 37 percent of all U.S. households have a landline phone,³⁶ and that as of December 2019, 30 percent of residential fixed voice connections were switched access, and 70 percent were interconnect Voice over Internet

³² See *Lifeline Marketplace Report*, p. 25, stating with reference to the EBB Program (cites omitted): “Several commenters have highlighted the fact that the design of the EBB Program is more conducive to encouraging a variety of providers and service offerings, which will ultimately benefit consumers.”

³³ *Id.*, p. 6.

³⁴ *Id.*, p. 7.

³⁵ *Id.*, pp. 7-8 (as of May 2021). In Figure 2, the *Lifeline Marketplace Report* also depicts “bundled broadband” and “bundled voice.” *Id.*, p. 8.

³⁶*Id.*, p. 11.

Protocol (“VoIP”), with a compound annual decrease of 13 percent in retail switched access lines over the past three years, and a compound annual increase of 3 percent in interconnected VoIP lines.³⁷ In its report, the Wireline Competition Bureau discusses the trend of low-income consumers relying on mobile-only broadband, stating, among other things that “[a] growing number of consumers, particularly those who are low-income, rely exclusively on smartphone devices for broadband access.”³⁸ In June 2021, the Pew Research Center released data regarding mobile phone use.³⁹

43. The June 2021 Pew report states (emphasis added):

And broadband non-adopters continue to cite financial constraints as one of the most important reasons why they forgo these services. Among non-broadband users, 45% say a reason why they do not have broadband at home is that the monthly cost of a home broadband subscription is too expensive, while about four-in-ten (37%) say the same about the cost of a computer. Beyond cost barriers, a little fewer than half of non-users cite having other options for internet access *or the fact that their smartphone does everything online they need as a reason why they do not have a high-speed internet connection at home.*⁴⁰

44. The June Pew Report also states:

About one-in-five adults (19%) say their most important reason for not having broadband at home is that their smartphone does everything they need to do online. Looking specifically at smartphone-dependent Americans, three-in-ten say their smartphone doing everything they need to do online is their most important reason for not having broadband at home. That share did not meaningfully change from 2019.

³⁷ *Id.*, p. 12. As a separate matter, households’ increasing reliance on VoIP underscores the importance of ensuring that Lifeline customers have affordable options for back-up power when they subscribe to bundled broadband-VoIP offerings. Such offerings could include payment plans, or, at a minimum, requirements that providers offer back-up power at cost, i.e., without marking up the price.

³⁸ *Id.*, p. 10 (see also, *id.*, pp. 9-10).

³⁹ *June 2021 Pew Report*.

⁴⁰ *Id.* (emphasis added).

45. Some may contend that these statistics reported by the Pew Center demonstrate that wireless broadband is sufficient, and that, indeed, those with smartphones do not actually “want” wireline broadband. Assessing what consumers “want” is subjective and also influenced by various factors, such as price and digital literacy training – if a service is affordable and if a community organization, for example, has shown a prospective consumer the usefulness and relevance of high-speed internet access connected to a computer and router, then a consumer is more likely to “want” to subscribe to wireline broadband.⁴¹

46. The Wireline Competition Bureau states that “[c]onsumers rely on their smartphones for remote learning, telehealth, obtaining employment and staying connected to friends and families.”⁴² The fact that consumers rely on smartphones to access the internet should not be construed as evidence that they *prefer* to do so on smartphones. The Commission should reject policies and programs that would entrench digital disparities among Americans.⁴³ Similarly, data regarding increasing mobile usage⁴⁴ does not justify relegating low-income households to accessing the internet with smartphones. High cell phone usage does not translate into consumers’ desire to rely on smartphones for high-speed internet access. By way of example, those “choosing” to bicycle to work include those who genuinely want this car-free way of commuting but also include those who may not be able to afford a car.

⁴¹ Benton Institute for Broadband & Society, Pew’s Home Broadband 2021 Survey, June 7, 2021, Mike Conlow. <https://www.benton.org/headlines/pews-home-broadband-2021-survey>.

⁴² *Lifeline Marketplace Report*, p. 15.

⁴³ The Brookings Institution, Techtank, “Don’t replace the digital divide with the ‘not good enough divide,’” Tom Wheeler, June 21, 2021, <https://www.brookings.edu/blog/techtank/2021/06/21/dont-replace-the-digital-divide-with-the-not-good-enough-divide/>

⁴⁴ *Lifeline Marketplace Report*, p. 15.

Simply counting up the number of bikes on the road will give a misleading impression of how many people actually want cars.

47. Simply examining past patterns of consumer demand provides a misleading representation of how to achieve digital equity – where all consumers, regardless of age, race, income, education, ability, and geography have comparable access to broadband services. If, hypothetically, large numbers of people who now have wireline broadband were to “cut the wireline broadband cord” tomorrow, this could be evidence that consumers “prefer” smartphone-based access to the internet. Instead, as I demonstrate earlier, the adoption of broadband service (not smartphone-based) tracks age, education, income and other socioeconomic factors. In my view, these patterns are not a matter of preference but rather a result of necessity – broadband service and the related equipment are expensive – and caused by other factors such as lack of digital literacy training – for example, older persons, may need assistance learning how to navigate internet-based applications.
48. Also, older adults are less likely to have smartphones, and, so likely (1) disproportionately rely on voice-only services and (2) would benefit from broadband services delivered to devices larger than smartphones (and thus which are computers, and laptops, which are easier to see and use). The Pew research states: “While the share of adults ages 65 and older who have a smartphone has increased from 53% to 61% in the past two years, this age cohort remains far less likely than younger groups to report having this type of mobile device. As was the case in 2019, ownership rates also vary among the oldest adults: 71% of adults ages 65 to 74 say they are smartphone owners, but that share falls to 43% among those 75 and older.”⁴⁵

⁴⁵ *June 2021 Pew Report.*

49. Doing homework, connecting with a health care provider, completing job applications, overcoming social isolation, attending school, designing graphics, and many other applications are far more difficult, less reliable, and potentially more expensive on cell phones than they are with wireline connections and computer equipment.
50. The goal of the Lifeline Program (and other subsidized programs) should be to ensure that providers deploy high-speed internet access evenly throughout their serving territories, and not relegate some communities to inferior technologies, and to ensure that all consumers can afford broadband service of similar quality, reliability, and price.
51. As quoted in the *Lifeline Marketplace Report*, one of the goals of the *2016 Lifeline Order*, was to “ensure that future Lifeline offerings are sufficient for consumers to participate in the 21st Century economy.”⁴⁶ Wireless-only access to the internet is insufficient to enable consumers to participate in today’s economy and society.
52. In sum, the FCC should examine data carefully that the *Lifeline Marketplace Report* includes regarding smartphones, and reject claims that consumers “prefer” to access the internet using their cell phones. Instead, the FCC should focus on programs and subsidies that enable all Americans to partake equally of high-speed internet applications. Policies that implicitly or explicitly relegate Lifeline customers to mobile broadband would fail to achieve universal service.

D. Broadband services, even with the Lifeline subsidy, are not affordable

53. The *Lifeline Marketplace Report* assesses, among other things, “the affordability of voice and broadband services.”⁴⁷ The \$9.25 Lifeline subsidy is clearly insufficient to overcome

⁴⁶ *Lifeline Marketplace Report*, p. 7, citing *2016 Lifeline Order*, 31 FCC Rcd at 3985, para. 61.

⁴⁷ *Lifeline Marketplace Report*, p. 4.

the steep affordability barrier to broadband adoption.⁴⁸ Moreover, the Lifeline Program does not subsidize interconnected equipment, as does the EBB Program, which further increases the likelihood that Lifeline participants will be relegated at best, to smartphone-only broadband service, and at worse, to no broadband service.

V. CONCLUSION

54. Based on the analysis above, and based on filings made previously by NASUCA in this docket, I conclude that:

- The FCC should reinstate full Lifeline subsidies for voice-only services.
- The FCC should continue its efforts to evaluate the pricing and affordability of Lifeline services, particularly those offered as a bundle, and assess whether Lifeline support should be increased.
- The FCC should act expeditiously to implement long-overdue reform to the USF contribution mechanism. Our country is embracing multifaceted measures and programs at the federal, state, local and Tribal levels of government (often collaborating with community-based organizations and broadband providers) to ensure that all Americans can subscribe to affordable, reliable, ubiquitous high-speed internet access. The FCC's Lifeline program, which has transitioned to a broadband subsidy, is one of these many measures. It is entirely fitting and extremely important that the contribution surcharge be assessed on the services of today and of the future, which encompass not only voice services, but also

⁴⁸ "Price Too High and Rising: The Facts About America's Broadband Affordability Gap," Free Press, S. Derek Turner, Released May 6, 2021. Updated May 20, 2021; Becky Chao & Claire Park, "The Cost of Connectivity 2020," Open Technology Institute, New America Foundation, July 2020.

broadband services, which generate increasing percentages of total relevant communications revenues. By so doing, the FCC can shore up the foundation for Lifeline and contribute to progress toward digital equity.

I declare under penalty of perjury under the laws of the State of Massachusetts that, to the best of my knowledge, the foregoing is true and correct.

Executed on August 2, 2021 in Groton, Massachusetts



Susan M. Baldwin, Consultant to NASUCA

SUSAN M. BALDWIN
45 Acorn Path
Groton, Massachusetts 01450
smbaldwinconsulting@gmail.com

Susan M. Baldwin specializes in utility economics, regulation, and public policy, with a long-standing focus on telecommunications and with a more recent focus on consumer issues in electric and gas markets. Ms. Baldwin has been actively involved in public policy for forty-three years, which includes thirty-seven years in telecommunications policy and regulation, and thirteen years in energy policy and regulation. Since 2001, she has been consulting to public sector agencies, consumer advocates, and others as an independent consultant. Ms. Baldwin received her Master of Economics from Boston University, her Master of Public Policy from Harvard University's Kennedy School of Government, and her Bachelor of Arts degree in Mathematics and English from Wellesley College. Ms. Baldwin has extensive experience both in government and in the private sector.

Ms. Baldwin has testified before 24 public utility commissions in more than 75 state proceedings, including: the Arkansas Public Service Commission, California Public Utilities Commission, Colorado Public Utilities Commission, Connecticut Department of Public Utility Control, District of Columbia Public Service Commission, Idaho Public Utilities Commission, Illinois Commerce Commission, Indiana Utility Regulatory Commission, Iowa Utilities Board, Maryland Public Service Commission, Massachusetts Department of Telecommunications and Cable, Nevada Public Service Commission, New Hampshire Public Utilities Commission, New Jersey Board of Public Utilities, New Mexico Public Regulation Commission, New York Public Service Commission, Public Utilities Commission of Ohio, Pennsylvania Public Utility Commission, Rhode Island Public Utilities Commission, Tennessee Public Service Commission, Vermont Public Service Board, Washington Utilities and Transportation Commission, Public Service Commission of West Virginia and Wyoming Public Service Commission. Ms. Baldwin has also authored numerous comments and declarations submitted in various Federal Communications Commission proceedings.

Ms. Baldwin has also participated in projects in Delaware, Hawaii, Illinois, New York, South Dakota, and Canada on behalf of consumer advocates, public utility commissions, and competitive local exchange carriers. Ms. Baldwin has served in a direct advisory capacity to public utility commissions in the District of Columbia, Massachusetts, New Mexico, Utah and Vermont. Ms. Baldwin has also testified on behalf of public utility commission staff in Idaho and Rhode Island. Ms. Baldwin has testified before state legislative committees in Maryland, Massachusetts, Ohio, and Pennsylvania.

Ms. Baldwin has sponsored expert reports in state taxation proceedings. Also, in her capacity as an independent consultant, Ms. Baldwin has consulted to and testified on behalf of consumer advocates on diverse matters including the electric retail market, consumer protection and consumer services issues in telecommunications, electric, and gas proceedings, broadband deployment, numbering resources, unbundled network element (UNE) cost studies, incumbent

local exchange carriers' requests for competitive classification of services, mergers and spin-offs, rate cases, universal service, service quality, and state *Triennial Review Order* (TRO) proceedings.

Ms. Baldwin sponsored detailed testimony on behalf of the Connecticut Office of Consumer Counsel in 2019 and in 2014 regarding the third-party residential electric market. In her testimony, she summarized her detailed analysis of the prices that retail customers of suppliers pay and her review of consumer complaints regarding the retail electric market. In 2018, Ms. Baldwin co-authored an analysis of Maryland's residential electric and gas supply markets on behalf of the Maryland Office of People's Counsel. She also conducted an in-depth analysis of the retail residential electric market in Massachusetts for the Massachusetts Office of the Attorney General.

Ms. Baldwin has analyzed customer service issues in many electric and gas rate case proceedings on behalf of consumer advocate offices. Ms. Baldwin has worked with local, state, and federal officials on energy and environmental issues. As a policy analyst for the New England Regional Commission (NERCOM) and Massachusetts Office of Energy Resources (MOER), she acquired extensive experience working with governors' offices, state legislatures, congressional offices, and industry and advocacy groups. As an energy analyst for NERCOM, Ms. Baldwin coordinated New England's first regional seminar on low-level radioactive waste, analyzed federal and state energy policies, and wrote several reports on regional energy issues. While working with the MOER, Ms. Baldwin conducted a statewide survey of the solar industry and analyzed federal solar legislation. While attending the Kennedy School of Government, Ms. Baldwin served as a research assistant for the school's Energy and Environmental Policy Center.

Ms. Baldwin has contributed to numerous comments submitted to the FCC on diverse aspects of broadband in various proceedings on topics such as data collection, mapping, deployment, universal service, affordability, consumer protection, and network management. Also, in state regulatory proceedings that have examined carriers' proposals for spin-offs and for mergers, she has recommended conditions concerning broadband deployment.

Ms. Baldwin served as a direct advisor to the Massachusetts Department of Telecommunications and Energy (DTE) between August 2001 and July 2003, in Massachusetts DTE Docket 01-20, an investigation of Verizon's total element long run incremental cost (TELRIC) studies for recurring and nonrecurring unbundled network elements (UNEs). She assisted with all aspects of this comprehensive case in Massachusetts. Ms. Baldwin analyzed recurring and nonrecurring cost studies; ran cost models; reviewed parties' testimony, cross-examined witnesses, trained staff, met with the members of the Commission, assisted with substantial portions of the major orders issued by the DTE; and also assisted with the compliance phase of the proceeding.

Ms. Baldwin has also contributed to numerous comments and declarations submitted to the Federal Communications Commission on issues such as broadband; intercarrier compensation reform; the Comcast-NBCU merger, price cap regulation; universal service; carriers' petitions for forbearance; separations reform; special access services, relay services; numbering

optimization, and the Internet Protocol transition.

Ms. Baldwin worked with Economics and Technology, Inc. for twelve years (1984 to 1988 and 1992 to 2000), most recently as a Senior Vice President. Among her numerous projects were the responsibility of advising the Vermont Public Service Board in matters relating to a comprehensive investigation of NYNEX's revenue requirement and proposed alternative regulation plan. She participated in all phases of the docket, encompassing review of testimony, issuance of discovery, cross-examination of witnesses, drafting memoranda and decisions, and reviewing compliance filings. Another year-long project managed by Ms. Baldwin was the in-depth analysis and evaluation of the cost proxy models submitted in the FCC's universal service proceeding. Also, on behalf of the staff of the Idaho Public Utilities Commission, Ms. Baldwin testified on the proper allocation of US West's costs between regulated and non-regulated services. On behalf of AT&T Communications of California, Inc. and MCI Telecommunications Corporation, Ms. Baldwin comprehensively analyzed the non-recurring cost studies submitted by California's incumbent local exchange carriers. Ms. Baldwin has participated in more than twenty state and federal regulatory investigations of the impact of proposed transfers of control of wireline, wireless and cable companies.

Ms. Baldwin has contributed to the development of state and federal policy on numbering matters. On behalf of the Ad Hoc Telecommunications Users Committee, Ms. Baldwin participated in the Numbering Resource Optimization Working Group (NRO-WG), and in that capacity, served as a co-chair of the Analysis Task Force of the NRO-WG. She has also provided technical assistance to consumer advocates in the District of Columbia, Illinois, Iowa, Massachusetts, and Pennsylvania on area code relief and numbering optimization measures. Ms. Baldwin also co-authored comments on behalf of the National Association of State Utility Consumer Advocates in the FCC's proceeding on numbering resource optimization.

During her first years at ETI, Ms. Baldwin was the Director of Publications and Tariff Research, and, in that capacity, she trained and supervised staff in the analysis of telecommunications rate structures, services, and regulation.

Ms. Baldwin served four years (1988-1992) as the Director of the Telecommunications Division for the Massachusetts Department of Public Utilities (now the Department of Telecommunications & Cable), where she directed a staff of nine, and acted in a direct advisory capacity to the DPU Commissioners. (The Massachusetts DTC maintains a non-separated staff, which directly interacts with the Commission, rather than taking an advocacy role of its own in proceedings). Ms. Baldwin advised and drafted decisions for the Commission in numerous DPU proceedings including investigations of a comprehensive restructuring of the rates of New England Telephone Company (NET), an audit of NET's transactions with its NYNEX affiliates, collocation, ISDN, Caller ID, 900-type services, AT&T's request for a change in regulatory treatment, pay telephone and alternative operator services, increased accessibility to the network by disabled persons, conduit rates charged by NET to cable companies, and quality of service. Under her supervision, staff analyzed all telecommunications matters relating to the regulation of the then \$1.7-billion telecommunications industry in Massachusetts, including the review of all

telecommunications tariff filings; petitions; cost, revenue, and quality of service data; and certification applications. As a member of the Telecommunications Staff Committees of the New England Conference of Public Utility Commissioners (NECPUC) and the National Association of Regulatory Utility Commissioners (NARUC), she contributed to the development of telecommunications policy on state, regional, and national levels.

As a budget analyst for the Massachusetts Department of Public Welfare, Ms. Baldwin forecast expenditures, developed low-income policy, negotiated contracts, prepared and defended budget requests, and monitored expenditures of over \$100 million.

Ms. Baldwin received Boston University's Dean's Fellowship. While attending the Kennedy School of Government, Ms. Baldwin served as a teaching assistant for a graduate course in microeconomics and as a research assistant for the school's Energy and Environmental Policy Center, and at Wellesley College was a Rhodes Scholar nominee. She has also studied in Ghent, Belgium.

Record of Prior Testimony

In the matter of the Application of the New Jersey Bell Telephone Company for Approval of its Plan for an Alternative Form of Regulation, New Jersey Board of Regulatory Commissioners Docket No. T092030358, on behalf of the New Jersey Cable Television Association, filed September 21, 1992, cross-examined October 2, 1992.

DPUC review and management audit of construction programs of Connecticut's telecommunications local exchange carriers, Connecticut Department of Public Utility Control Docket No. 91-10-06, on behalf of the Connecticut Office of the Consumer Counsel, filed October 30, 1992, cross-examined November 4, 1992.

Joint petition of New England Telephone and Telegraph Company and Department of Public Service seeking a second extension of the Vermont Telecommunications Agreement, Vermont Public Service Board 5614, Public Contract Advocate, filed December 15, 1992, cross-examined December 21, 1992.

Application of the Southern New England Telephone Company to amend its rates and rate structure, Connecticut Department of Public Utility Control Docket No. 92-09-19, on behalf of the Connecticut Office of Consumer Counsel, filed March 26, 1993 and May 19, 1993, cross-examined May 25, 1993.

In the matter of the Application of Cincinnati Bell Telephone Company for Approval of an Alternative Form of Regulation and for a Threshold Increase in Rates, Public Utilities Commission of Ohio Case No. 93-432-TP-ALT, on behalf of Time Warner AxS, filed March 2, 1994.

Matters relating to IntraLATA Toll Competition and Access Rate Structure, Rhode Island Public Utilities Commission Docket 1995, on behalf of the Rhode Island Public Utilities Commission Staff, filed March 28, 1994 and June 9, 1994, cross-examined August 1, 1994.

In the Matter of the Application of The Ohio Bell Telephone Company for Approval of an Alternative Form of Regulation, Public Utilities Commission of Ohio Case No. 93-487-TP-ALT, on behalf of Time Warner AxS, filed May 5, 1994, cross-examined August 11, 1994.

In Re: Universal Service Proceeding: The Cost of Universal Service and Current Sources of Universal Service Support, Tennessee Public Service Commission Docket No. 95-02499, on behalf of Time Warner

AxS of Tennessee, L.P., filed October 18, 1995 and October 25, 1995, cross-examined October 27, 1995.

In Re: Universal Service Proceeding: Alternative Universal Service Support Mechanisms, Tennessee Public Service Commission Docket No. 95-02499, on behalf of Time Warner AxS of Tennessee, L.P., filed October 30, 1995 and November 3, 1995, cross-examined November 7, 1995.

In the Matter of the Application of US West Communications, Inc. for Authority to Increase its Rates and Charge for Regulated Title 61 Services, Idaho Public Utilities Commission Case No. USW-S-96-5, on behalf of the Staff of the Idaho Public Utilities Commission, filed November 26, 1996 and February 25, 1997, cross-examined March 19, 1997.

A Petition by the Regulatory Operations Staff to Open an Investigation into the Procedures and Methodologies that Should Be Used to Develop Costs for Bundled or Unbundled Telephone Services or Service Elements in the State of Nevada, Nevada Public Service Commission Docket No. 96-9035, on behalf of AT&T Communications of Nevada, Inc., filed May 23, 1997, cross-examined June 6, 1997.

Rulemaking on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish a Framework for Network Architecture; Investigation on the Commission's Own Motion into Open Access and Network Architecture Development of Dominant Carrier Networks, California Public Utilities Commission R.93-04-003 and I.93-04-002, co-authored a declaration on behalf of AT&T Communications of California, Inc., and MCI Telecommunications Corporation, filed on December 15, 1997 and on February 11, 1998.

Consolidated Petitions for Arbitration of Interconnection Agreements, Massachusetts Department of Telecommunications and Energy, DPU 96-73/74, 96-75, 96-80/81, 96-83, and 96-84, on behalf of AT&T Communications of New England, Inc. and MCI Telecommunications Corporation, filed February 3, 1998.

In the Matter of the Application of US West Communications, Inc. for Specific Forms of Price Regulation, Colorado Public Utilities Commission Docket No. 97-A-540T, on behalf of the Colorado Office of Consumer Counsel, filed on April 16, 1998, May 14, 1998 and May 27, 1998, cross-examined June 2, 1998.

Joint Application of SBC Communications and Southern New England Telecommunications Corporation for Approval of a Change of Control, Connecticut Department of Public Utility Control Docket No. 98-02-20, on behalf of the Connecticut Office of Consumer Counsel, filed May 7, 1998 and June 12, 1998, cross-examined June 15-16, 1998.

Fourth Annual Price Cap Filing of Bell Atlantic-Massachusetts, Massachusetts Department of Telecommunications and Energy Docket DTE 98-67, on behalf of MCI Telecommunications Corporation, filed September 11, 1998 and September 25, 1998, cross-examined October 22, 1998.

Applications of Ameritech Corp., Transferor, and SBC Communications, Inc., Transferee, For Consent to Transfer Control, Federal Communications Commission CC Docket No. 98-141, co-sponsored affidavit on behalf of Indiana Utility Consumer Counselor, Michigan Attorney General, Missouri Public Counsel, Ohio Consumers' Counsel, Texas Public Utility Counsel and Utility Reform Network, filed on October 13, 1998.

In the Matter of the Joint Application of SBC Communications Inc., SBC Delaware, Inc., Ameritech Corporation and Ameritech Ohio for Consent and Approval of a Change of Control, Public Utilities Commission of Ohio Case No.98-1082-TP-AMT, on behalf of Ohio Consumers' Counsel, filed on December 10, 1998, cross-examined on January 22, 1999.

GTE Corporation, Transferor, and Bell Atlantic Corporation, Transferee, For Consent to Transfer

Control, Federal Communications Commission CC Docket No. 98-184, co-sponsored an affidavit on behalf of a coalition of consumer advocates from Delaware, Hawaii, Maine, Maryland, Missouri, Ohio, Oregon, West Virginia, and Michigan, filed on December 18, 1998.

In the Matter of the Joint Application of GTE and Bell Atlantic to Transfer Control of GTE's California Utility Subsidiaries to Bell Atlantic, Which Will Occur Indirectly as a Result of GTE's Merger with Bell Atlantic, California Public Utilities Commission A. 98-12-005, on behalf of the California Office of Ratepayer Advocate, filed on June 7, 1999.

In the Matter of the Investigation on the Commission's Own Motion Into All Matters Relating to the Merger of Ameritech Corporation and SBC Communications Inc., Indiana Utility Regulatory Commission Cause No. 41255, on behalf of the Indiana Office of Utility Consumer Counselor, filed on June 22, 1999 and July 12, 1999, cross-examined July 20, 1999.

In re Application of Bell Atlantic Corporation and GTE Corporation for Approval of the GTE Corporation - Bell Atlantic Corporation Merger, Washington Utilities and Transportation Commission UT-981367, on behalf of the Washington Attorney General Public Counsel Section, filed on August 2, 1999.

Application of New York Telephone Company for Alternative Rate Regulation, Connecticut Department of Public Utility Control Docket No. 99-03-06, on behalf of the Connecticut Office of Consumer Counsel, filed October 22, 1999.

In re: Area Code 515 Relief Plan, Iowa Utilities Board Docket No. SPU-99-22, on behalf of Iowa Office of Consumer Advocate, filed November 8, 1999, and December 3, 1999, cross-examined December 14, 1999.

In re Application of MCI WorldCom, Inc. and Central Telephone Company - Nevada, d/b/a Sprint of Nevada, and other Sprint entities for Approval of Transfer of Control pursuant to NRS 704.329, Nevada Public Utilities Commission Application No. 99-12029, on behalf of the Nevada Office of the Attorney General, Bureau of Consumer Protection, filed April 20, 2000.

In re: Area Code 319 Relief Plan, Iowa Utilities Board Docket No. SPU-99-30, on behalf of Iowa Office of Consumer Advocate, filed June 26, 2000 and July 24, 2000.

In re: Sprint Communications Company, L.P. & Level 3 Communications, L.L.C., Iowa Utilities Board Docket Nos. SPU-02-11 & SPU-02-13, on behalf of Iowa Office of Consumer Advocate, filed October 14, 2002 and January 6, 2003, cross-examined February 5, 2003.

Illinois Bell Telephone Company filing to increase unbundled loop and nonrecurring rates (tariffs filed December 24, 2002), Illinois Commerce Commission Docket No. 02-0864, on behalf of Citizens Utility Board, filed May 6, 2003 and February 20, 2004.

Qwest Petition for Competitive Classification of Business Services, Washington Utilities and Transportation Commission Docket No. 030614, on behalf of Public Counsel, filed August 13, 2003 and August 29, 2003, cross-examined September 18, 2003.

In the Matter of the Application of CenturyTel of Northwest Arkansas, LLC for Approval of a General Change in Rates and Tariffs, Arkansas Public Service Commission Docket No. 03-041-U, on behalf of the Attorney General, filed October 9, 2003 and November 20, 2003.

In the Matter of the Board's Review of Unbundled Network Elements, Rates, Terms and Conditions of Bell Atlantic New Jersey, Inc., New Jersey Board of Public Utilities Docket No. TO00060356, on behalf of the New Jersey Division of the Ratepayer Advocate, filed January 23, 2004.

In the Matter of the Implementation of the Federal Communications Commission's Triennial Review Order, New Jersey Board of Public Utilities Docket No. TO03090705, on behalf of the New Jersey Division of the Ratepayer Advocate, filed February 2, 2004.

Unbundled Access to Network Elements, Review of the Section 251 Unbundling Obligations of Local Exchange Carriers, Federal Communications Commission WC Docket No. 04-313, CC Docket No. 01-338, sponsored affidavit on behalf of the New Jersey Division of the Ratepayer Advocate, filed October 4, 2004.

Unbundled Access to Network Elements, Review of the Section 251 Unbundling Obligations of Local Exchange Carriers, Federal Communications Commission WC Docket No. 04-313, CC Docket No. 01-338, sponsored affidavit on behalf of the Utah Committee of Consumer Services, filed October 4, 2004.

In the Matter of Verizon New Jersey, Inc. For a Revision of Tariff B.P.U.-N.J. – No. 2 Providing for a Revenue Neutral Rate Restructure Including a Restructure of Residence and Business Basic Exchange Service and Elimination of \$.65 Credit, New Jersey Board of Public Utilities Docket No. TT04060442, on behalf of the New Jersey Division of the Ratepayer Advocate, filed December 22, 2004 and January 18, 2005.

In the Matter of the Application of Verizon New Jersey, Inc. for Approval (I) of a New Plan for an Alternative Form of Regulation and (II) to Reclassify Multi-Line Rate Regulated Business Services as Competitive Services, and Compliance Filing, New Jersey Board of Public Utilities Docket No. TO01020095, on behalf of the New Jersey Division of the Ratepayer Advocate, filed January 10, 2005 and February 4, 2005.

Joint Petition of SBC Communications Inc. and AT&T Corp., Together with its Certificated Subsidiaries for Approval of Merger, New Jersey Board of Public Utilities Docket No. TM05020168, on behalf of the New Jersey Division of the Ratepayer Advocate, filed May 4, 2005 and June 1, 2005.

In the Matter of Verizon Communications Inc. and MCI, Inc., Applications for Approval of Transfer of Control, Federal Communications Commission WC Docket No. 05-75, co-sponsored affidavit on behalf of the New Jersey Division of the Ratepayer Advocate, filed on May 9, 2005.

In the Matter of the Application of Southwestern Bell Telephone, L.P., d/b/a SBC Arkansas to Set Rates for Unbundled Network Elements, Arkansas Public Service Commission Docket No. 04-109-U, on behalf of the Attorney General, filed May 27, 2005.

Joint Petition of Verizon Communications Inc. and MCI, Inc. for Approval of Merger, New Jersey Board of Public Utilities Docket No. TM05030189, on behalf of the New Jersey Division of the Ratepayer Advocate, filed July 8, 2005 and August 19, 2005.

In the Matter of Joint Petition of United Telephone Company of New Jersey, Inc. d/b/a Sprint and LTD Holding Company for Approval Pursuant to *N.J.S.A. 48:2-51* and *N.J.S.A. 48:3-10* of a change in Ownership and Control, New Jersey Board of Public Utilities Docket No. TM05080739, on behalf of the New Jersey Division of the Ratepayer Advocate, filed November 29, 2005.

In the Matter of the Board's Review of the Classification of Verizon New Jersey's Directory Assistance Services ("DAS") as Competitive and Associated Service Quality, Docket No. TX06010057, In the Matter of the Filing by Verizon New Jersey Inc. for the Reclassification of Existing Rate Regulated Services – Directory Assistance Services as Competitive, New Jersey Board of Public Utilities, Docket No. TT97120889, on behalf of the New Jersey Division of the Ratepayer Advocate, filed May 12, 2006.

In the Matter of AT&T Inc. and BellSouth Corporation Applications for Approval of Transfer of Control, Federal Communications Commission WC Docket No. 06-74, sponsored declaration with Sarah M.

Bosley on behalf of the New Jersey Division of the Ratepayer Advocate, filed June 5, 2006; sponsored declaration with Sarah M. Bosley and Timothy E. Howington on behalf of the New Jersey Division of Rate Counsel, October 3, 2006.

In the Matter of Jurisdictional Separations and Referral to the Federal-State Joint Board, CC Docket No. 80-286, sponsored affidavit on behalf of the National Association of State Utility Consumer Advocates and the New Jersey Division of Rate Counsel, filed August 22, 2006.

In the Matter of the Board Investigation Regarding the Reclassification of Competitive Local Exchange Carrier (CLEC) Services as Competitive, New Jersey Board of Public Utilities Docket No. TX06120841, on behalf of the New Jersey Division of Rate Counsel, filed January 7, 2007, January 30, 2007, and February 20, 2007.

Verizon New England Inc., Bell Atlantic Communications, Inc., NYNEX Long Distance Company, Verizon Select Services Inc. and FairPoint Communications, Inc. Joint Petition for Authority to Transfer Assets and Franchise to FairPoint Communications, Inc., New Hampshire Public Utilities Commission Docket No. DT-07-011, on behalf of the Office of Consumer Advocate, filed August 1, 2007, cross-examined November 1, 2007.

In the Matter of the Commission's Investigation into Verizon Maryland, Inc.'s Affiliate Relationships, Maryland Public Service Commission Case No. 9120, on behalf of the Office of People's Counsel, filed October 29, 2007 and November 19, 2007, cross-examined November 28, 2007.

In the Matter of the Board Investigation Regarding the Reclassification of Incumbent Local Exchange Carrier (ILEC) Services as Competitive, New Jersey Board of Public Utilities Docket No. TX07110873, on behalf of the New Jersey Division of Rate Counsel, filed December 14, 2007, January 10, 2008.

In the Matter of Verizon Washington, DC Inc.'s Price Cap Plan 2007 for the Provision of Local Telecommunications Services in the District of Columbia, Public Service Commission of the District of Columbia Formal Case No. 1057, on behalf of the District of Columbia Office of People's Counsel, filed December 20, 2007, January 31, 2008.

In re Possible Extension of Board Jurisdiction over Single Line Flat-Rated Residential and Business Rates for Local Exchange Carriers, Iowa Utilities Board Docket No. INU-08-1, on behalf of Iowa Office of Consumer Advocate, filed March 17, 2008, April 28, 2008, cross-examined May 22, 2008.

Petition of the Office of Consumer Counsel for Enforcement of Quality of Service Standards for the Southern New England Telephone Company d/b/a AT&T Connecticut, Connecticut Department of Public Utility Control Docket No. 08-07-15, on behalf of the Communications Workers of America, Local 1298, filed January 30, 2009, cross-examined February 25, 2009.

In the Matter of the Board's Investigation and Review of Local Exchange Carrier Intrastate Exchange Access Rates, New Jersey Board of Public Utilities Docket No. TX08090830, on behalf of the New Jersey Division of Rate Counsel, filed February 13, 2009, April 20, 2009, and June 22, 2009, cross-examined October 20, 2009.

In the Matter of Appropriate Forms Of Regulating Telephone Companies, Maryland Public Service Commission, Case No. 9133, on behalf of the Communications Workers of America, filed June 1, 2009, October 16, 2009, October 30, 2009, cross-examined November 4, 2009.

Petition of the Office of Consumer Counsel for Enforcement of Quality of Service Standards for the Southern New England Telephone Company d/b/a AT&T Connecticut, Connecticut Department of Public Utility Control Docket No. 08-07-15PH02, on behalf of the Communications Workers of America, Local 1298, filed September 21, 2009.

In the Matter of the Application of Frontier Communications Corporation, New Communications Holdings, Inc. and Verizon Communications Inc. for Consent and Approval of a Change in Control, Public Utilities Commission of Ohio Case No. 09-454-TP-ACO, on behalf of the Communications Workers of America and International Brotherhood of Electrical Workers, Local 986, filed October 14, 2009.

Frontier Communications Corporation, Verizon Communications, Inc., Verizon North Inc., Verizon South Inc., New Communications of the Carolinas, Inc. Joint Application for the approval of a Reorganization, Illinois Commerce Commission Docket No. 09-0268, on behalf of the International Brotherhood of Electrical Workers, Locals 21, 51, and 702, filed October 20, 2009.

In re Verizon Service Quality in Western Massachusetts, Massachusetts Department of Telecommunications and Cable D.T.C. 09-1, on behalf of the Office of the Attorney General, filed November 9, 2009, February 24, 2010, cross-examined March 31, 2010, April 1, 2010, May 21, 2010.

Joint Application of Frontier Communications Corporation and Verizon West Virginia Inc. and certain affiliates for approval of the transfer of Verizon's local exchange and long distance business in West Virginia to companies to be owned and controlled by Frontier Communications Corporation, Public Service Commission of West Virginia Case No. 09-0871-T-PC, on behalf of the Communications Workers of America, AFL-CIO, filed November 16, 2009.

In the Matter of Qwest Communications Company and CenturyTel, Inc. for Approval of Control of Qwest Communications Company LLC, New Jersey Board of Public Utilities Docket No. TM10050343, on behalf of the New Jersey Division of Rate Counsel, filed September 23, 2010.

Petition of the North American Numbering Plan Administrator on behalf of the Pennsylvania Telecommunications Industry for Approval of Numbering Plan Area Relief Planning for the 814 NPA, Pennsylvania Public Utility Commission Docket No. P-2009-2112925, on behalf of the Pennsylvania Office of Consumer Advocate, filed May 23, 2011, cross-examined May 24, 2011.

In re Applications of AT&T, Inc. and Deutsche Telekom AG for Consent to the Transfer of Control of the Licenses and Authorizations Held by T-Mobile USA, Inc. and its Subsidiaries to AT&T Inc., WT Docket No. 11-65, File Nos. 0004669383, *et al.*, sponsored declarations on behalf of the New Jersey Division of Rate Counsel, May 31, 2011, and June 20, 2011.

In the Matter of Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC For Consent To Assign Licenses, WT Docket No. 12-4, sponsored declarations on behalf of the New Jersey Division of Rate Counsel, filed February 17, 2012, and March 26, 2012.

In the Matter of the Board's Investigation Regarding the Reclassification of Incumbent Local Exchange Carrier (ILEC) Services as Competitive – Phase II, New Jersey Board of Public Utilities Docket No. TX11090570, on behalf of the New Jersey Division of Rate Counsel, filed February 24, 2012, April 27, 2012, and June 11, 2012, cross-examined July 17, 2012.

Petition of David K. Ebersole, Jr. and the Office of Consumer Advocate for a Declaratory Order that Verizon Pennsylvania Inc. Has Not Met Its Legal Obligation to the Greensburg Bona Fide Retail Request Group Pursuant to Its Chapter 30 Plan, Pennsylvania Public Utility Commission Docket No. P-2012-2323362, affidavit on behalf of the Pennsylvania Office of Consumer Advocate, September 6, 2012.

In the Matter of Commission Consideration Of Effective Competition Areas and the Classification of Basic Local Exchange Service, Colorado Public Utilities Commission Proceeding Number 13M-0422T, Pursuant to 4 CCR 723-2-2213, answer testimony on behalf of AARP, December 6, 2013, cross-examined January 7, 2014.

PURA Establishment of Rules for Electric Suppliers and EDCs Concerning Operations and Marketing in the Electric Retail Market, Connecticut Public Utilities Regulatory Authority Docket No. 13-07-18, testimony and supplemental testimony on behalf of the Connecticut Office of Consumer Counsel, initial and supplemental testimony (with Helen E. Golding), March 10, 2014 and March 17, 2014, cross-examined March 27, 2014.

Joint Application of Frontier Communications Corporation and AT&T Inc. for Approval of a Change in Control, Connecticut Public Utilities Regulatory Authority Docket No. 14-01-46, testimony on behalf of the Connecticut Office of Consumer Counsel, May 23, 2014, cross-examined June 30, 2014.

The Utility Reform Network, Complainant vs. Pacific Bell Telephone Company D/B/A AT&T California (U1001C); AT&T Communications of California, Inc. (U5002C), Defendants, California Public Utilities Commission Case No. 13-12-005, Complaint of the Utility Reform Network Regarding Basic Service Rates of AT&T California (Public Utilities Code Section 1702; Commission Rule of Practice and Procedure 4.1(b)), December 6, 2013, initial and rebuttal testimony on behalf of the Utility Reform Network (TURN), August 22, 2014 and October 3, 2014.

Joint Petition of Verizon Pennsylvania LLC and Verizon North LLC for Competitive Classification of all Retail Services in Certain Geographic Areas, and for a Waiver of Regulation for Competitive Services, Pennsylvania PUC Docket Nos. P-2014-2446303 and P-2014-2446304, direct and surrebuttal testimony on behalf of Communications Workers of America and the International Brotherhood of Electrical Workers, November 14, 2014, and December 12, 2014, cross-examined December 16, 2014.

Joint Application of Comcast Corporation, Time Warner Cable Inc., Time Warner Cable Information Services (California), LLC, and Bright House Networks Information Services (California), LLC for Expedited Approval of Indirect Transfer of Control of Time Warner Cable Information Services (California), LLC, (U-68740-C); and The Pro Forma Transfer of Control of Bright House Networks Information Services (California), LLC (U-6955-C) to Comcast Corporation, Pursuant to Public Utilities Code Section 854(A), Application No. 14-04-013 (filed April 11, 2014), initial and reply testimony on behalf of the Utility Reform Network (TURN), December 3, 2014 and December 10, 2014.

In the Matter of the Joint Application of Frontier Communications Corporation, Frontier Communications of America, Inc. (U 5429 C), Verizon California Inc. (U 1002 C), Verizon Long Distance, LLC (U 5732), and Newco West Holdings LLC for Approval of Transfer of Control Over Verizon California Inc. and Related Approval of Transfer of Assets and Certifications (Filed March 18, 2015), Application 15-03-005, reply and supplemental testimony on behalf of the Utility Reform Network (TURN), July 28, 2015 and September 11, 2015.

Order Instituting Investigation to Assess the State of Competition Among Telecommunications Providers in California, and to Consider and Resolve Limited Rehearing of Decision (D.) 08-09-042, California Public Utilities Commission Investigation 15-11-007 (November 5, 2015), testimony on behalf of the Utility Reform Network (TURN), March 15, 2016, June 1, 2016 and July 15, 2016; participated in Expert Panel, July 20, 2016.

Pennsylvania Public Utility Commission Docket No. P-2015-2509336, Petition of Communications Workers of America for a Public, On-the-Record Commission Investigation of the Safety, Adequacy, and Reasonableness of Service Provided by Verizon Pennsylvania, LLC, direct testimony on behalf of Communications Workers of America, September 29, 2016.

Petition of the Maryland Office of People's Counsel for an Investigation into Verizon Maryland's Provision of Basic Local Phone Service Over Copper or Fiber Networks, affidavit on behalf of the Maryland Office of People's Counsel, January 13, 2017.

Iowa Utilities Board Docket No. INU-2016-0001, In re: Deregulation of Local Exchange Service, testimony on behalf of Office of Consumer Advocate, February 17, 2017 and April 21, 2017, cross-examined May 23, 2017.

New York Public Service Commission Case 16-C-0122, Proceeding on Motion of the Commission to Consider the Adequacy of Verizon New York Inc.'s Retail Service Quality Processes and Programs, testimony on behalf of the Communications Workers of America, March 24, 2017.

In the Matter of Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment, WC Docket No. 17-84, Notice of Proposed Rulemaking, Notice of Inquiry, and Request for Comment, FCC Rcd 3266, (rel. Apr. 21, 2017), declaration on behalf of the National Association of State Utility Consumer Advocates, Maine Office of the Public Advocate, Maryland Office of People's Counsel ("OPC"), New Jersey Division of Rate Counsel, Office of the Ohio Consumers' Counsel, Pennsylvania Office of Consumer Advocate and The Utility Reform Network, June 15, 2017.

New Jersey Board of Public Utilities Docket No. ER 17030308, In the Matter of the Petition of Atlantic City Electric Company for Approval of Amendments to its Tariff to Provide For an Increase in Rates and Charges for Electric Service Pursuant to N.J.S.A. 48:2-21 and N.J.S.A. 48:2-21.1, and for Other Appropriate Relief (2017), testimony on behalf of New Jersey Division of Rate Counsel, August 1, 2017.

Wyoming Public Service Commission Docket No. 700000-1644-TA-17, In the Matter of the Application of Qwest Corporation d/b/a CenturyLink QC for Determination that Basic Residential and Business Services Are Competitive Throughout All of CenturyLink QC's Zone 2 and Zone 3 Service Areas, testimony on behalf of AARP, November 15, 2017, cross-examined December 11, 2018.

Washington Utilities & Transportation Commission Docket UT-171082, CenturyLink's Obligations Under the Commission's Line Extension Rules, testimony on behalf of Public Counsel, June 1, 2018 and July 3, 2018.

New Jersey Board of Public Utilities Docket Nos. ER18010029 and GR18010030, In the Matter of the Petition of Public Service Electric and Gas Company for Approval of an Increase in Electric and Gas Rates and for Changes in the Tariffs for Electric and Gas Service, B.P.U.N.J. No. 16 Electric and B.P.U.N.J. No. 16 Gas, and for Changes in Depreciation Rates Pursuant to N.J.S.A. 48:2-18, N.J.S.A. 48:2-21 and N.J.S.A. 48:2-21.1 and for Other Appropriate Relief, testimony on behalf of New Jersey Division of Rate Counsel, August 6, 2018.

Washington Utilities & Transportation Commission, Docket UT-180831, Rulemaking to Consider Possible Changes to Rules in Chapter 480-120 WAC, Relating to Service Obligations of Telephone Companies, assisted with the preparation of Comments of Public Counsel, December 7, 2018, participated in technical conference on behalf of Public Counsel, January 17, 2019.

In the Matter of the Petition of the Maryland Office of People's Counsel for an Investigation into Verizon Maryland's Provision of Basic Local Phone Service Over Copper or Fiber Networks - ML#210061, Report on behalf of Maryland Office of People's Counsel, February 8, 2019.

Connecticut Public Utilities Regulatory Authority Docket No. 18-06-02, Review of Feasibility, Costs, and Benefits of Placing Certain Customers on Standard Service Pursuant to Conn. Gen. Stat. § 16-245o(m), testimony on behalf of Connecticut Office of Consumer Counsel, February 27, 2019, cross-examined July 18, 2019.

New Mexico Public Regulation Commission Case No. 18-00295-UT, In the Matter of the Petition of CenturyLink CQ Regarding Effective Competition for Retail Residential Services, testimony on behalf of CWA, April 15, 2019, cross-examined September 25-26, 2019.

New Jersey Board of Public Utilities Docket No. ER19050552, In the Matter of the Verified Petition of Rockland Electric Company for Approval of Changes in Electric Rates, Its Tariff for Electric Service, and Its Depreciation Rates, and for Other Relief, testimony on behalf of New Jersey Division of Rate Counsel, October 11, 2019.

Washington Utilities and Transportation Commission Dockets UE-190529 and UG-190530 (Consolidated), Washington Utilities and Transportation Commission v. Puget Sound Energy, response testimony on behalf of Public Counsel, November 22, 2019.

Washington Utilities and Transportation Commission Docket No. UT-190209, Washington Utilities and Transportation Commission v. Qwest Corporation d/b/a CenturyLink QC, testimony on behalf of Public Counsel, January 9, 2020 and February 13, 2020.

Maryland Public Service Commission Case No. 9613, In the Matter of the Complaint by the Staff of the Public Service Commission v. SmartEnergy Holdings LLC, testimony on behalf of Maryland Office of People's Counsel, January 31, 2020 and July 8, 2020.

Maryland Public Service Commission Case No. 9615, In the Matter of the Complaint by the Staff of the Public Service Commission v. U.S. Gas & Electric Services Providers, Inc., d/b/a Maryland Gas & Electric, testimony on behalf of Maryland Office of People's Counsel, February 14, 2020, March 27, 2020, February 5, 2021, and March 19, 2021.

Maryland Public Service Commission Case No. 9614, In the Matter of the Complaint by the Staff of the Public Service Commission v. Direct Energy Services, LLC testimony on behalf of Maryland Office of People's Counsel, March 6, 2020, February 12, 2021, March 19, 2021, and May 5, 2021.

Maryland Public Service Commission Case No. 9624, In the Matter of the Complaint by the Staff of the Public Service Commission Atlantic Energy MD, LLC, testimony on behalf of Maryland Office of People's Counsel, October 15, 2020, February 22, 2021, and March 17, 2021.

Testimony before State Legislatures:

Testified on September 24, 1997, before the Massachusetts State Legislature Joint Committee on Government Regulations regarding House Bill 4937 (concerning area codes).

Testified on March 2, 2010, before the Maryland State Legislature Senate Finance Committee regarding Senate Bill 677 (concerning Telephone Landline Sale Bill).

Testified on March 11, 2010, before the Maryland State Legislature House Economic Matters Committee regarding House Bill 937 (concerning Telephone Landline Sale Bill).

Testified on June 25, 2013, on behalf of AARP, before the Ohio Select Committee on Telecommunications Regulatory Reform (regarding SB 162).

Testified on December 12, 2013, on behalf of AARP, before the Pennsylvania House Consumer Affairs Committee (regarding House Bill 1608).

Reports/Publications/Presentations

Expert reports in tax matters, reports and publications on telecommunications and energy policy

in trade journals, and presentations at industry associations and conferences include the following:

Expert reports in tax matters:

Iowa Department of Inspections and Appeals, In the Matter of Cable One, Inc. v. Iowa Department of Revenue, DIA 10DORFC014, SBTR Nos. 899 and 903, Property Tax Assessment, Expert Report, January 21, 2011 (on behalf of the Iowa Department of Revenue), deposed February 9, 2011.

Level 3 Communications, LLC. v. Arizona Department of Revenue; Coshise County; Graham County; Greenlee County; La Paz County; Maricopa County; Mohave County; Pima County, Pinal County and Yuma County, Superior Court of the State of Arizona in the Arizona Tax Court, No. TX-2007-000594, Expert Report, May 20, 2011 (on behalf of the Arizona Department of Revenue), deposed July 14, 2011; cross-examined August 24, 2012.

Bresnan Communications, LLC, Plaintiff, v. State of Montana Department of Revenue, Defendant, Cause No. DV-10-1312, July 5, 2011 (on behalf of the Montana Department of Revenue), deposed July 29, 2011.

Verizon California Inc., Plaintiff, v. California Board of Equalization, Defendants, December 18, 2015 (on behalf of the California Board of Equalization), deposed January 20, 2016.

Reports and Publications:

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“Are Consumers Benefiting from Competition? An Analysis of the Individual Residential Electric Supply Market in Massachusetts” (with Sarah M. Bosley), prepared for the Massachusetts Attorney General’s Office, March 29, 2018.

“The Cable-Telco Duopoly’s Deployment of New Jersey’s Information Infrastructure: Establishing Accountability” (with Sarah M. Bosley and Timothy E. Howington). Prepared for the Public Advocate of New Jersey, January 19, 2007.

“Assessing SBC/Pacific’s Progress in Eliminating Barriers to Entry: The Local Market in California Is Not Yet ‘Fully and Irreversibly Open’” (with Patricia D. Kravtin, Dr. Lee L. Selwyn, and Douglas S. Williams). Prepared for the California Association of Competitive Telecommunications Companies, July 2000.

“Where Have All the Numbers Gone? (Second Edition): Rescuing the North American Numbering Plan from Mismanagement and Premature Exhaust” (with Dr. Lee L. Selwyn). Prepared for the Ad Hoc Telecommunications Users Committee, June 2000.

“Price Cap Plan for USWC: Establishing Appropriate Price and Service Quality Incentives for Utah” (with Patricia D. Kravtin and Scott C. Lundquist). Prepared for the Utah Division of Public Utilities, March 22, 2000.

“Telephone Numbering: Establishing a Policy for the District of Columbia to Promote Economic Development” (with Douglas S. Williams and Sarah C. Bosley). Prepared for the District of Columbia Office of People’s Counsel, February 2000 (submitted to Eric W. Price, Deputy Mayor, April 6, 2000).

“The Use of Cost Proxy Models to Make Implicit Support Explicit, Assessing the BCPM and the Hatfield Model 3.1” (with Dr. Lee L. Selwyn). Prepared for the National Cable Television Association, submitted in FCC CC Docket No. 96-45, March 1997.

“The Use of Forward-Looking Economic Cost Proxy Models” (with Dr. Lee L. Selwyn). Prepared for the National Cable Television Association, submitted in FCC Docket No. CCB/CPB 97-2, February 1997.

“Continuing Evaluation of Cost Proxy Models for Sizing the Universal Service Fund, Analysis of the Similarities and Differences between the Hatfield Model and the BCM2” (with Dr. Lee L. Selwyn). Prepared for the National Cable Television Association, submitted in FCC CC Docket No. 96-45, October 1996.

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“ISDN Rate-Setting in Massachusetts.” *Business Communications Review*, June 1992 (Volume 22, No. 6).

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“Competitive Pricing Analysis of Interstate Private Line Services.” Prepared for the National Telecommunications Network, June 1986.

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“Evaluation of Economic Development and Energy Program in Lawrence, Massachusetts.” (with Richard Innes). Prepared for U.S. Department of Energy, August, 1982.

“Energy Efficiency in New England’s Rental Housing.” New England Regional Commission, 1981.

“Low Level Radioactive Waste Management in New England.” New England Regional Commission, 1981.

“The Realtor's Guide to Residential Energy Efficiency.” Prepared for the U.S. Department of Energy and the National Association of Realtors, 1980.

Presentations:

“Telecom Committee Panel: Like the Phoenix, Telecommunication Service Quality Issues are Rising Again,” National Association of State Utility Consumer Advocates Annual Meeting, San Antonio, Texas, November 19, 2019.

“Retail Supplier Abuses and High Prices for Consumers: Does Retail Choice Still Make Sense?” 2019 National Association of State Utility Consumer Advocates Mid-Year Meeting, Portland, Oregon, June 21, 2019.

“The Battle for Net Neutrality,” lecture in “Methods of Policy Analysis,” MIT Department of Urban Studies & Planning, May 7, 2018.

“Discussion of Massachusetts Report,” Presentation to Nevada Governor’s Committee on Energy Choice, Technical Working Group on Consumer Protection, April 20, 2018.

“Back to Basics: What Specific Consumer Protections Are Still Needed in Telecommunications Regulation?,” Presentation at the Mid-Atlantic Conference of Regulatory Utilities Commissioners 21st Annual Education Conference, Williamsburg, Virginia, June 23, 2016.

“The Three Rs: The Need for Reliable, Redundant and Resilient Telecommunications in the New Age,” 2015 National Association of State Utility Consumer Advocates Annual Meeting, Austin, Texas, November 9, 2015.

“Telecommunications in Transition: Advocating for 50+ Consumers in the Brave New World,”

Presentation at AARP’s State Advocacy and Strategy Integration conference on “State Regulatory and Legislative Landscapes,” Portland, Oregon, September 16, 2014.

“What the IP Transition Means for Consumers and a Ubiquitous, Affordable, Reliable National Communications System,” 2014 National Association of State Utility Consumer Advocates Mid-Year Meeting, Santa Fe, New Mexico, June 2, 2014.

“For Sale - The National Wireline Communications System,” 2014 National Association of State Utility Consumer Advocates Mid-Year Meeting, Santa Fe, New Mexico, June 3, 2014.

“FCC Review of Verizon’s Section 214 Application and Its Implications for the IP Transition,” NASUCA Annual Meeting, Orlando, Florida, November 19, 2013.

“What gets lost in the IP Transition?” NASUCA Annual Meeting, Orlando, Florida, November 18, 2013.

“Service Outage and Restoration,” NARUC Staff panel, NARUC 125th Annual Meeting, Orlando, Florida, November 16, 2013.

“You Don’t Know What You’ve Got Til It’s Gone – Utilities Consumer Protections,” Presentation at AARP’s State Advocacy and Strategy Integration conference on “Fighting for Consumers,” Minneapolis, Minnesota, September 19, 2013.

“Protecting Consumers’ Assets and Income,” Presentation at the National Association of Latino Elected and Appointed Officials Policy Institute on “The Changing Dynamics of the Latino 50+ Population,” Albuquerque, New Mexico, August 25, 2013.

“Federalism in the 21st Century,” Presentation at the Mid-Atlantic Conference of Regulatory Utilities Commissioners 18th Annual Education Conference, Hershey, Pennsylvania, June 24, 2013.

“Trials for the Transition from TDM to IP,” Presentation at the New England Conference of Public Utilities Commissioners 66th Annual Symposium, Groton, Connecticut, June 11, 2013.

“The 1996 Telecom Act Today: Universal, affordable, reliable access to telecommunications for all. Does the federal-state partnership still exist?” AARP Telecommunications Summit, Pew Center for Charitable Trusts, Washington, DC, July 18, 2012.

“Issues and Ramifications Arising From the FCC’s Connect America Fund Order Affecting High Cost Universal Service and Intercarrier Compensation,” 2012 National Association of State Utility Consumer Advocates Mid-Year Meeting, Charleston, South Carolina, June 24, 2012.

“FCC Lifeline/Link Up Reform Order – What will it mean for regulators, consumers, and companies?” Presentation at the Mid-America Regulatory Conference, Des Moines, Iowa, June 11, 2012.

“Improving the Separations Process: Consumer Impact,” panelist for Federal-State Joint Board on Separations on behalf of the National Association of State Utility Consumer Advocates and the New Jersey Division of Rate Counsel, September 24, 2010, CC Docket No. 80-286, Washington, DC.

“The Evolving Role of State Regulation in a Changing Industry,” Presentation at the New England Conference of Public Utilities Commissioners 63th Annual Symposium, Brewster, Massachusetts, May 17, 2010.

“Broadband: Where it is, where it ain’t, and where it oughta be,” June 29, 2009, National Association of State Utility Consumer Advocates Mid-Year Meeting, Boston, Massachusetts.

“Deregulation and Price Increases: The Hallmarks of a Competitive Market?” November 18, 2008; 2008 National Association of State Utility Consumer Advocates Annual Meeting, New Orleans, Louisiana.

“Forbearance: What is it? What’s wrong with it? How to fix it,” November 12, 2007; “Net Neutrality – Not Dead Yet!,” November 13, 2007; 2007 National Association of State Utility Consumer Advocates Annual Meeting, Anaheim, California.

“FCC’s Regulatory Stance – Consumer Advocates’ Role More Important Than Ever,” 2005 National Association of State Utility Consumer Advocates Winter Meeting, March 2, 2005, Washington, D.C.

“Impact of Federal Regulatory Developments on Consumers and Consumers’ Impact on Regulatory Developments,” Presentation for the Washington Attorney General’s Office, Seattle, Washington, May 27, 2003.

“The Finances of Local Competition” Presentation at the New England Conference of Public Utilities Commissioners 54th Annual Symposium, Mystic, Connecticut, May 21, 2001.

“Facilities-Based Competition” Presentation at the New England Conference of Public Utilities Commissioners 52nd Annual Symposium, Bretton Woods, New Hampshire, May 24, 1999.

“Exploring Solutions for Number Exhaust on the State Level” and “A Forum for Clarification and Dialogue on Numbering Ideas,” ICM Conference on Number Resource Optimization, New Orleans, Louisiana, December 10-11, 1998.

“Telecommunications Mergers: Impact on Consumers,” AARP Legislative Council 1998 Roundtable Meeting, Washington, D.C., November 18, 1998.

“Consumer Perspectives on Incumbent Local Exchange Carrier Mergers,” National Association of Regulatory Utility Commissioners 110th Annual Convention, Orlando, Florida, November 11, 1998.

Federal Communications Commission En Banc Hearing on “Proposals to Revised the Methodology for Determining Universal Service Support,” CC Docket Nos. 96-45 and 97-160,” June 8, 1998, panelist.

“Universal Service: Real World Applications,” 1997 National Association of State Utility Consumer Advocates Mid-Year Meeting, Charleston, South Carolina, June 9, 1997.

“Modeling operating and support expenses” and “Modeling capital expenses,” panelist for Federal-State Joint Board on Universal Service Staff Workshops on Proxy Cost Models, January 14-15, 1997, CC Docket 96-45.

“Evaluating the BCM2: An Assessment of Its Strengths and Weaknesses,” presentation to the AT&T Cost Team (with Michael J. DeWinter), December 4, 1996.

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“Making Adjustments to the BCM2.” Presentation to the Staff of the Federal-State Joint Board on Universal Service, September 16, 1996.

“Converging on a Model: An Examination of Updated Benchmark Cost Models and their Use in Support of Universal Service Funding.” Presentation to the National Association of Regulatory Utility Commissioners Summer Committee Meetings, July 22, 1996.

“ETI’s Corrections to and Sensitivity Analyses of the Benchmark Cost Model.” Presentation to the Staff of the Federal-State Joint Board on Universal Service,” May 30, 1996.

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Communications Policy White Paper, September 1995.

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“New Frontiers in Regulation.” Presentation to the New England Women Economists Association, December 12, 1995.

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“Crafting a Rational Path to the Information Age.” Presentation at the State of New Hampshire's conference on the “Twenty-First Century Telecommunications Infrastructure,” Durham, New Hampshire, April 1993.

“The Political Economics of ISDN,” presentation at the John F. Kennedy School of Government seminar on “Getting from Here to There: Building an Information Infrastructure in Massachusetts,” March 1993.

“The New Competitive Landscape: Collocation in Massachusetts.” Presentation at TeleStrategies Conference on Local Exchange Competition, Washington, D.C., November 1991.

“Telecommunications Policy Developments in Massachusetts.” Presentations to the Boston Area Telecommunications Association, October 1989; March 1990; November 1990; June 1992. Presentation to the New England Telecommunications Association, March 1990.

“How to Capitalize on the New Tariffs.” Presentation at Communications Managers Association conference, 1988.

Advisor to:

United States General Accounting Office Report to the Subcommittee on Antitrust, Business Rights and Competition, Committee on the Judiciary, U.S. Senate, *Characteristics and Competitiveness of the Internet Backbone Market*, GAO-02-16, October 2001.