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Application of Pacific Bell Telephone Company d/b/a AT&T California (U 1001 C) for Targeted Relief from Its Carrier of Last Resort Obligation and Certain Associated Tariff Obligations	A.23-03-xxx (Filed March 3, 2023)

APPLICATION OF PACIFIC BELL TELEPHONE COMPANY D/B/A AT&T CALIFORNIA (U 1001 C) FOR TARGETED RELIEF FROM ITS CARRIER OF LAST RESORT OBLIGATION AND CERTAIN ASSOCIATED TARIFF OBLIGATIONS

[PUBLIC VERSION]

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Pursuant to Article 2 of the California Public Utilities Commission's Rules of Practice and Procedure, Pacific Bell Telephone Company d/b/a AT&T California (U 1001 C)[1] submits this Application for targeted relief from its Carrier of Last Resort ("COLR") obligation and certain associated tariff obligations.

I. EXECUTIVE SUMMARY

California consumers enjoy one of the most innovative and competitive communications marketplaces in the country. Implementing California's policies, the Commission has facilitated robust competitive entry and strengthened investment incentives for the deployment of advanced communications services. AT&T and others have been investing enormous sums in California to deploy high-capacity, state-of-the-art broadband technologies—both wired and wireless. These changes are a boon for consumers, for the environment, and for the California economy.

To accelerate this transformation, AT&T California seeks tailored relief from its outdated COLR obligation, which effectively mandates AT&T California to maintain a copper-based network throughout its service territory. In effect, this obligation requires AT&T California, but not its major competitors, to wastefully operate and maintain two duplicative networks: one, an antiquated, narrowband network with an ever-dwindling base of subscribers, and the other, a forward-looking, fiber and wireless broadband network.[2] The modest regulatory reforms sought in this Application would boost investment in next-generation broadband services and networks,

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[1] "AT&T California" refers to Pacific Bell Telephone Company, and "AT&T" refers to the larger corporate family ultimately owned by AT&T Inc. This Application is filed pursuant to Pub. Util. Code § 275.6, *Rulemaking on Comm'n's Own Motion into Universal Serv. & To Comply with the Mandates of Assembly Bill 3643*, D.96-10-066, 1996 Cal. PUC LEXIS 1046, at *470 app. B (Rule 6.D.7) (Oct. 25, 1996) ("*1996 CPUC Decision*"); *Ord. Instituting Rulemaking Regarding Revisions to the Cal. High Cost Fund B Program*, D.12-12-038, 2012 Cal. PUC LEXIS 597, at *99–100 app. C (Rule 6.D.6) (Dec. 20, 2012) ("*2012 CPUC Decision*"); and Article 2 of the Rules of Practice and Procedure.

[2] As used herein, AT&T's "broadband network" includes both fiber and wireless segments.

reduce waste, and ensure regulatory parity. At the same time, AT&T's proposed relief would protect the needs of current basic service customers without alternatives for voice service and would allow others with existing options plenty of time to choose among them.

Prompt action on this Application is important because broadband deployment is at a critical inflection point. The federal Broadband Equity, Access, and Deployment ("BEAD") Program, which promises to expand and hasten broadband deployment in unserved and underserved areas, is entering its decisive phase. That program will succeed in California only if the Commission promotes regulatory conditions conducive to further investment and innovation in broadband technologies. To that end, the COLR relief proposed here would enable AT&T California to redeploy resources from yesterday's voice-centric technologies and hasten its ability to roll out broadband to more Californians.

Significantly, AT&T California is not seeking *total* COLR relief at this time: for the few customers who currently lack an alternative to AT&T California's basic voice service, AT&T California would continue offering voice service on the same terms as before until an alternative becomes available. This proposal thus presents the best of all worlds: it would reduce economic and environmental waste and propel greater investment and innovation while protecting the relatively few customers whose only current option for voice service is a legacy telephone line.

A. For most of the 20th century, consumers had only one technological option for voice service: a twisted pair of copper wires connecting their homes to the local phone company's circuit-switching equipment. Through the 1980s, such "plain old telephone service" ("POTS") was regarded as a natural monopoly, and voice competition from wireless, cable, and other competitive service providers had not yet emerged. Each local telephone company thus

entered into a compact with regulators to serve everyone within its service area in exchange for guaranteed returns on investment.

The COLR obligation made sense in the monopolistic environment of 40 years ago, but it makes no sense given today's robust competition from a wide variety of providers that have now deployed broadband networks. Like Blockbuster rentals and Kodak film, POTS has fallen from technological primacy to effective obsolescence in the course of a generation. As Dr. Mark Israel of Compass Lexecon explains in his attached declaration, the overwhelming majority of Californians today rely on broadband connections for voice calls; only a small minority still subscribe to copper-line telephone service. Indeed, the number of POTS lines provided by AT&T California plummeted by 89 percent from 2000 to 2021.[3] And even most remaining landline customers rely primarily on their mobile phones.[4]

Moreover, almost everyone in AT&T California's service territory can choose among several comparably or lower-priced wireline and wireless alternatives to POTS for voice service. These alternatives include such household names as Comcast/Xfinity, Charter/Spectrum, Cox, T-Mobile, and Verizon Wireless as well as AT&T Fiber and AT&T Mobility.[5] In fact, fully 99.9 percent of the population in AT&T California's service territory has access to at least two facilities-based alternatives to POTS, and 99.7 percent has access to at least three.[6]

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[3] Declaration of Mark A. Israel ¶ 44 ("Israel Decl.") (attached hereto as Attachment A).

[4] According to federal estimates, only 2.7% of California adults are "landline-only" (*i.e.*, POTS or broadband VoIP), and only 4.4% are "landline-mostly"; the remainder rely equally (8.9%), mostly (19%), or exclusively (64.2%) on their wireless phones. *National Health Interview Survey Early Release Program*, Nat'l Ctr. for Health Stat. (Dec. 2022), https://www.cdc.gov/nchs/data/nhis/earlyrelease/Wireless_state_202212.pdf.

[5] *See* Israel Decl. ¶¶ 31–38.

[6] *Id*. ¶ 33.

These trends reflect the new commercial reality: the overwhelming majority of California consumers utilize "voice" not as a standalone service tethered to fixed narrowband copper wires, but rather as part of a broader package of connectivity services offered by a number of home-broadband and mobile wireless companies. Within its wireline footprint, AT&T California is not even the market leader for such services, a complete reversal from the monopoly era. For home broadband/VoIP, AT&T California has far fewer subscribers than the incumbent cable company in most areas.[7] And for wireless voice-and-data services, T-Mobile and Verizon Wireless have similar scale and scope to AT&T Mobility.[8] Yet the Commission's COLR obligation persists in treating AT&T California as though it were still a monopolist. Only AT&T California—not Comcast, not Charter, not Cox, not Verizon Wireless, not T-Mobile—remains saddled with an obligation to provide a tariffed, standalone voice service to any requesting customer within its service area, even as demand for such standalone voice service has all but disappeared amid the plethora of alternatives available to consumers.[9]

That regulatory asymmetry lacks any rational basis. It creates both economic and environmental waste and impedes AT&T California's ability to compete effectively. Unburdened by legacy obligations, AT&T California's competitors can focus entirely on developing forward-looking networks and services with state-of-the-art broadband capabilities. In contrast, AT&T California's status as a regulated POTS provider effectively requires it to maintain two parallel networks: one cutting-edge and the other dating to the origins of the Bell System. And AT&T California alone must continue to fulfill every request to extend an outdated

[7] *See id.* ¶ 54.

[8] *Id.* ¶ 53.

[9] *See id.* ¶ 39–44.

voice-centric network to anyone, anywhere within its footprint, even in cases where the customer has access to a modern alternative. Maintaining the copper network, with its legacy telephone technology and obsolete equipment, drains resources away from AT&T California's expansion of its state-of-the-art broadband network. Moreover, the constraints COLR places on AT&T California allows its competitors to reduce their investments too. AT&T California's COLR obligation thus slows technological and economic progress in the state, to the detriment of California's consumers, workers, and economy.

The COLR obligation also comes at a significant cost to the environment. AT&T California must consume extra fuel to conduct additional truck rolls to repair obsolete copper lines. It must keep large numbers of aged network components powered and running notwithstanding the massive reduction in time-division multiplexing ("TDM") traffic.[10] In contrast, AT&T California's broadband fiber network is far more energy efficient.

In today's modern and competitive marketplace, it defies reason to subject AT&T California to these regulatory disadvantages in perpetuity, based on its market position decades ago for a technology that is now obsolete. Every other state in which AT&T operates as an incumbent local exchange carrier recognizes this reality and has thus granted AT&T substantial—frequently, total—COLR relief.[11] AT&T California requests that this Commission do the same.

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[10] *See id.* ¶ 23.

[11] *See*, *e.g.*, *Petition for Modification of Rules & Regul. Necessary To Achieve Regul. Parity & Modernization*, General Order No. R-31839, 2014 La. PUC LEXIS 52 (Mar. 11, 2014) (granting request to eliminate AT&T Louisiana's COLR obligation); *Application of Nev. Bell Tel. Co. d/b/a AT&T Nev. & AT&T Wholesale for Relief from Designation as a Provider of Last Resort in Portions of Nev. Pursuant to NRS 704.68886*, Order, Docket No. 16-03021, 2016 Nev. PUC LEXIS 144 (Sept. 12, 2016) (approving application for relief from designation as a provider of last resort except in limited portions of its service territory). A full list of citations may be found in Attachment B.

B. When the Commission designated AT&T California and other incumbent POTS providers as default COLRs in 1996,[12] it stressed that, as market conditions "move[] from a monopoly provider to multiple providers, the universal service program needs to be readjusted to meet the challenges of increasing competition."[13] It explained that "[s]tatutory policies and the level of market competition advise against the continuation of monopoly era regulations that limit the ability of carriers to withdraw or grandfather services that are no longer attractive to customers."[14]

The Commission has thus made clear since the 1990s that, once competition takes root, COLR status is voluntary, and carriers can apply not only to become COLRs, but also to be relieved of their COLR obligation.[15] This Application accordingly seeks to adjust AT&T California's COLR status to reflect technological advances and the near-ubiquity of voice competition throughout its service territory. The Commission has clear legal authority to take this step: the Legislature has authorized the Commission to "amend any order or decision made

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[12] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *3–4, *37–46, *454, *460–62, *465–73, *481–82 (Rules 1.F, 4, 6; attach. A).

[13] *Id.* at *369 (Finding of Fact 16); *see also* 1994 Cal. Stat. ch. 278 § 2(a)(4) (A.B. 3643) ("The Public Utilities Commission shall … [d]evelop a process to periodically review and revise the definition of universal service to reflect new technology and markets."); *2012 CPUC Decision*, 2012 Cal. PUC LEXIS 597, at *74–75 (Finding of Fact 5) ("Although basic service has traditionally been provided by carriers using local exchange wireline network architecture, other forms of telecommunications services offered by wireless, cable, and VoIP have been growing in popularity, particularly over the past decade.").

[14] *Ord. Instituting Rulemaking on the Comm'n's Own Motion To Assess & Revise the Regul. of Telecomms. Utils.*, D.06-08-030, 2006 Cal. PUC LEXIS 367, at *295 (Aug. 24, 2006) ("*2006 CPUC Decision*"), *modified on reh'g on other grounds*, D.06-08-030, 2006 Cal. PUC Lexis 511 (Dec. 14, 2006); *see also id.* ("With the wide availability of communications alternatives from voice competitors, we see no reason to impose regulatory requirements on ILECs that we do not impose on other carriers."); *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *455 app. B (Rule 1.J) (defining "[c]ompetitive neutrality" as "[t]he concept that regulation of the telecommunications industry should be structured in such a way that it neither favors nor impedes one telecommunications carrier or group of telecommunications carriers, over any other carrier or group of carriers").

[15] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *470 (Rule 6.D.6).

by it,"[16] and this authority extends to changing its prior COLR designation of AT&T California. Failure to do so would contravene Commission precedent, state and federal legislative commands, as well as the overarching requirements of reasoned decisionmaking and due process.

The relief sought here would more closely tailor AT&T California's COLR obligation to the differing competitive conditions across its territory. AT&T California's COLR duties to existing customers would continue where there is no voice alternative to POTS, such as fixed broadband VoIP or mobile wireless. For those few customers, who are generally located in remote rural areas, AT&T California would continue to provide POTS subject to its existing tariff[17] until such time that a voice alternative becomes available, whether provided by AT&T or another service provider. In contrast, in areas where consumers *do* have a voice alternative to POTS, the relief sought here would free AT&T California from continued state-law obligations to provide a tariffed voice service. It would thus place AT&T California in the same regulatory position as its competitors, all of which operate on a non-tariffed basis.

Nonetheless, to avoid the possibility of disruption, even in areas where there is an alternative to POTS, AT&T California would continue serving *existing* POTS customers pursuant to its current tariff for at least six months following grant of this Application. Moreover, AT&T California must continue to offer POTS until it completes the Section 214 discontinuance

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[16] Cal. Pub. Util. Code § 1708 ("The commission may at any time, upon notice to the parties, and with opportunity to be heard as provided in the case of complaints, rescind, alter, or amend any order or decision made by it. Any order rescinding, altering, or amending a prior order or decision shall, when served upon the parties, have the same effect as an original order or decision."); *see also id.* § 701 ("The commission may supervise and regulate every public utility in the State and may do all things, whether specifically designated in this part or in addition thereto, which are necessary and convenient in the exercise of such power and jurisdiction.").

[17] While AT&T California serves business customers pursuant to its Guidebook instead of a tariff, "tariff" is used herein for ease of reference to refer to both the actual tariff and the Guidebook.

process administered by the Federal Communications Commission ("FCC") for any given part of its service territory.[18]

Even areas without a voice alternative to POTS today are poised to become competitive, particularly as federal and state funding programs extend broadband networks into previously unserved and underserved areas of California. AT&T thus further proposes that the Commission approve a streamlined process for COLR relief in those areas once a voice alternative becomes available. Namely, AT&T California proposes to file an advice letter with the Commission demonstrating that the area in question has a voice alternative to POTS, and a timetable for phased COLR relief would begin in that area from the date of approval of the advice letter.[19]

C. The Commission should act promptly on this Application because COLR relief would deliver vital benefits to California, including reallocation of AT&T's resources to broadband deployment around the state. These benefits are especially urgent for promoting digital equity for the state's low-income, tribal, and rural communities.

Low-income communities. As Governor Newsom has stated, "broadband access, adoption, and training are essential components of digital equity for California's diverse populations."[20] That is particularly true of Californians in low-income areas who need high-speed broadband for remote learning, remote work, and economic advancement.

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[18] As used herein, "Section 214 discontinuance process" encompasses both the FCC grant of a Section 214 discontinuance application as well as circumstances when service obligations lapse by rule. *See* 47 C.F.R. § 63.71(g).

[19] Here, too, AT&T California would need to complete the FCC's Section 214 discontinuance process for the area before terminating POTS service there.

[20] Cal. Exec. Order No. N-73-20 (Aug. 14, 2020), https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf.

AT&T California is working diligently to boost fiber availability and adoption in those low-income neighborhoods. Among its other current initiatives in low-income communities, AT&T offers customers who are eligible to participate in the Affordable Connectivity Program ("ACP") up to 100/100 Mbps symmetrical broadband service (where available), with no data caps, for a nominal fee of $30 per month. Because ACP matches that amount, this AT&T initiative enables eligible customers to receive high-speed broadband *for free*.[21] To date, more than 1.8 million California households have taken advantage of this unprecedented opportunity.[22]

It is nonetheless estimated that, at the height of pandemic school closures, 1.3 million K-12 students in California lacked home internet service.[23] In one response to this crisis, AT&T has opened five Connected Learning Centers ("CLCs") in California, giving underserved students and their families free access to the internet, computers, and educational resources.[24] As leaders of the host organizations explain, each CLC "is a critical link to connectivity" for the families it serves,[25] "set[ting] them up for success in the future."[26] AT&T also works with local

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[21] *See New 'Access from AT&T' Plan + New Federal Benefit = Free Internet*, AT&T (Feb. 7, 2022), https://about.att.com/story/2022/new-access-plan-plus-new-federal-benefit.html.

[22] *See ACP Enrollment and Claims Tracker,* Universal Serv. Admin. Co., https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/#enrollment-by-state (last visited Feb. 16, 2023).

[23] *See Interactive Map: America's Unconnected Students*, Digit. Bridge K-12, https://digitalbridgek12.org/toolkit/assess-need/connectivity-map/ (last visited Feb. 16, 2023).

[24] *See*, *e.g.*, *AT&T Expands Efforts To Bridge the Digital Divide in Communities Across the Nation*, AT&T (Sept. 16, 2021), https://about.att.com/story/2021/att_connected_learning_center.html; *AT&T and Rincon Tribe Celebrate Opening of New Connected Learning Center*, AT&T (Feb. 23, 2023), https://about.att.com/story/2023/connected-learning-center-rincon-tribe.html ("*Rincon CLC Release*").

[25] *AT&T Opens 2nd Connected Learning Center in California*, AT&T (Apr. 6, 2022), https://about.att.com/story/2022/connected-learning-center-san-francisco.html (quoting Rex Tabora, Executive Director, Asian Pacific American Community Center).

[26] *AT&T Connected Learning Center Opens at CRCD*, Coal. for Responsible Cmty. Dev. (May 20, 2022), https://coalitionrcd.org/2022/05/20/att-connected-learning-center-opens-at-crcd/ (quoting Mark Wilson, President and CEO, CRCD).

governments across the state to expand the availability of fiber broadband to low-income households. For example, AT&T recently announced a collaborative effort with the Los Angeles Unified School District ("LAUSD")—80% of whose students live at or below the poverty level—to provide high-speed broadband to students' homes at no cost to their families.[27] As LAUSD Superintendent Alberto Carvalho explained, without "reliable internet access, around the clock, on- and off-campus … our students don't have what they need to learn."[28] The COLR relief sought here would free up critical resources for similar efforts around the state.

Tribal communities. As the Commission recognizes, access to state-of-the-art broadband is indispensable to economic opportunity and civic engagement in tribal communities.[29] To that end, COLR relief also would allow AT&T California to expand its collaborations with tribal governments to ensure high-speed connectivity on tribal lands. There would be more examples such as AT&T's partnership with the Rincon Band of Luiseño Indians. That partnership seeks to bring fiber broadband to more than 400 homes on Rincon lands,[30] which Rincon Band Chairman Bo Mazzetti calls "a major service for everyone."[31] And, on February 23, AT&T opened a new CLC on the Rincon reservation, which Chairman Mazzetti hailed as "an absolute dream come true for our seniors, youth and the many tribal members who for many years did not have access

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[27] *See AT&T Brings Reliable Internet to LA Unified Students' Homes*, AT&T (May 3, 2022), https://about.att.com/story/2022/los-angeles-unified-digital-divide.html.

[28] *Id.* (quoting Superintendent Alberto Carvalho).

[29] *See*, *e.g.*, *CPUC Acts To Increase Broadband Deployment Throughout California* (Feb. 24, 2022), https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-acts-to-increase-broadband-deployment-throughout-california-02-24-2022.

[30] Jeff Luong, *Bridging the Digital Divide, One Tribe at a Time*, AT&T Blog (Mar. 7, 2022), https://about.att.com/innovationblog/2022/bridging-digital-divide-one-tribe-at-a-time.html.

[31] Lauren J. Mapp, *Rincon Tribe To Bring Broadband Service to Reservation Through Partnership with AT&T*, San Diego Union-Trib. (Mar. 8, 2022), https://www.sandiegouniontribune.com/communities/north-county/story/2022-03-08/rincon-tribe-to-bring-broadband-service-to-reservation-through-partnership-with-at-t (quoting Chairman Bo Mazzetti).

to technology."[32] This new facility serves not only the Rincon Band itself, but four neighboring tribes as well: the Pala and San Pasqual Bands of Mission Indians and the La Jolla and Pauma Bands of Luiseño Indians.[33] Through the relief sought here, even more tribal communities across the state would enjoy remote learning for students and adults, access to telemedicine to improve health outcomes and address healthcare disparities, the ability to build and grow a business online, the chance to learn new skills and apply for jobs, and even enjoy the simple pleasure of streaming entertainment.

Rural communities. Like this Commission, AT&T California is committed to closing the broadband availability gap between urban and rural areas, and here, too, COLR relief is an important part of the solution. With freed-up resources, AT&T California could deploy fiber broadband to additional households in rural areas across the state, as it already has in Amador, El Dorado, Kings, Madera, and Mariposa Counties, among other locales.

AT&T California has further demonstrated its commitment to rural broadband by working tirelessly to restore and—in the process—improve connectivity in the disproportionately rural areas ravaged by recent wildfires. As fiber technology has evolved, AT&T has continually integrated fiber upgrades into its disaster restoration efforts. And when AT&T confronts total destruction of its network, it generally opts, to the extent feasible, to rebuild with fiber rather than copper. For example, since 2017, AT&T has undertaken extensive fiber-rebuild projects in the areas damaged by the Atlas, Caldor, Camp, Carr, Fawn, Mill, Thomas, Tubbs, and Woolsey Fires, thereby extending advanced broadband services for the first time to thousands of

[32] *Rincon CLC Release* (quoting Chairman Bo Mazzetti).

[33] *Cf. id.* (noting service to "students on the Tribal Nations in the Valley Center region"). AT&T is also a proud corporate sponsor of important tribal initiatives across California, including—to take just one example—Walking Shields, a nonprofit that promotes digital literacy and ACP enrollment.

households in these less-populous areas. The COLR relief sought here would facilitate similar fiber upgrades as AT&T works with rural communities to restore connectivity in the wake of future natural disasters.

* * *

The remainder of this Application is organized as follows. Section II discusses the monopoly-era roots of COLR obligations in California, the Commission's recognition of the need to adapt those obligations to the rise of competition, and the Commission's legal obligation to allow AT&T California to relinquish its COLR obligation in these circumstances. Section III, which summarizes Dr. Israel's attached declaration, explains why COLR rules are *unnecessary* to protect the overwhelming majority of California consumers, given their access to many competitive alternatives and their large-scale abandonment of POTS service. Section IV explains why COLR obligations are affirmatively *counterproductive* and why eliminating them in most areas would benefit consumers, workers, and the environment. Section V sets forth AT&T California's proposed relief and explains how granting that targeted relief would not disrupt remaining POTS customers. Finally, Section VI addresses certain procedural matters.

II. THE COMMISSION DESIGNED ITS COLR RULES TO BE COMPETITIVELY NEUTRAL AND PROVIDED AT&T CALIFORNIA WITH A CLEAR PATHWAY FOR RELIEF.

In California, all incumbent local exchange carriers ("ILECs") were initially classified as COLRs approximately 30 years ago.[34] However, those initial designations were not intended to be permanent. Rather, the Commission's decisions make clear that ILECs can apply and obtain permission to exit the COLR regime. Although these decisions do not clearly state the specific

[34] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *468–69 (Rule 6.D.1).

criteria that should now apply for assessing COLR relief applications,[35] the history and purpose of COLR obligations make clear that the Commission should approve such applications where, as here, virtually every customer in the ILEC's service territory can choose another facilities-based voice service provider.

A. The Monopoly-Era Roots of COLR Regulation

Throughout most of the 20th century, consumers had one choice for voice service—the ILEC—and local telephone service was regulated as a natural monopoly. Under a longstanding regulatory compact, the Commission agreed to rate structures sufficient for each ILEC, including AT&T California, to earn a reasonable overall return on investment in exchange for agreeing to serve all customers within its geographic footprint.[36]

As part of that regulatory compact, the Commission authorized above-cost rates for certain customers (*e.g.*, those in high-density urban areas) and for certain services (*e.g.*, business lines and exchange access) to support radically below-cost basic service rates for customers in rural and other high-cost areas.[37] In the absence of competition, this system of implicit cross-subsidies generally assured each ILEC a reasonable return on its network investments.[38]

This universal service regime broke down as competition surged (as policymakers intended) in the wake of the federal Telecommunications Act of 1996, first from other providers

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[35] *See supra* notes 12–15 and accompanying text (discussing Commission COLR decisions).

[36] *See* Israel Decl. ¶ 16.

[37] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *24 ("Prior to the opening of the local exchange and toll markets to competition, the incumbent LECs were able to offset the increased cost or doing business in high cost areas by several mechanisms. They were able to have averaged rates throughout their service territory, which enabled the LECs to set a rate which reflected an average of the higher cost exchanges with the more profitable exchanges. The LECs were also able to price certain services above costs so as to subsidize basic local exchange service, which was generally priced below cost.").

[38] Israel Decl. ¶ 16.

of landline telephone services and then from rapidly escalating entry of intermodal cable and wireless providers. New entrants focused on the most-profitable customers who had once subsidized the ILECs' costs of serving unprofitable customers. As a result, ILECs were increasingly left serving the higher-cost customers, but without the implicit cross-subsidies needed to keep those customers' rates below cost.[39]

The Commission adopted California's current COLR regime as part of a more general universal service overhaul in the 1990s, when competition for local telecommunications services was only beginning to emerge. The Commission recognized that it needed to replace its legacy internal cross-subsidy system with an external direct-support mechanism, among other revisions.[40] The Commission thus created the California High Cost Fund-B ("CHCF-B Fund"), which is funded by fees assessed on the end-user customers of all telecommunications providers, to provide direct support to any provider serving a high-cost customer.[41] To qualify for this support, a carrier must be a COLR, which requires it to offer tariffed, basic voice telephone service to any requesting customer in the carrier's service area.[42]

B. The Opt-In/Opt-Out Nature of California COLR Obligations

In 1996, to ensure that a COLR was available to all Californians during this transition to local competition and to the new direct-support mechanism, the Commission initially assigned each ILEC as the COLR for its service areas, while inviting other providers to opt into the COLR

[39] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *24 ("With the introduction of competition, multiple carriers will be competing for the same customers. The implicit subsidies of averaged rates, and services priced above cost to support services priced below cost, will no longer be sustainable in a competitive market."); Israel Decl. ¶ 17.

[40] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *2 ("As we enter this competitive environment, yesterday's policies supporting universal service will no longer be sustainable.").

[41] *See id.* at *3–4.

[42] *Id.* at *293, *300–09.

regime as well.[43] The Commission expected that these initial COLR classifications would be temporary: "As the marketplace for local telephone exchange service moves from a monopoly provider to multiple providers, the universal service program needs to be readjusted to meet the challenges of increasing competition."[44] The Commission further emphasized that COLR obligations should be "competitively neutral[]," and "regulation of the telecommunications industry should be structured in such a way that it neither favors nor impedes one telecommunications carrier or group of telecommunications carriers, over any other carrier or group of carriers," including incumbents.[45]

The Commission thus adopted rules—which are still in effect—that expressly allow an ILEC to withdraw from its initial COLR classification: either by advice letter if there is another COLR already serving the same area or by application if there is not. In the latter case, the rules provide for a reverse auction in which competitive carriers bid to offer basic service at the prescribed retail rate and the lowest support level.[46] Theoretically, the guaranteed support level in such auctions would keep increasing until at least one carrier opts into COLR status, at which point the requesting ILEC would withdraw as COLR while the auction winner takes its place.[47]

The Commission, however, never adopted any rules for such reverse auctions, mainly because competitors chose to deploy and expand their networks in California without seeking

[43] *Id.* at *468–69 (Rule 6.D.1).

[44] *See id.* at *369 (Finding of Fact 16).

[45] *Id.* at *455 (Rule 1.J).

[46] *Id.* at *470–72 (Rules 6.D.6, 6.E).

[47] *See id*. at *471–72 (Rule 6.E).

COLR status,[48] likely concluding that the money available from the CHCF-B Fund did not offset the substantial burdens and associated costs of a COLR obligation.

It is not surprising that competitors find the costs of a COLR obligation to outweigh the benefits. The available CHCF-B support for residential basic service in California has dropped precipitously since 1996, when it totaled $352 million per year for all carriers (or $668 million adjusted for inflation).[49] For 2020–21, the Commission budgeted only $22 million dollars (about three percent of the original amount, adjusting for inflation) to support about 66,000 voice lines, choosing to devote the bulk of funding to broadband deployment instead.[50] Within AT&T California's ILEC service wireline footprint, it remains the only COLR subject to the attendant burdensome tariffing and basic service obligations—even though, in nearly every area within that footprint, multiple other providers stand ready and willing to provide competitive voice service to requesting customers.

C. The Commission Has Clear Legal Authority To Grant COLR Relief and Legally Must Do So.

The Commission's COLR rules provide a pathway to relieve AT&T California from its legacy COLR obligation. Those rules provide that "[a] designated COLR may opt out of its

[48] In 2012, the Commission revisited its COLR rules in light of accelerating competition and deployment of mobile and broadband technologies. *2012 CPUC Decision*, 2012 Cal. PUC LEXIS 597, at *1–2, *6–8. The Commission acknowledged that it had not yet implemented the auction process and that some parties had questioned whether a reverse auction would be successful, given the radical declines in voice support levels. *Id.* at *11–13 & n.10. But the Commission did not amend its prior COLR rules providing that any solitary COLR for a given area, including any ILEC, could obtain COLR relief by invoking the auction process.

[49] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *483 app. D.

[50] *California High Cost Fund B Fact Sheet*, Cal. Pub. Utils. Comm'n (Jan. 2022), https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/high-cost-support-and-surcharges/chcf-b/chcf-b-fact-sheet-january-2022.pdf. The high costs of serving customers outside urban and suburban areas are underscored by programs such as BEAD, which are devoting billions of dollars to facilitate broadband deployment.

obligations in a GSA by advice letter, unless it is the only carrier remaining in the GSA, in which case it must file an application to withdraw as the COLR, and continue to act as the COLR until the application is granted or a new COLR has been designated as a result of an auction."[51]

Because, as shown below, AT&T California's COLR obligation has outlived its purpose and become counterproductive, AT&T California must be permitted to exercise this opt-out. The Commission has broad authority to grant relief from regulatory obligations that no longer serve their intended purpose and whose costs now outweigh any benefits.[52] In cases like this one, the Legislature has directed the Commission to adapt its policies as relevant circumstances change: "The [C]ommission *shall take steps* to ensure that competition in telecommunications markets is fair and that the state's universal service policy is observed."[53] The Legislature has also directed the Commission to "*remove* the barriers to open and competitive markets and promote fair product and price competition in a way that encourages greater efficiency, lower prices, and more consumer choice."[54]

Federal law imposes similar requirements on the Commission. Section 254 of the Communications Act allows the Commission to adopt rules to advance universal service,[55] but

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[51] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *470 (Rule 6.D.7); *see also 2012 CPUC Decision*, 2012 Cal. PUC LEXIS 597, at *100 app. C (reproducing COLR rules from *1996 CPUC Decision*).

[52] Cal. Pub. Util. Code § 1708 ("The commission may at any time, upon notice to the parties, and with opportunity to be heard as provided in the case of complaints, rescind, alter, or amend any order or decision made by it."); *see also id.* § 701.

[53] *See id.* § 709.5 (emphasis added). The Legislature has also directed that "[t]he Public Utilities Commission shall … [d]evelop a process to periodically review and revise the definition of universal service to reflect new technology and markets." 1994 Cal. Stat. ch. 278 § 2(a)(4) (A.B. 3643).

[54] Cal. Pub. Util. Code § 709(g) (emphasis added); *see also id.* § 709(c).

[55] 47 U.S.C. § 254.

those rules must be "equitable and nondiscriminatory."[56] In implementing Section 254, the FCC emphasized that "competitive neutrality" must be a guiding principle for "the preservation and advancement of universal service."[57]

As demonstrated below, continuation of AT&T California's COLR obligation where there is a voice service alternative to POTS is no longer fair, competitively neutral, or nondiscriminatory, nor does that obligation serve any valid public purpose. Accordingly, the Commission has an affirmative statutory obligation to "remove the barriers to open and competitive markets" and "promote fair … competition" by granting relief.[58]

Basic principles of California administrative law also require the Commission to relieve AT&T California of its now-obsolete COLR obligation.[59] In reviewing this Application, the Commission must consider "all relevant factors" and ensure there is "a rational connection between those factors, the choice made, and the purpose of the enabling statute."[60] Constitutional due process likewise requires regulation to "have a reasonable relation to [the] legislative

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[56] *Id.* § 254(b)(4), (f).

[57] *Fed.-State Joint Bd. on Univ. Serv.*, Report and Order, 12 FCC Rcd. 8776, 8801 ¶ 46 (1997) (relying on 47 U.S.C. § 254(b)(7)). It thus held that "universal service support mechanisms and rules [must] neither unfairly advantage nor disadvantage one provider over another." *Id.* at 8801 ¶ 47.

[58] *See* Cal. Gov't Code § 11342.2 ("Whenever by the express or implied terms of any statute a state agency has authority to adopt regulations to implement, interpret, make specific or otherwise carry out the provisions of the statute, no regulation adopted is valid or effective unless consistent and not in conflict with the statute and reasonably necessary to effectuate the purpose of the statute."); *see also Ass'n of Irritated Residents v. San Joaquin Valley Unified Air Pollution Control Dist.*, 168 Cal.App.4th 535, 557 (2008) (reversing agency for failure to account for statutory factor).

[59] *See* Cal. Pub. Util. Code § 1757(a).

[60] *Cal. Hotel & Motel Ass'n v. Indus. Welfare Comm'n*, 25 Cal.3d 200, 212 (1979); *see also Ass'n of Irritated Residents*, 168 Cal. App. 4th at 545 ("We decline to construe a statute in a way that makes meaningless the words chosen by the Legislature. … The statute requires that the rule be assessed in light of the identified problem and that the actual words of the statute be given their plain and commonsense meaning.").

purpose."[61] These principles apply with particular force in this context, where the Commission has recognized it must adjust COLR obligations to competitive realities: "As the marketplace for local telephone exchange service moves from a monopoly provider to multiple providers, the universal service program needs to be readjusted to meet the challenges of increasing competition."[62]

The requirement that California agencies engage in reasoned decisionmaking also means that the Commission cannot maintain rules that have become patently discriminatory. "A fundamental norm of administrative procedure requires an agency to treat like cases alike."[63] The Commission accordingly has emphasized that COLR obligations must be "competitively neutral[]" and that "regulation of the telecommunications industry should be structured in such a way that it neither favors nor impedes one telecommunications carrier or group of telecommunications carriers, over any other carrier or group of carriers," including incumbents.[64]

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[61] *W. Coast Hotel Co. v. Parrish*, 300 U.S. 379, 398 (1937); *see Thorpe v. Hous. Auth. of City of Durham*, 393 U.S. 268, 281–82 (1969) (holding that due process requires a regulation to be "reasonably related to the purposes of the enabling legislation under which it was promulgated").

[62] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *369 (Finding of Fact 16). Reasoned decisionmaking also requires an agency to adhere to its precedents. *See Silva v. Nelson*, 31 Cal. App. 3d 136, 142 (1973) (overturning Unemployment Insurance Appeals Board decision that failed to conform to agency's stated policy).

[63] *Westar Energy, Inc. v. FERC*, 473 F.3d 1239, 1241 (D.C. Cir. 2007); *see Chaplin v. State Pers. Bd.*, 54 Cal. App. 5th 1104, 1114 (Ct. App. 2020) (stating that agency reliance on previous "decisions should be encouraged because it contributes to principled decisionmaking and to consistency and predictability of results" (internal quotation marks omitted)); *Port of Seattle v. FERC*, 499 F.3d 1016, 1034 (9th Cir. 2007) (reasoning that agency's "conflicting interpretation of a similar complaint in a similar refund proceeding renders its subsequent interpretation unworthy of deference"); *Colo. Interstate Gas Co. v. FERC*, 850 F.2d 769, 774 (D.C. Cir. 1988) ("[D]issimilar treatment of evidently identical cases … seems the quintessence of arbitrariness and caprice."); *Fed. Emps. Metal Trades Council, AFL-CIO v. Fed. Lab. Rels. Auth.*, 778 F.2d 1429, 1431 (9th Cir. 1985) ("Arbitrary differences in the treatment of similar cases undercut [an] agency's claim to deference.").

[64] *1996 CPUC Decision*, 1996 Cal. PUC LEXIS 1046, at *455 (Rule 1.J) (defining "[c]ompetitive neutrality" as "[t]he concept that regulation of the telecommunications industry should be structured in such a way that it neither favors nor impedes one telecommunications carrier or group of telecommunications carriers, over any other carrier or group of carriers").

The Commission also emphasized that "[s]tatutory policies and the level of market competition advise against the continuation of monopoly era regulations that limit the ability of carriers to withdraw or grandfather services that are no longer attractive to customers."[65]

Finally, maintaining this discriminatory treatment would raise grave equal-protection concerns. State action that effectively creates a "class of one" and subjects its sole member to regulatory disadvantages may violate the equal protection clause.[66] Likewise, economic legislation (or regulation) drawing distinctions that "do[] not operate so as rationally to further" the statute's purpose and are "without any rational basis" runs afoul of the equal protection clause.[67] Applying that clause, the Supreme Court has voided legislation that imposed common carrier-type service obligations on one company while imposing no similar obligation on other companies "doing the same business in the same way."[68]

Here, these principles weigh strongly against compelling AT&T California alone to continue shouldering the costs of the COLR obligation in areas where alternative voice service is

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[65] *2006 CPUC Decision*, 2006 Cal. PUC LEXIS 367, at *295; *see also id.* ("With the wide availability of communications alternatives from voice competitors, we see no reason to impose regulatory requirements on ILECs that we do not impose on other carriers.").

[66] *See Vill. of Willowbrook v. Olech*, 528 U.S. 562, 564 (2000); *Bank Markazi v. Peterson*, 578 U.S. 212, 234 n.27 (2016) ("Laws narrow in scope, including 'class of one' legislation, may violate the Equal Protection Clause if arbitrary or inadequately justified."); *Gerhart v. Lake Cnty., Mont.*, 637 F.3d 1013, 1014–22 (9th Cir. 2011) (allowing class-of-one claim based on selective regulatory action to proceed); *Mimics, Inc. v. Vill. of Angel Fire*, 394 F.3d 836, 849 (10th Cir. 2005) (similar).

[67] *U.S. Dep't of Agric. v. Moreno*, 413 U.S. 528, 537–38 (1973); *see also Long Island Lighting Co. v. Cuomo*, 666 F. Supp. 370, 422 (N.D.N.Y. 1987), *vacated in other respects*, 888 F.2d 230 (2d Cir. 1989) (equal protection holding not vacated, *id.* at 234 n.5).

[68] *Cotting v. Godard*, 183 U.S. 79, 109 (1901) (striking down a Kansas statute that imposed common carrier-type regulation on just one stockyard notwithstanding evidence that numerous smaller stockyards offered competitive services; simply being the largest stockyard was an insufficient basis for that discriminatory treatment); *see also Nashville, C. & St. L. Ry. v. Walters*, 294 U.S. 405, 429 (1935) ("[W]hen particular individuals are singled out to bear the cost of advancing the public convenience, that imposition must bear some reasonable relation to the evils to be eradicated or the advantages to be secured.").

available.[69] As the next sections explain, even if there once were a defensible basis for singling out AT&T California for COLR regulation, there is no such basis now in light of the "revolution wrought" by the advent of rival cable and mobile providers, which has made legacy voice service obsolete.[70]

In short, precedent, statutes, and principles of reasoned decisionmaking, due process, and equal protection all mandate approval of this Application because, as demonstrated below, AT&T California's COLR obligation is unnecessary to achieve its purpose, hinders competition, and otherwise harms consumers, California's economy, and the environment.

III. THE COLR OBLIGATION SERVES NO CONTINUED PURPOSE IN AT&T CALIFORNIA'S SERVICE TERRITORY.

To satisfy its COLR obligation to provide basic telephone service, AT&T California still operates a legacy TDM network composed of copper lines and antiquated circuit switches. That network was considered state-of-the-art in the 1980s, when consumers relied entirely on home telephone lines for their communications needs, but it is fast becoming a historical curiosity. As the FCC notes, "Although the public switched telephone network used to be the only means to connect, there now exist many other voice service options for consumers in the United States."[71] Indeed, consumers now have access to vastly more powerful fixed and mobile broadband

[69] *See* Israel Decl. ¶ 33–38.

[70] *Walters*, 294 U.S. at 431; *see id.* at 415 ("A [law] valid when enacted may become invalid by change in the conditions to which it is applied."); *accord Whole Woman's Health v. Hellerstedt*, 136 S. Ct. 2292, 2306 (2016).

[71] *2022 Commc'ns Marketplace Rep.*, GN Dkt No. 22-203, FCC 22-103, at 121 ¶ 168 (rel. Dec. 30, 2022) ("*2022 Commc'ns Marketplace Rep.*").

services, which support not only high-quality voice connectivity but also a limitless range of data applications.[72]

In choosing these modern forms of communications over legacy voice service, the overwhelming majority of consumers have thus voted with their wallets, cutting the cord to the landline TDM network and opting instead for the many mobile and fixed broadband services available to them.[73] Eleven percent of U.S. households subscribed to POTS in 2020, as compared to 96 percent in 2005—an "enormous" 85-percentage-point decline over 15 years.[74] AT&T California's POTS penetration is even lower at six and one-half percent in 2022,[75] and AT&T California lost 89 percent of its POTS lines from 2000 to 2021,[76] even as California's population grew by almost 16 percent during that same period.[77] Nor does the decline in POTS subscribership show any sign of slowing.[78]

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[72] *See* Israel Decl. ¶¶ 39, 45, 47–48, 50–51. These applications include highly popular platforms like Snapchat, iMessage, Instagram, and Zoom that offer diverse methods for communications far beyond the limited capabilities of POTS.

[73] *See generally 2012 CPUC Decision*, 2012 Cal. PUC LEXIS 597, at *74–75 (Finding of Fact 5) ("Although basic service has traditionally been provided by carriers using local exchange wireline network architecture, other forms of telecommunications services offered by wireless, cable, and VoIP have been growing in popularity, particularly over the past decade.").

[74] Israel Decl. ¶ 42.

[75] *Id.*

[76] *Id.* ¶ 44.

[77] *Compare DPO5: ACS Demographic and Housing Estimates*, U.S. Census Bureau (2021), https://data.census.gov/table?q=2021+california+population (2021 population estimate of 39,237,836), *with DP1: Profile of General Demographic Characteristics: 2000*, U.S. Census Bureau (2000), https://data.census.gov/table?q=2000+california+population (2000 population of 33,871,648).

[78] *See 2022 Commc'ns Marketplace Rep.* at 122 ¶ 170 (noting that "[t]he number of fixed retail switched-access lines declined [nationwide from December 2018 to December 2021] at a compound annual rate of 12.3" percent "while interconnected VoIP services continue[d] to increase").

Regulators and legislators, too, have recognized the inadequacy of POTS. They are increasingly directing public funds—whether for new deployment or support for lower-income consumers—to high-speed broadband.[79]

These POTS-replacing broadband services are nearly ubiquitous across AT&T California's footprint, as Dr. Israel details in his attached declaration. As a result of the wide deployment of broadband networks, 99.9 percent of the population in AT&T California's service territory has access to at least two facilities-based voice alternatives to POTS, and 99.7 percent has access to at least three facilities-based voice alternatives to POTS.[80] Dr. Israel found little difference for the percentages of potential and existing POTS customers in census blocks classified as rural or in tribal lands that have at least one facilities-based voice alternative.[81] His

[79] These programs include Lifeline, *see Lifeline & Link Up Reform & Modernization*, Third Report and Order, 31 FCC Rcd. 3962, 3985 ¶ 61 (2016) (explaining "to ensure that future Lifeline offerings are sufficient for consumers to participate in the 21st Century economy at affordable rates, and to obtain the most value possible from the Lifeline benefit, we modify the Lifeline rules to support voice services only through a bundle that includes broadband services"); the Affordable Connectivity Program, *see* 47 C.F.R. § 54.1802(a) (Affordable Connectivity Program supports only broadband internet access service); the California Advanced Services Fund, *see*, *e.g.*, 2017 Cal. Stat. ch. 851 § 3(b)(1)(A) (A.B. 1665) (goal of California Advanced Services Fund program "is, no later than December 31, 2022, to approve funding for infrastructure projects that will provide broadband access to no less than 98 percent of California households in each consortia region"); the Rural Digital Opportunity Fund, *see Rural Digit. Opportunity Fund*, Report and Order, 35 FCC Rcd. 686, 687 ¶ 2 (2020) ("The Rural Digital Opportunity Fund represents the [FCC's] single biggest step to close the digital divide by providing up to $20.4 billion to connect millions more rural homes and small businesses to high-speed broadband networks."); and the BEAD Program, *see Broadband Equity, Access, and Deployment (BEAD) Program*, BroadbandUSA, https://broadbandusa.ntia.doc.gov/broadband-equity-access-and-deployment-bead-program#:~:text=The%20Broadband%20Equity%2C%20Access%2C%20and,and%20the%20Commonwealth%20of%20the (last visited Jan. 18, 2023) (providing $42.45 billion to expand high-speed internet access).

[80] Israel Decl. ¶ 33.

[81] *Id.* ¶ 36.

results also are similar for the quartiles of census blocks with the lowest median incomes or with the lowest proportion of households identifying as non-Hispanic White.[82]

Available alternatives are a combination of fixed and mobile services.[83] Cable broadband service from providers such as Comcast, Charter, and Cox is widely available across AT&T California's service territory. For its part, AT&T California continues to expand the portions of its service territory where it provides fiber-based service, and smaller wireline broadband companies also compete in specific areas.[84] Fixed wireless internet service increasingly is becoming an option as well; it now reaches more households (84.9 percent) nationwide than cable company broadband.[85] With respect to mobile wireless, the three national facilities-based carriers—T-Mobile, Verizon Wireless, and AT&T Mobility[86]—cover almost all of the populated areas in AT&T California's service territory, and regional carriers such as US Cellular provide additional coverage.

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[82] *Id.*. Dr. Israel relies on the definitions of race and ethnic origin used by the U.S. Census Bureau in its American Community Survey ("ACS"). The ACS definitions are available at U.S. Census Bureau, American Community Survey and Puerto Rico Community Survey: 2021 Subject Definitions (2021), https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2021_ACSSubjectDefinitions.pdf.

[83] *Id.* ¶ 33.

[84] For example, Race Communications specializes in fiber-based communications services to underserved and rural areas of California. *About Us*, Race Comm'cns, https://race.com/about-us/ (last visited Jan. 18, 2023).

[85] *2022 Commc'ns Marketplace Rep.* at 10 fig. II.A.1. For instance, T-Mobile alone covers about 60 percent of the U.S. population with speeds between 25 and 100 Mbps. *Id.* at 16–17 ¶ 27 & fig. II.A.7, 41 fig. II.A.27.

[86] Because COLR's purpose is to ensure consumers have *a* voice service, it is appropriate to consider voice alternatives provided by AT&T itself as well as by third parties. *See* Israel Decl. ¶¶ 30–31. The FCC takes this approach when reviewing applications to discontinue voice service: "[B]oth first and third party services should be eligible as potential adequate replacement services. … The question is whether an adequate replacement exists in the service area, not who provides the service that provides that adequate replacement." *Tech. Transitions;* et al., Second Report and Order, 31 FCC Rcd. 8283, 8311–12 ¶ 84 (2016).

Dr. Israel's analysis is conservative in several respects and thus understates the availability of POTS alternatives. First, the Commission's broadband deployment data on which he relies date from 2020 and do not reflect network expansion since then,[87] including AT&T's own construction. Second, Dr. Israel's analysis also does not account for DISH's buildout commitments to offer 5G wireless across most of AT&T California's service territory by 2025, as it emerges as a national facilities-based wireless carrier.[88] Third, Dr. Israel's analysis does not include satellite-based broadband, which is available from HughesNet, Viasat, and Starlink across nearly all of AT&T California's service territory.[89] Competition will only accelerate with the increased deployment of broadband networks and new satellite-based services, with the unprecedented levels of public and private capital available for reaching unserved and underserved areas.[90] All this investment has put the high-speed broadband "market … on the cusp of generational change."[91] Finally, in counting the number of alternatives to POTS, Dr. Israel does not consider wireline and wireless resellers or over-the-top VoIP providers, as his analysis is limited only to facilities-based competitors.[92]

[87] Israel Decl. ¶ 30 & n.22.

[88] *Id.* ¶ 38; *see Applications of T-Mobile US, Inc., & Sprint Corp., for Consent To Transfer Control of Licenses & Authorizations, et al.*, Order, 34 FCC Rcd. 10578, 10830–31 app. H (2019) (setting forth DISH commitments to deploy 5G service to at least 70% of the U.S. population by June 2023 and 5G broadband service to at least 75% of the population in each Partial Economic Area no later than June 2025); DISH Network Corp., Quarterly Report (Form 10-Q) at 28, 30 (estimating capital expenditures for its 5G network deployment to be approximately $10 billion).

[89] Israel Decl. ¶ 38; *see also 2022 Commc'ns Marketplace Rep.* at 136 ¶ 200 (explaining that planned launches of next-generation satellites should improve the quality of satellite broadband services).

[90] *See 2022 Commc'ns Marketplace Rep.* at 4–5 ¶¶ 4–6.

[91] *Id.* at 4 ¶ 4.

[92] Israel Decl. ¶¶ 37–38.

Fixed and mobile broadband services are not only reasonable alternatives to POTS; they are in fact technologically superior and available at comparable or lower prices—which is why consumers have overwhelmingly dropped POTS in favor of them.

First, as to *fixed-broadband-based* alternatives to POTS, the managed VoIP services that broadband providers offer over their cable, fiber, and fixed wireless networks are also generally less expensive than POTS. Comcast and Cox, for example, offer standalone VoIP services that cost less than AT&T California's basic telephone service and include unlimited local and long-distance calling.[93] And fixed VoIP is technologically superior to basic telephone service. Because of its inherent efficiencies, AT&T California VoIP exceeds POTS in the service quality metrics set forth in the Commission's General Order 133-D.[94] Fiber-based VoIP is even more reliable than VoIP delivered over copper last-mile connections,[95] providing still greater security in emergencies. Moreover, AT&T California's VoIP service meets the FCC's Enhanced 911 ("E911") requirements, providing the caller's call-back number and, in most cases, location information to emergency service personnel.[96] This service also complies with FCC requirements

[93] Israel Decl. ¶ 46 & n.51, tbl. 2 (Comcast and Cox offer unbundled VoIP service at $20/month, as opposed to AT&T POTS at $34.50/month).

[94] AT&T, Opening Comments on Administrative Law Judge Ruling Requesting Comments on Network Examination and ARMIS Reporting 31 (Mar. 17, 2022) ("Service Quality Opening Comments"), Order Instituting Rulemaking Proceeding to Consider Amendments to General Order 133, R.22-03-016; Declaration of Dr. Debra J. Aron ¶¶ 191–93, *attached to* Service Quality Opening Comments; *see also* Kiely Kuligowski, *Is a VoIP or Landline System Better for Your Business?*, Bus. News Daily (Jan. 23, 2023), https://www.businessnewsdaily.com/15323-voip-vs-landline.html ("Sound is usually clearer with VoIP than with analog phone lines, but this too depends on your internet connection. A slow connection can negatively affect the quality of your call, but a strong connection typically results in clear, consistent sound quality.").

[95] *See* Israel Decl. ¶ 23 n.5.

[96] *See generally Making 911 Emergency Calls*, AT&T, https://www.att.com/support/article/u-verse-voice/KM1002114/ (last visited Dec. 23, 2022).

for accessibility by people with disabilities, including 711 abbreviated dialing for access to relay services.[97]

Second, as to *mobile wireless* alternatives to POTS, T-Mobile, Verizon Wireless, and AT&T Mobility all offer plans at prices less than or comparable to AT&T California's basic telephone service.[98] Resellers offer mobile wireless service that is less costly still,[99] and several of them offer Lifeline services.[100] Indeed, the overwhelming majority of California Lifeline subscribers choose mobile over POTS.[101]

Mobile wireless services also come with several technological advantages over POTS that increase their value to consumers. Most obviously, they are *mobile*: a customer can make and receive calls outside the home, which is the main reason why the overwhelming majority of

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[97] *See generally Dial 7-1-1 for Relay Services*, AT&T, https://www.att.com/support/article/u-verse-voice/KM1010572/ (last visited Dec. 23, 2022).

[98] Israel Decl. ¶ 47 & tbl. 3 (AT&T California POTS costs $34.50/month; T-Mobile service starts at $10/month, Verizon Wireless at $35/month, and AT&T Mobility at $25/month).

[99] *Id.* ¶¶ 47–48. When quantifying alternative voice options, Dr. Israel took the conservative approach of counting only facilities-based mobile carriers. From the standpoint of pricing, however, Dr. Israel explains that it is appropriate to count mobile resellers. *See id.* ¶ 48.

[100] For example, Assurance Wireless and Infiniti Mobile both have Eligible Telecommunications Carrier ("ETC") designations, *see* Cal. Pub. Utils. Comm'n Resol. T-17388 (Feb. 28, 2013); Cal. Pub. Utils. Comm'n Resol. T-17729, (June 3, 2021), meaning they must provide Lifeline service, *see* 47 C.F.R. § 54.405(a); *see also Lifeline Free Government Phone Program*, Assurance Wireless, https://www.assurancewireless.com (last visited Jan. 18, 2023); *Why Choose Infiniti Mobile?*, Infiniti Mobile, https://infinitimobile.com (last visited Jan. 18, 2023). Also, Blue Casa Telephone, LLC and ConnecTo Communications, Inc. resell AT&T California's wireline service and hold ETC designations throughout AT&T California's territory. *See* Cal. Pub. Utils. Comm'n Resol. T-17384 (Dec. 20, 2012); Cal. Pub. Utils. Comm'n Resol. T-17152 (Dec. 4, 2008).

[101] *See California LifeLine Related Forms and Notices for Carriers*, Cal. Pub. Utils. Comm'n, https://www.cpuc.ca.gov/consumer-support/financial-assistance-savings-and-discounts/lifeline/lifeline-related-forms-and-notices-for-carriers (last visited Jan. 20, 2023) (choose "2022" under "THIRD PARTY ADMINISTRATOR LIFELINE CUSTOMER COUNTS" to access data in Excel file) (indicating that, as of November 2022, there were more than one million mobile LifeLine customers and fewer than 200,000 wireline LifeLine customers).

consumers have now cut the cord for voice service.[102] Likewise, when customers move, they do not have to cancel and initiate new service, nor do they have to worry about changing phone numbers. In addition, mobile wireless is also almost always bundled with features like long distance service, voicemail, caller ID, three-way calling, and text messaging that are not included with basic telephone service.[103] And in many cases, these wireless plans include data service in addition to voice service.[104]

Mobile wireless service is also highly reliable. Current wireless voice technology offers substantially better quality than earlier versions.[105] Although some might cling to the belief that POTS offers still better call quality, consumers have reached the opposite view: as noted, the overwhelming majority primarily use mobile wireless service for their voice calls.[106] Mobile wireless providers are also subject to the FCC's 911 regulations, including location-accuracy requirements.[107] According to AARP, "[t]he bottom line is that you can make the switch from your copper-wire landline safely."[108] Indeed, "'it is actually safer to call 911 from a cellphone because of all of the additional information that you are able to share.' … For example, Apple iOS users can choose to share critical health information via the Apple Medical ID feature, a

[102] *See supra* n.4 (U.S. government data on cord-cutting in California).

[103] Israel Decl. ¶ 50.

[104] *Id.* ¶ 47 & tbl. 3 (the lowest cost T-Mobile and AT&T plans include a data allowance).

[105] *See Why Deploy VoLTE Now*, Ericsson, https://www.ericsson.com/en/volte/volte-deployment (last visited Jan. 6, 2023); *Five Benefits of VoLTE over Traditional CS Voice Calls*, GSMA (June 14, 2022), https://www.gsma.com/membership/resources/five-benefits-of-volte-over-traditional-cs-voice-calls/.

[106] *See supra* n.4 (U.S. government data on cord-cutting in California).

[107] 47 C.F.R. § 9.10.

[108] John R. Quain, *Is It Safe To Get Rid of Your Landline?*, AARP (June 21, 2021), https://www.aarp.org/home-family/personal-technology/info-2020/get-rid-of-landline.html.

potentially lifesaving function."[109] Moreover, mobile wireless service provides access to 711 abbreviated dialing for Telecommunications Relay Service users.[110] Not surprisingly, even most of the remaining California landline customers rely primarily on their mobile phones.[111]

IV. GRANTING THE REQUESTED COLR RELIEF TO AT&T CALIFORNIA WOULD BENEFIT CONSUMERS, WORKERS, AND THE ENVIRONMENT.

AT&T California's COLR obligation is unnecessary to ensure connectivity for the 99.9 percent of consumers in AT&T California's service territory who can choose at least one voice alternative to POTS. On the other side of the cost-benefit ledger, the COLR obligation is affirmatively counterproductive because (1) it requires AT&T (but not its competitors) to divert resources away from broadband deployment in California; (2) it reduces competitive intensity for modern communications services by arbitrarily constraining AT&T—and only AT&T; and (3) it harms the environment by requiring AT&T to maintain an aging and energy-inefficient TDM network alongside its greener wireless and fiber broadband network. Freeing AT&T California from its anachronistic and unduly burdensome COLR obligation thus would promote competition, further investment in new broadband technologies, create new jobs, and better protect the environment.

[109] *Id.* (quoting RapidSOS Chief Executive Michael Martin and noting that RapidSOS works with thousands of 911 call centers).

[110] *See*, *e.g.*, *Dial 7-1-1 for Relay Services*, AT&T, https://www.att.com/support/article/u-verse-voice/KM1010572/ (last visited Dec. 23, 2022).

[111] *See supra* n.4 (U.S. government data on California consumer phone preferences).

A. Targeted COLR Relief Would Enhance Competition and Benefit Consumers and Workers.

The COLR obligation requires AT&T California, and it alone, to offer legacy voice-only service on a highly regulated and tariffed basis in its service area. That obligation harms consumers by slowing technological progress and distorting competition.

Dr. Israel explains the economics of technological evolution in these words:

> When older technologies become eclipsed by newer technologies, there are often transition periods when both exist at the same time, with market forces determining when and where each technology is offered, on what terms, and how the old technology is phased out. During that process, a core tenet of market economics is that investment will be efficiently allocated by market forces. Eventually, older technologies are retired completely when any remaining demand for them no longer justifies the investments required to provide them. During the transition process from one technology to the next, there may still be people who would like to use the older technology if they could get it at the price charged when it was widely available. But as demand for the product evaporates, and economies of scale in producing the product likewise disappear, it can become uneconomic for the product to be produced at all—and certainly uneconomic for it to be provided at historical prices—and thus the product fades away in favor of newer, more popular technologies.[112]

AT&T California's COLR obligation impedes this "essence of competition and … engine of technological progress."[113] As Dr. Israel explains, when regulation forces a company to provide a legacy technology in places where market forces otherwise would have led to its replacement, economic theory holds that investment is misallocated. This misallocation "waste[s]" economic resources, harming consumers.[114] Even consumers who prefer the older technology will be harmed in the long run, post-transition, when they too will rely upon the

[112] Israel Decl. ¶ 19.

[113] *Id.* ¶ 20.

[114] *Id.*

newer technology, which will be less developed or extensively deployed than it otherwise would have been due to the waste.[115]

Here, the COLR obligation requires AT&T California to divert financial and human resources to maintaining the obsolescent copper-based network throughout its service territory.[116] Overall, AT&T California has been investing over a billion dollars each year on its legacy copper network and associated legacy services in California.[117] These immense sums of money are not being put to their best use, slowing technological and economic progress.[118]

In addition, AT&T California's COLR obligation distorts competition by placing AT&T at a stark disadvantage compared to its fixed and mobile broadband rivals. For fixed broadband, cable companies such as Comcast, Charter, and Cox lead in subscribership in their franchise areas.[119] For mobile broadband, T-Mobile and Verizon Wireless have similar scale and scope to AT&T Mobility.[120] Unlike AT&T, those market leaders can focus their resources on providing the state-of-the-art communications services that today's consumers actually demand.

Placing AT&T at this asymmetric regulatory disadvantage harms competition overall. As Dr. Israel explains, economic theory says that all else being equal, investors prefer firms that can devote their resources to the best new technology, not ones that have to spend wastefully on a technology for which demand has largely died.[121] Firms with older technology also tend to be

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[115] *See id.*

[116] *See supra* Section III; *see also* Israel Decl. ¶ 23.

[117] *See* Israel Decl. ¶ 23. As TDM subscribership declines, fewer and fewer people benefit from this spending, making this diversion of resources increasingly inefficient. *See id.* ¶¶ 19–23.

[118] *See id.* ¶ 24.

[119] *See id.* ¶¶ 52, 54 & tbl. 4.

[120] *See id.* ¶¶ 52–53.

[121] *See id*. ¶ 22.

less-attractive employers.[122] Both financial and human resources are "critical to compete effectively," so requiring only one firm to "divert resources to a dying legacy technology … is bad for the overall competitive process—reducing competitive pressure on other firms—and hence for consumers."[123]

By the same token, removing that regulatory disadvantage would benefit consumers by allowing AT&T California to retire obsolete services and equipment and redirect savings to expansion of its state-of-the-art, future-proof broadband technologies.[124] Software-defined fiber and wireless networks like the one AT&T is deploying are more flexible and easier to configure and update than traditional copper networks because the software that controls them resides separately from the physical networking equipment.[125] Instead of physical equipment controlling the network, software "virtualizes" and automates network functions, including provisioning and monitoring.[126] In addition, many components require only software updates for upgrades instead

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[122] *See id.*

[123] *Id.*; *see also id.* ¶ 27.

[124] *See id.* ¶¶ 24–25, 27, 59.

[125] *See Software-Defined Networking*, Cisco, https://www.cisco.com/c/en/us/solutions/software-defined-networking/overview.html#~what-is-sdn (last visited Feb. 2, 2023) (describing the architecture of software-defined networks); Rakesh Kumar Jha & Burhan Num Mina Llah, *Software Defined Optical Networks (SDON): Proposed Architecture and Comparative Analysis*, 15 J. European Optical Soc'y-Rapid Pub'ns art. no. 16, June 28, 2019, at 3, https://doi.org/10.1186/s41476-019-0105-4 (describing the separation of "the forwarding plane … from the control plane" in software-defined networks that allows for "flexible, adaptable" networks); Yongli Zhao et al., *Software-Defined Optical Networking (SDON): Principles and Applications*, InTechOpen (June 21, 2017), https://www.intechopen.com/chapters/54939 (explaining that a software-defined network "separates the control plane from the data plane" that then allows for "centralized and flexible" management of the network); *What Is SDN?*, Ciena, https://www.ciena.com/insights/what-is/What-Is-SDN.html (last visited Feb. 2, 2023) ("*What Is SDN?*") (stating that "decoupling the hardware from the software" enables operators to "introduce innovative, differentiated new services rapidly").

[126] Jeff Heynen, Dell'Oro Grp., *Telco's Tipping Point: 10G Fiber and Software-Defined Access* 7 (2020) (explaining that software-defined networks allow "network engineers [to] automate the provisioning and management of services remotely and continuously update scripts to monitor the health of network elements"); Niall Robinson, *The Rise of SDN in Open Optical Networks*, LightWave (Sept. 12, 2018),

of physical hardware replacements.[127] These capabilities reduce operational costs significantly.[128] Moreover, last-mile fiber connections by and large "can easily scale speeds over time to meet the evolving connectivity needs of households and businesses"[129] simply by replacing the equipment at the endpoints, not the entire connection.[130]

That redirection of the company's resources also should spur greater investment by the company's competitors.[131] "All consumers in California would benefit from such enhanced

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https://www.lightwaveonline.com/network-design/packet-transport/article/16675845/the-rise-of-sdn-in-open-optical-networks ("*Rise of SDN*") (explaining that software-defined networks can "continuously report network performance and telemetry data to a centralized controller for analysis, delivering network optimization insights").

[127] *See* John Donovan, CEO – AT&T Commc'ns, *Paving the Way for Software-Defined Networking*, AT&T Blog (Oct. 20, 2014), https://about.att.com/innovationblog/120514pavingthewayfo (stating that new network capabilities can be added to software-defined networks using software upgrades); *What Is SDN?* (explaining that software-defined networks can be controlled and programmed using "software applications"); Geoffrey Starks, Comm'r, Fed. Commc'ns Comm'n, Remarks at the FCC & NCSC National Supply Chain Integrity Joint Workshop 2 (Apr. 26, 2021), https://www.fcc.gov/document/starks-remarks-supply-chain-integrity-workshop (explaining that software-defined technology allows "carriers to make upgrades, including adding 5G capabilities and new spectrum bands, via software updates instead of hardware replacements, which can be expensive and time-consuming, particularly in the remote areas").

[128] *Rise of SDN* (noting that the use of software-defined networks results in "greater operational efficiency"); Tom Wheeler, Chairman, Fed. Commc'ns Comm'n, Prepared Remarks at the Brookings Institution 2 (June 26, 2015), https://www.fcc.gov/document/remarks-fcc-chairman-tom-wheeler-brookings-institution ("Wheeler Remarks") ("Verizon, for instance, reports that the replacement of central office physical switching systems with software reduces their real estate costs by up to 80 percent. What used to require floors and floors of switches can now be done by a few racks of computers in a fraction of the space."); *id.* (noting that "the evolution to software defined networks with virtualized components means that network operating expenses decrease" and "can save up to 60 percent on energy costs").

[129] Nat'l Telecomms. & Info. Admin., Notice of Funding Opportunity for Broadband Equity, Access, and Deployment Program at 14 n.9 (May 13, 2022), https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf ("BEAD NOFO"); *see* Chris Sambar, *Why We're Expanding One of the Country's Largest Fiber Networks—And Why That Matters to You*, AT&T Blog (Aug. 2, 2022), https://about.att.com/innovationblog/2022/sambar-fiber-expansion.html (explaining that fiber provides "a far superior upgradeable capacity to handle soaring demand for high-quality bandwidth well into the future").

[130] BEAD NOFO at 42 ("End-to-end fiber networks can be updated by replacing equipment attached to the ends of the fiber-optic facilities, allowing for quick and relatively inexpensive network scaling as compared to other technologies.").

[131] *See* Israel Decl. ¶¶ 22, 27.

competitive pressure and the associated improvement in allocation of investment dollars."[132] These new investments would narrow the digital divide by enabling more consumers to enjoy the social and economic advantages of modern telecommunications services. As this Commission recently noted, "[p]roviding for more broadband deployment as a means of bridging the Digital Divide has become an enhanced priority for California."[133] In the words of Governor Newsom's Executive Order N-73-20, it "will accelerate continuous improvements in economic and workforce development, infrastructure, public safety, education, economy, and an engaged citizenry."[134] California workers would benefit too, as the improved investments would support well-paying jobs.

B. Targeted COLR Relief Would Increase California's Energy Security and Benefit the Environment.

Approval of this Application would also make for sound energy and environmental policy. Today, as a result of its COLR obligation, and while AT&T is expanding its cutting-edge broadband network, AT&T California maintains a redundant, antiquated, copper-based TDM network. Indefinitely maintaining this latter network simply to support the rapidly dwindling number of California consumers who retain POTS is not only economically, but also environmentally, wasteful. COLR relief is thus an important component of AT&T's commitment to become carbon-neutral across its entire global operations by 2035.[135] Today, the

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[132] *Id*. ¶ 27.

[133] *Ord. Instituting Investigation into the Creation of a Shared Database or Statewide Census of Util. Poles & Conduit in Cal.*, D.22-10-025, 2022 Cal. PUC LEXIS 467, at *7 n.22 (Oct. 20, 2022); *see also* Cal. Exec. Order No. N-73-20 (Aug. 14, 2020), https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf.

[134] Cal. Exec. Order No. N-73-20 (Aug. 14, 2020), https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf.

[135] *See Social Responsibility*, AT&T, https://about.att.com/csr/home/environment/carbon-neutral.html (last visited Jan. 18, 2023).

telecommunications industry emits twice as much CO_2 as civil aviation.[136] Decisively cutting those emissions is crucial to meeting climate change goals. As Governor Newsom has stated, "We need to supercharge our efforts to significantly reduce harmful carbon pollution."[137]

Relief from its COLR obligation would facilitate AT&T California's migration to its growing broadband network. This transition will allow AT&T California to use less of the state's electricity,[138] hastening the transition from fossil fuels. Copper networks consume massive amounts of electricity.[139] Because fiber networks use unpowered (passive) optical splitters and generate less heat overall (thereby requiring less cooling), replacing copper with fiber improves energy efficiency by over two thirds.[140] Modern IP switches are very efficient and can be housed in much smaller facilities with correspondingly smaller energy needs than the gargantuan facilities that legacy TDM switches require.[141] As this Commission knows all too well, California needs all the load reduction that can be accomplished.[142]

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[136] Roman Friedrich et al., *Putting Sustainability at the Top of the Telco Agenda*, Boston Consulting Grp. (BCS) (June 24, 2021), https://www.bcg.com/publications/2021/building-sustainable-telecommunications-companies.

[137] *Governor Newscom Calls for Bold Actions To Move Faster Toward Climate Goals*, Off. of Governor Gavin Newsom (July 22, 2022), https://www.gov.ca.gov/2022/07/22/governor-newsom-calls-for-bold-actions-to-move-faster-toward-climate-goals/.

[138] Israel Decl. ¶ 26.

[139] *Id.*

[140] *See ABI Research Identifies 30 Sustainability Action Items for Telco Operators*, ABI Rsch. (Apr. 21, 2022), https://www.abiresearch.com/press/purchasing-renewable-energy-removes-co2-emissions-equal-to-20-million-barrels-of-oil-a-year-for-leading-telco-operators/ ("replace copper with fiber (85% improved efficiency)").

[141] Wheeler Remarks (noting that software defined networks "can save up to 60 percent on energy costs"); *see* Israel Decl. ¶ 26.

[142] *See*, *e.g.*, *Ord. Instituting Rulemaking To Establish Pol'ys, Processes, & Rules To Ensure Reliable Elec. Serv. in Cal. in the Event of an Extreme Weather Event in 2021*, D.21-03-056, 2021 WL 1240280, at *1, *5 (Cal. P.U.C. Mar. 25, 2021) (directing large electric companies "to take specific actions to decrease peak and net peak demand and increase peak and net peak supply to avert the potential need for rotating outages that are similar to the events that occurred in summer 2020 in the summers of 2021 and

Fiber networks also require less maintenance than the old copper network.[143] Less maintenance means fewer truck rolls to repair sites and thus less consumption of fossil fuels.[144] Similarly, software-defined fiber networks generally do not require new construction or technician visits to increase the capacity delivered to subscribers,[145] further reducing energy demand over the long run.

2022"; instituting a paid media campaign program "to encourage ratepayers to voluntarily reduce demand during moments of a stressed grid in California"; modifying and expanding the critical peak pricing program, which "charges a higher price for consumption of electricity during peak hours on selected days"; establishing an emergency load reduction program "as an insurance policy against the need for future rotating outages"; and modifying demand response programs to make them "more effective and more aligned with grid needs").

[143] *See* Melanie Weir, *A Guide to Fiber Optics, and How Fiber-Optic Networks Are Improving Data Transfer*, Bus. Insider (Mar. 17, 2021, 2:41 PM), https://www.businessinsider.com/guides/tech/fiber-optic (explaining that fiber strands take "much longer to break down than a natural substance like copper," so "they need much less maintenance, which means fewer service interruptions and less construction in general"); Kara Mullaley, *When To Transition from Copper to Fiber*, Broadband Cmtys., Aug.–Sept. 2019, at 55, https://www.bbcmag.com/pub/doc/BBC_Aug19_Copper.pdf (explaining that "[m]aintaining a copper network is inherently more expensive" than maintaining a fiber network because "[f]iber is not nearly as susceptible to water, salt and other external factors that impact copper networks, often leading to service degradation and associated trouble reports" and noting that "[h]eavy rain often leads to a spike in trouble tickets and truck rolls—or even multiple truck rolls" for copper networks); Jim Hayes, *Fiber Optic Network Operation, Maintenance, and Restoration*, NETA World (Nov. 1, 2019), https://netaworldjournal.org/fiber-optic-network-operation-maintenance-and-restoration/ (explaining that "fiber optic cable plants are very reliable and need no routine maintenance").

[144] *See* Barry Walton, *Cost Calculations of Fiber and Copper*, Corning, https://www.corning.com/fiber-to-the-premise/worldwide/en/home/knowledge-center/cost-calculations-of-fiber-and-copper.html (last visited Dec. 28, 2022) ("[C]opper-based broadband service can be less reliable and often requires several repeat truck rolls with technicians of various skill sets to carry out the frequent repairs needed to maintain service speeds."); Yanitsa Boyadzhieva, *TalkTalk Finds Fibre Networks Will Cost The Planet Much Less Than Copper*, TelecomTV (Apr. 8, 2022), https://www.telecomtv.com/content/sustainability/talktalk-finds-fibre-networks-will-cost-the-planet-much-less-than-copper-44136/ (reasoning that fiber is more resilient than copper, and this results in "fewer faults and 'dramatically' less need for engineers to be sent to fix the networks" and in "lower carbon footprint through reduced transportation costs").

[145] *See*, *e.g.*, Linda Hardesty, *AT&T Upgrades Its Fiber Network To Offer 2-Gig, 5-Gig Speeds*, Fierce Telecom (Jan. 24, 2022), https://www.fiercetelecom.com/broadband/att-upgrades-its-fiber-network-offer-2-gig-5-gig-speeds.

In short, subjecting AT&T California to a continued COLR obligation throughout its wireline footprint impedes the greening of the state's economy. Approval of this Application is the correct choice for the environment.

V. AT&T CALIFORNIA'S PROPOSAL FOR TARGETED COLR RELIEF

This Application seeks targeted COLR relief for areas in AT&T California's service territory where another voice service currently exists, and a process for obtaining COLR relief in those areas that currently do not have a voice alternative. In particular, it proposes that the Commission remove the COLR obligation only in census blocks where there is a demonstrated voice alternative to AT&T California's POTS service.[146] In those census blocks, COLR would sunset, and AT&T California would be authorized to withdraw its basic service, as COLR is no longer necessary to fulfilling its purpose of ensuring consumers have access to voice service. Further, to foreclose any concerns regarding service disruption, in those census blocks where COLR sunsets, AT&T California would commit to maintain POTS to current customers during a reasonable transition period. Where, however, there currently is no alternative to POTS for voice service, AT&T California would remain the COLR and provide basic service until such time as AT&T California demonstrates an alternative to the Commission through the streamlined process discussed below.

Specifically, AT&T California's proposal is as follows:

- *Areas with a voice alternative.* AT&T California seeks COLR relief for geographic areas where there is a demonstrated voice alternative to AT&T California's POTS. In those areas, AT&T would no longer have a COLR obligation to provide a basic voice service, and its tariff would be modified accordingly.

[146] Consistent with the way the FCC aggregates areas that do not overlap perfectly with census areas, AT&T California considers a census block to have a demonstrated voice alternative to its POTS service based on wireless service only if a wireless carrier's footprint covers at least 50 percent of the physical area of that census block. *See* Israel Decl. ¶ 31 & n.27.

- This demonstration would be made on a granular basis (*e.g.*, by census block).

- Voice alternatives would include wireline VoIP as well as fixed and mobile wireless.

- *Continuation of existing service.* To allow any existing AT&T POTS customer to transition to a different technology for voice service over time and without disruption, AT&T California would commit to maintaining each existing customer's current POTS voice service (per the basic service tariff) at that customer's current service location for at least six months after grant of this Application.

- *Tariffing changes.* To operationalize COLR relief, the Commission should authorize AT&T California to modify its basic service tariff to exclude geographic areas where the Commission determines in this proceeding there is a demonstrated voice alternative offered by any provider. The exclusion would become effective in a geographic area when AT&T California discontinues POTS there.

- *Areas without a voice alternative.* For the geographic areas that do not yet have a voice alternative, AT&T California would continue to satisfy its COLR obligation as it does today until such time as AT&T California demonstrates that a voice alternative offered by any provider has become available.

- *Streamlined process for future relief.* As wireless and fiber networks are expanded in AT&T California's service territory, the geographic areas subject to its COLR obligation would be reduced accordingly.

    - In those circumstances, AT&T California would file a Tier 1 advice letter with the Commission demonstrating that the geographic areas at issue now have a voice alternative offered by any provider.

    - After this process is completed, AT&T California would be authorized to modify its basic service tariff further to exclude the additional areas subject to the advice letter. However, current customers in the affected areas, as of the advice letter's effective date, would continue to receive POTS (per the tariff) until AT&T California discontinues POTS, which would be no sooner than six months after the effective date of the advice letter.

AT&T California's proposal for targeted COLR relief reflects its continued commitment to California and its consumers. Following approval of this Application, AT&T's fiber and mobile broadband network—bolstered by internal resources redirected from the TDM network—would continue to deliver high-speed broadband services to the state's residents, businesses, and government agencies. Moreover, AT&T California designed the proposal to ensure COLR relief would not leave consumers without voice service. First, for the small number of subscribers in

AT&T California's service territory without a demonstrated voice alternative—which Dr. Israel estimates to number fewer than 1,482[147]—AT&T California would continue to act as the COLR until such time as they gain a voice alternative from any provider.[148] Second, for *existing* POTS customers in areas where COLR relief is granted, AT&T California would commit to an ample period for customers to transition to a different technology for voice service. Together, these two elements should ensure an orderly transition and prevent any service disruption.

VI. PROCEDURAL REQUIREMENTS

A. Compliance with Rule 2.1(a)

Pursuant to Rule 2.1(a) of the Commission's Rules of Practice and Procedure, AT&T California's full legal name is Pacific Bell Telephone Company d/b/a AT&T California. AT&T California is a corporation created under the laws of California and is located at 430 Bush Street, San Francisco, CA 94108.

B. Compliance with Rule 2.1(b)

Pursuant to Rule 2.1(b) of the Commission's Rules of Practice and Procedure, AT&T California provides the following contact information:

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[147] *See id*. ¶¶ 34 tbl. 1, 56 (1,159 residential POTS lines and 323 business POTS lines).

[148] When a voice alternative becomes available in a census block, AT&T California would follow the advice letter process described above for relief.

C. Compliance with Rule 2.1(c)

Pursuant to Rule 2.1(c) and Rule 7.1 of the Commission's Rules of Practice and Procedure, this Application should be categorized as a rate-setting proceeding. The sole issue to be considered is whether AT&T California shall be authorized to withdraw as COLR and modify its tariff as explained herein. AT&T California does not believe an evidentiary hearing will be warranted. The proposed schedule is:

Date	**Event**
March 3, 2023	AT&T California Files Application
30 days after appears in Daily Calendar	Responses/Protests to Application[149]
40 days after appears in Daily Calendar	Reply to Responses/Protests to Application
61 days after appears in Daily Calendar	Pre-Hearing Conference
90 days after appears in Daily Calendar	Scoping Memo
150-165 days after appears in Daily Calendar	Public Participation Hearings
180 days after appears in Daily Calendar	Opening Comments
201 days after appears in Daily Calendar	Reply Comments
300 days after appears in Daily Calendar	Proposed Decision
First voting meeting in February 2024	Decision Approved and Effective

D. Compliance with Rule 2.2

Rule 2.2 requires applicants to submit with their applications a copy of the entity's organizing documents and evidence of the applicant's qualification to transact business in California. But in lieu of submitting these documents, the Rule also allows an applicant to

[149] Although not required by the rules, AT&T California has served this Application on each party of record on the service list in Rulemaking 22-03-016 in a good-faith effort to notify anticipated interested parties.

reference current documentation previously filed with the Commission. A copy of AT&T California's Articles of Incorporation, as amended, was filed with the Commission on January 14, 2000 in Application No. 00-01-023, and is incorporated herein by reference.

VII. CONCLUSION

Granting this Application for targeted relief of AT&T California's COLR obligation and certain associated tariff obligations would increase investment in world-class, next-generation networks, promote California's economic and environmental goals, and result in regulatory parity—all while protecting the needs of current basic service customers. For these reasons, the Commission should do so promptly.

Dated this 3rd day of March 2023.

Respectfully submitted,

AT&T California

/s/ Isabelle Salgado

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Attorneys for AT&T California

VERIFICATION

Marc D. Blakeman, under penalty of perjury, certifies as follows:

I am an officer, **President**, of Pacific Bell Telephone Company d/b/a AT&T California and am authorized to make this verification on its behalf. The statements in the foregoing document are true of my own knowledge, except as to matters which are therein stated on information or belief, as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 3, 2023 at San Francisco, California.

/s/
Marc D. Blakeman

ATTACHMENT A

DECLARATION OF MARK A. ISRAEL

[PUBLIC VERSION]

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of Pacific Bell Telephone Company d/b/a AT&T California (U 1001 C) for Targeted Relief from Its Carrier of Last Resort Obligation and Certain Associated Tariff Obligations	A.23-03-xxx (Filed March 3, 2023)

DECLARATION OF MARK A. ISRAEL

ON BEHALF OF AT&T

[PUBLIC VERSION]

Filed March 3, 2023

CONTENTS

I. QUALIFICATIONS, ASSIGNMENT, AND SUMMARY OF CONCLUSIONS

1. In this section, I describe my qualifications, assignment, and overall conclusions.

A. QUALIFICATIONS

2. I am a Senior Managing Director at Compass Lexecon, an economic consulting firm where I have worked since 2006. From 2000 to 2006, I served as a full-time member of the faculty at Kellogg School of Management at Northwestern University in Illinois.

3. I am an economist by training and by profession. I have Bachelor's, Master's and Doctoral degrees in economics. I received my B.A. from Illinois Wesleyan University in 1991, graduating summa cum laude. I received my M.S. from the University of Wisconsin-Madison in 1992. I received my Ph.D. from Stanford University in 2001.

4. I specialize in the economics of industrial organization—which is the study of competition in imperfectly competitive markets, including the study of antitrust and regulatory issues—as well as applied econometrics. At Kellogg and Stanford, I taught graduate-level courses covering topics including business strategy, industrial organization economics, and econometrics. My research on these topics has been published in leading peer-reviewed economics journals, including the American Economic Review, the Rand Journal of Economics, the Review of Industrial Organization, Information Economics and Policy, and the Journal of Competition Law and Economics.

5. My work at Compass Lexecon has focused on the application of economic theory and econometric methods to competitive analysis of the impact of mergers, antitrust and pricing issues including a wide variety of single-firm and multi-firm conduct, class certification, and damages estimation. I have analyzed these competition issues on behalf of a wide range of clients, including private companies and government entities.

6. I have particular interest, experience, and expertise in applying economic analysis to issues involving competition and regulation in telecommunications. I have been involved in the telecommunications industry throughout my career, have been among the lead economists on nearly all of the recent wireless telecommunications transactions of significance in North America, including the recent Sprint-T-Mobile and Verizon-Tracfone transactions in the United

States and the recent Rogers-Shaw transaction in Canada. As part of this work, I have submitted testimony related to the telecommunications industry before courts, tribunals, and regulatory bodies on many occasions.

7. I have testified in federal courts and multiple state courts in the United States, and in many regulatory and arbitration proceedings in the United States and around the world, including Canada. I have testified repeatedly before the U.S. Federal Communications Commission ("FCC"), which regulates international and interstate communications in the United States by, among other things, radio. In addition, I have testified before the Public Utilities Commission of the State of California ("CPUC") during my work on Verizon-TracFone, Sprint-T-Mobile, and Comcast-Time Warner Cable transactions. I have also presented my findings to the Department of Justice and the Federal Trade Commission on dozens of occasions. In addition, I have submitted expert reports, declarations, and affidavits to government agencies and federal and state/provincial courts on numerous occasions over the years.

8. My *curriculum vitae*, attached as Attachment A to this declaration, includes a list of my publications and a list of my engagements in which I testified at trial or by deposition.

B. BACKGROUND AND ASSIGNMENT

9. AT&T's subsidiary Pacific Bell Telephone Company, d/b/a AT&T California, is an Incumbent Local Exchange Carrier ("ILEC") providing Plain Old Telephone Service ("POTS") in its service territory in the state of California. In this declaration, I will refer to Pacific Bell as AT&T for simplicity, but all my analysis concerns AT&T's subsidiary Pacific Bell and its service territory in California.

10. As an ILEC, AT&T is subject to regulations, one of which is a Carrier of Last Resort ("COLR") designation, which requires it to provide basic voice service upon request to customers within its designated service territory.[1] I understand that, based on the demonstrated

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1. See, *e.g.*, COLR definition in CPUC General Order 133-D (available at https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/proceedings/proceedings_rules/go133d.pdf). AT&T provides POTS over its Time-Division Multiplexing ("TDM") network to satisfy its COLR obligation.

presence of voice alternatives, AT&T is requesting that the CPUC eliminate the COLR obligation with respect to its service territory in California.

11. I have been asked by counsel for AT&T to evaluate, based on my training and experience in economics and my experience in telecommunications, whether continuing AT&T's COLR obligation serves the public interest, or if, instead, eliminating the COLR obligation would better serve the public interest. More specifically, I have been asked to evaluate: (i) whether a requirement to maintain a declining legacy technology in the presence of superior alternatives is economically efficient or inefficient, and, relatedly, whether customers would benefit from the elimination of the COLR obligation with respect to AT&T's POTS; (ii) whether areas where there are AT&T POTS customers have access to one or more alternative forms of voice service from other providers, based on superior technologies such as mobile and Voice Over Internet Protocol ("VOIP"); (iii) whether POTS is growing or declining in California relative to these mobile and VOIP alternatives; and (iv) whether remaining POTS customers will be harmed by, or will benefit from, the proposed elimination of AT&T's COLR obligation.

12. The materials I have relied upon are listed in Attachment B. In addition to analyses of data, I had conducted interviews with AT&T subject matter experts on several topics relevant to my opinions in this matter. I have been assisted in my work by staff at Compass Lexecon working under my direction.

C. SUMMARY OF CONCLUSIONS

13. Applying core principles of economics to the relevant facts and data yields the following principal conclusion: Allowing AT&T to relinquish its COLR obligation and discontinue its POTS in California would be economically efficient, benefit consumers, and serve the public interest. A COLR obligation mandating indefinite support of a declining legacy technology in the face of widely available alternatives based on superior technologies, such as mobile[2] and VOIP, is economically inefficient, tying up scarce resources that could better serve consumers elsewhere, including via redeployment to investment in superior technologies. Such

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2. Throughout this declaration, I use the term "mobile" when referring to mobile wireless services, consistent with CPUC and FCC nomenclature. By contrast, fixed broadband services may be provided through fixed wireless (not mobile) or through landlines.

problems are part and parcel of the need to maintain the legacy network: AT&T is required to maintain indefinitely a legacy network even though fewer and fewer customers use it, thus violating the core economic principle that investments should track consumer demand.

14. My principal conclusion is supported by the following more detailed findings:

- COLR is a remnant from a different era in telecommunications when POTS was the only widely available voice technology, and it was provided by regulated local monopolies in designated service territories. Under those conditions, COLR requirements served the public policy goal of ensuring access to voice service for all consumers even in the face of a monopoly provider. But today, in the presence of many alternatives from other carriers—which generally provide superior and more popular voice technologies—a policy that forces just one competitor among many to devote scarce resources to a declining legacy technology distorts competition, inefficiently allocates scarce resources, and harms consumers. (Section II)

- Both current and potential future customers in AT&T's service territory would benefit if AT&T were relieved of its COLR obligation. This conclusion follows as a matter of economics because continuing that obligation requires that scarce resources continue to be devoted to maintaining legacy POTS service, rather than devoted to newer technologies that will benefit California consumers going forward. This is not a trivial concern. Unlike its competitors, AT&T must devote more than a billion dollars a year in California to maintaining an entire legacy network and set of services that serves a small and rapidly declining fraction of customers. And it must do so while also maintaining and investing in the newer technologies that consumers demand and that will enable it to compete going forward. Regulating to bolster an otherwise declining technology is regulating against market forces, and while this might superficially appear to offer some short-term benefits for a few consumers using the declining technology, the long run effect will be to harm consumers, including current POTS customers, because of years of inefficiently allocated resources and slowed technological advancement. (Section II)

- Empirical analysis demonstrates that AT&T's POTS faces substantial competition in nearly all locations in its service territory, which is not surprising given the ubiquity of cable companies and mobile voice providers. Almost 100 percent of existing and potential customers within AT&T's POTS service territory have one or more alternative facilities-based options for voice service. This competition means that the economic justification for the COLR obligation—ensuring that consumers have access to voice services in the face of a monopoly provider—no longer exists. (Section III)
- The market has demonstrated the superiority of alternative technologies, as the number of POTS lines in service has been steadily declining for many years, whereas the number of customers using mobile or VOIP alternatives has been steadily growing. (Section IV)
- For the small and declining number of remaining POTS customers serviced by the legacy network, AT&T will offer protections to ensure ongoing, affordable service and thus avoid any disruption. (Section V)

II. COLR CREATES REGULATORY DISPARITY, DISTORTS COMPETITION, AND LEADS TO INEFFICIENT INVESTMENT, ALL TO THE DETRIMENT OF CONSUMERS

15. The COLR obligation has its economic roots in a time when there was only one carrier and only one voice technology in any given area. But circumstances have changed dramatically: Competition is now intense, and there are superior alternative voice technologies available in almost all areas.[3] The obligation that once made economic sense for a regulated monopolist now creates significant economic distortions, given the ubiquity of superior alternative voice technologies and the strength of the associated competition.

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3. "Although the public switched telephone network used to be the only means to connect, there now exist many other voice service options for consumers in the United States." FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, ¶ 168.

16. COLR regulation traces its roots to English common law and the concepts of "common carrier" and "franchise."[4] Common carriers in many industries, including telecommunications, were essentially local monopolists who had exclusive access to customers within their franchise territories. Existence of such local monopolies was often justified by the relatively high fixed costs required to build and maintain the networks required for service. In the presence of such monopoly providers, the COLR obligation ensured that no consumer could be denied service by that monopolist. Prices were typically regulated so that: (i) consumers could obtain a reasonably priced service while (ii) local monopolists could obtain a reasonable rate of return on investment. In this way, regulated monopolies are a kind of *quid pro quo,* in which a firm is granted the right to run the local monopoly, but in exchange it agrees to a variety of requirements on service and pricing, including the COLR obligation to provide service to any consumer in the service territory.

17. This set of circumstances obviously does not describe telecom today: Incumbents lost their local monopoly status in 1996 when the Telecommunications Act opened local markets for competition. Since then, superior telecom technologies have emerged and continued to evolve, *e.g.*, mobile and VOIP technologies. But regulations have failed to keep pace with these changes. Incumbents have remained subject to obligations that the new competitors are not subject to, creating an unjustified and competitively harmful disparity, which distorts competition, leads to inefficient deployment of investment dollars, and harms consumers.

18. More specifically, the disparity imposes costs on incumbents that the new competitors do not face. This has two economic effects. First, it handicaps the incumbents and distorts competition. Second, it mandates an inefficient allocation of resources among different technologies. Both effects work to the overall detriment of consumers.

19. The classic economic example of buggy whips, used with horses and carriages, which faded away after the introduction of the internal combustion engine and automobiles, is relevant here. While consumers adopted automobiles at different times, and some might have

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4. See, *e.g.*, Lichtenberg, Sherry, "Carrier of Last Resort: Anachronism or Necessity?" National Regulatory Research Institute, Report No. 16-06, July 2016, pp. 5-7 (available at https://pubs.naruc.org/pub/FA85B978-00A3-862C-5E8D-9E10816FA7DB).

benefited from forced maintenance of buggy whip production for some period of time, a regulatory requirement to maintain buggy whip production once the automobile industry was established would have been inefficient and harmful to consumers, due to the dynamic nature of changing technologies. When older technologies become eclipsed by newer technologies, there are often transition periods when both exist at the same time, with market forces determining when and where each technology is offered, on what terms, and how the old technology is phased out. During that process, a core tenet of market economics is that investment will be efficiently allocated by market forces. Eventually, older technologies are retired completely when any remaining demand for them no longer justifies the investments required to provide them. During the transition process from one technology to the next, there may still be people who would like to use the older technology if they could get it at the price charged when it was widely available. But as demand for the product evaporates, and economies of scale in producing the product likewise disappear, it can become uneconomic for the product to be produced at all—and certainly uneconomic for it to be provided at historical prices—and thus the product fades away in favor of newer, more popular technologies.

20. This process of Schumpeterian "creative destruction" is the essence of competition and the engine of technological progress. But it can be distorted—to the detriment of consumers—by regulation. If companies are forced to provide a legacy technology when market forces would otherwise have resulted in that technology being retired, that is, by definition, a market distortion. In such a case, investment is being made based on regulatory requirements, not market forces, and investment cannot follow demand as efficiency dictates it should. If a buggy whip manufacturer that started to make automobiles were required by regulation to maintain its legacy buggy whip manufacturing facilities in their entirety, year after year, in addition to the company's new automobile manufacturing facilities, it is readily apparent that (i) economic resources that market forces would otherwise efficiently allocate to newer technologies would be wasted, and (ii) the company would be at a clear disadvantage relative to automobile manufacturers that do not have to also maintain buggy whip manufacturing facilities. Because resources inefficiently devoted to maintaining the dying technology are resources diverted from more efficient uses, such as advancing the newer technologies, this slowing of the Schumpeterian process ultimately harms everyone.

21. In the present context, there are two primary economic distortions of concern. First, due to the COLR requirement, AT&T is being required to inefficiently maintain two networks when market forces would, over time, retire one of those networks (TDM network that underlies POTS) in favor of the newer one. This reduces investment in the new network and its associated technologies and slows overall technological progress, to the detriment of all in the long-run. Second, the requirement applies only to a single firm (AT&T, the legacy ILEC), not to its competitors. This inhibits competition by handicapping the regulated firm and thus both prevents the regulated firm from allocating resources optimally, and it also discourages investment by unregulated firms, as they do not need to compete as vigorously as they would have to if the regulated firm were not operating under the regulatory handicap.

22. This regulatory handicap can manifest in a variety of ways. Even putting aside the clear effects on invested capital, scarce managerial and engineering time must go to the dying legacy product—scarce resources that otherwise would go to products that are actually competitively relevant going forward. As a result, the firm with the regulatory requirement will struggle under an inefficient allocation of human and financial resources, which will cause it to lag behind where it otherwise would be with respect to the new technologies. Moreover, the mandated inefficiency in investment and operations can also make it more difficult for the firm to attract investment dollars. All else equal, outside investors will prefer to invest in firms that are not subject to regulatorily-mandated inefficiency. Similarly, new recruits generally prefer to work at a company where their career paths are not at risk from being assigned to work on dying technology. When it comes to financial and human resources—which are both critical to compete effectively—a firm that must divert resources to a dying legacy technology is at an inherent competitive disadvantage to firms that do not need to do so. And placing one firm at an asymmetric competitive disadvantage is bad for the overall competitive process—reducing competitive pressure on other firms—and hence for consumers.

23. These are not just theoretical concerns. As a practical matter, the COLR requirement to maintain the legacy POTS network means both: (i) maintaining central offices with decades-old circuit switches when an Internet Protocol ("IP")-based network could be run more efficiently, and (ii) having to maintain both networks simultaneously. Copper networks are generally more costly to operate and maintain than fiber networks, and COLR requires AT&T to

devote significant resources to maintaining that legacy POTS copper network.[5] I understand from AT&T that it spends more than a billion dollars per year in California on its TDM network and associated legacy services.[6] This is a clear example of a large investment that is not following consumer demand: As shown in Section IV, even in the face of the regulatory distortion requiring continued ubiquitous service availability for POTS, fewer and fewer people are willing to pay for POTS, with the vast majority of people preferring newer technologies.

24. Reallocation of investment dollars to newer technologies would also accelerate technological advancement. Newer fixed broadband and mobile technologies offer significant technological advantages over legacy POTS on the network side, including more efficient use of bandwidth and integration of additional functionality. When a call is initiated over a traditional circuit-switched network, a circuit is established between the parties of the call, and the entire bandwidth of the circuit is reserved for the call. In contrast, modern voice technologies rely on IP to transmit digitized signals in the form of "packets," which does not require the dedication of an entire circuit to one call, but rather consumes only the bandwidth required for movement of IP

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5. One article describes estimates that "legacy copper network maintenance OPEX is two to seven times higher, energy costs are three to six times higher, and network fault rates are five to 10 times higher." See, Dr. Taga, Karim, "Copper Switch Off: Opportunity to Drive Infrastructure Convergence?" Arthur D. Little Report, October 2021 (available at https://www.adlittle.com/en/insights/report/copper-switch-opportunity-drive-infrastructure-convergence). Another article notes that Verizon was able to achieve "nearly 60 percent operational savings" after rebuilding its network using fiber technology instead of copper after the legacy copper infrastructure was destroyed in some areas in 2012 by Hurricane Sandy. These savings were driven by "70 to 90 percent" higher reliability and "40 to 60 percent" lower energy consumption of fiber network relative to the (destroyed) copper network. See, Walton, Barry, "Cost Calculations of Fiber and Copper," 2018 (available at https://www.corning.com/fiber-to-the-premise/worldwide/en/home/knowledge-center/cost-calculations-of-fiber-and-copper.html). AT&T subject matter experts confirmed that savings due to lower energy consumption and higher reliability of fiber networks are substantial. Interview with Joe Taylor, Shannon Carroll, and Isabella Szutkowski.

6. Interview of AT&T subject matter experts James Lacy and Will Schutts.

packets related to the call.[7, 8] Due to advances in IP networking over the past decades, transmission of data over the Internet has significant cost and flexibility advantages over relying on a dedicated network that is used only for (or primarily for) voice communications. In addition, managing VOIP connections is cheaper because it relies heavily on software as opposed to (more expensive) hardware.

25. Modern fiber networks are also more future-proof relative to AT&T's legacy TDM network. End-to-end fiber networks can be scaled up relatively quickly and inexpensively by replacing equipment attached to both ends of optical fibers, without the need to lay new fiber.[9] The shift to the so-called Software Defined Networking ("SDN") architecture, which relies on software as opposed to hardware for network control, also improves upgradability and allows network operators to roll out new services quickly and efficiently.[10]

26. There are also environmental costs to maintaining a legacy copper network in addition to a modern fiber network. For example, POTS lines have electricity pushed through

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7. See, *e.g.*, Almeida, Fernando, and José Cruz, "Mitigation of Security Concerns of VoIP in the Corporate Environment." In Organizational, Legal, and Technological Dimensions of Information System Administration, edited by Portela, Irene Maria, and Fernando Almeida, IGI Global, 2014, p. 258. See also, https://www.geeksforgeeks.org/difference-between-voip-and-and-pots/.

8. See, *e.g.*, Kumar, Anuj, "Security and Risk Challenges of Voice over IP Telephony." *International Journal of Electronics Engineering*, 3(1), 2011, p. 86.

9. National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce, Notice of Funding Opportunity, NTIA-BEAD-2022, May 3, 2022, pp. 14, 42 (available at https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf). See, also, Hardesty, Linda, "AT&T upgrades its fiber network to offer 2-Gig, 5-Gig speeds," Fierce Telecom, January 24, 2022 (available at https://www.fiercetelecom.com/broadband/att-upgrades-its-fiber-network-offer-2-gig-5-gig-speeds).

10. Heynen, Jeff, "Telcos' Tipping Point: 10G Fiber and Software-Defined Access," Dell'Oro Group, December 11, 2020, (available at https://www.delloro.com/knowledge-center/white-papers/telcos-tipping-point-10g-fiber-and-software-defined-access-2/). See, also, Zhao, Yongli, Yuqiao Wang, Wei Wang & Xiaosong Yu, "Software-Defined Optical Networks (SDON): Principles and Applications," *Optical Fiber and Wireless Communications*, June 21, 2017 (available at https://www.intechopen.com/chapters/54939).

them from the central office to the household. Fiber networks consume less energy than copper networks due to lower transmission losses and less equipment required to send signals over the network.[11] Based on an interview with AT&T subject matter experts, I understand that AT&T has a long-term sustainability initiative to address climate change.[12] As a part of this initiative, I understand that AT&T evaluated potential energy and other savings that could be achieved by decommissioning AT&T's TDM network and found them to be quite substantial.[13]

- First, AT&T estimates that there are significant environmental costs resulting from AT&T's operation of two networks—copper and fiber—instead of one network (fiber). Effectively two sets of network components consume scarce electricity, a large portion of which is generated using non-renewable sources.[14]
- Second, based on AT&T's analysis, significant electricity consumption savings would likely be achieved by moving from copper to fiber network. The much larger copper network switches consume significantly more power than smaller switches used in fiber networks. These older, bulkier switches also require larger spaces, sometimes occupying several floors, which have to be heated and cooled.

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11. See, *e.g.*, Godlovitch, Ilsa and Peter Kroon, "Copper switch-off: European experience and practical considerations," WIK-Consult White paper, 30 November 2020 (available at https://www.wik.org/fileadmin/Studien/2020/Copper_switch-off_whitepaper.pdf), p. 24.

12. Interview with Joe Taylor, Shannon Carroll, and Isabella Szutkowski. See, *e.g.*, https://about.att.com/csr/home/environment.html.

13. There are other estimates of relative efficiency of fiber and copper networks. For example, one paper quotes an estimate that fiber networks emit 88 percent less greenhouse gas emissions per gigabit compared to other access technologies. See, *e.g.*, Godlovitch, Ilsa and Peter Kroon, "Copper switch-off: European experience and practical considerations." WIK-Consult White paper, 30 November 2020 (available at https://www.wik.org/fileadmin/Studien/2020/Copper_switch-off_whitepaper.pdf), pp. 28-29.

14. See, *e.g.*, 2022 California Renewables Portfolio Standard, Annual Report November 2022 (available at https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/documents/energy/rps/2022-rps-annual-report-to-the-legislature.pdf).

- Third, AT&T estimates that the truck roll required for repair and maintenance of fiber network is substantially lower than that required for maintenance of its TDM network. This is driven in part by lower failure rates associated with a fiber network.[15]

27. Unlike AT&T, other mobile, cable and satellite providers of voice service do not have to spend billions of dollars maintaining a legacy network. If AT&T were able to operate in a more market-driven fashion, without a multi-billion-dollar regulatory distortion to investment, that would not only enable AT&T to allocate investment dollars more efficiently—based on market forces rather than regulatory mandate—but it would also put increased competitive pressure on AT&T's competitors to invest more themselves in response to stronger competition from AT&T. All consumers in California would benefit from such enhanced competitive pressure and the associated improvement in allocation of investment dollars.

III. THERE ARE MULTIPLE VOICE SERVICE ALTERNATIVES AVAILABLE ACROSS ALMOST ALL OF AT&T'S POTS SERVICE TERRITORY

28. In this Section, I demonstrate that AT&T's service territory is almost entirely covered (with only de minimis exceptions) by overlapping footprints of other voice service providers—using both fixed and mobile technologies—meaning that COLR is no longer needed to ensure ubiquitous availability of voice service.[16] I perform my analysis at the Census Block ("CB") level.[17] When summarizing my results, I present calculations based on both (i) the

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15. See, also, Buckley, Sean, "Verizon sees value in transforming network to IP, fiber, but conversion challenges remain," Fierce Telecom, May 19, 2015, ("Unlike copper, fiber is also less prone to damage from water or other environmental issues, meaning it can reduce truck rolls to solve customer issues."), available at https://www.fiercetelecom.com/telecom/verizon-sees-value-transforming-network-to-ip-fiber-but-conversion-challenges-remain.

16. As I noted above, I use the terms "fixed broadband" and "mobile" consistent with CPUC and FCC nomenclature. Fixed broadband includes both landline services and fixed wireless services.

17. I use 2020 CB boundaries.

current population residing in CBs within AT&T's service territory,[18] which reflects the pool of potential customers whom AT&T would be required to serve if requested, and (ii) the number of actual AT&T POTS lines as of December 2022.

29. To define AT&T's service area, I first obtained AT&T's POTS service territory map from the FCC ("FCC Study Areas"), which depicts the service areas for all ILECs throughout the United States.[19] The FCC Study Areas data, shown below in Figure 1, consist of Geographic Information System ("GIS") shapefiles, which I converted into 2020 CBs.[20] To do this, I first overlayed the map of AT&T's POTS areas, as defined by the GIS shapefiles, with boundaries of CBs. I then classified CBs as either within AT&T's POTS service territory or outside of it. I consider CBs with any AT&T POTS network presence to be a part of the service territory, even if not the entire CB area is covered by AT&T's POTS service.[21] That is, if any portion of a CB falls within the FCC Study Areas, I treat the entire CB as part of AT&T's service territory.

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18. I rely on U.S. Census Bureau's ("Census") 2020 population estimates (available at https://www2.census.gov/geo/tiger/TIGER2020/TABBLOCK20/).

19. Available at https://www.fcc.gov/economics-analytics/industry-analysis-division/study-area-boundary-data. As noted above, I use data specific to AT&T's subsidiary "Pacific Bell."

20. Available at https://www.fcc.gov/file/18873/download. Shapefiles define an area by specifying coordinates on map of a collection of geometric shapes (polygons). Such polygons may be overlaid with polygons representing other boundaries, such as CB boundaries or service maps of other providers.

21. More specifically, I calculate the percentage of the total area of each CB covered by AT&T's POTS service territory. Because some of the shapes (polygons) are cut imprecisely in the underlying data, and, additionally, because calculations of the areas of complex shapes involve approximations, the resulting calculated percentage overlap between AT&T's service territory and the CB boundaries sometimes includes a small amount of rounding error. To minimize the effect that the rounding error has on my analysis, I assume that any CB that does not have at least 0.1 percent of the area overlapping is not a part of AT&T's POTS service territory. Imposing this condition excludes only 0.2 percent of the total number of CBs.

Figure 1: AT&T California's POTS Service Territory

30. I then compare the CB-level POTS service territory with footprints for other voice providers, based on maps of fixed broadband and mobile coverage from the CPUC, which includes maps for all types of broadband providers, not just ILECs (the "CPUC Fixed Broadband

Map" and "CPUC Mobile Broadband Map").[22, 23] The CPUC Fixed Broadband Map data list facilities-based broadband providers separately for each 2020 CB served and each technology type.[24] For each CB within AT&T service territory, I count the number of providers offering fixed broadband services (which implies that they also have the ability to offer voice service). I count each provider only once per CB, even if that provider offers multiple technologies in a given CB. In my count of providers offering services within each CB, I exclude DSL service provided by AT&T, which relies on the same copper network as POTS. But I count service provided by AT&T using its fiber-optic network, as well as its fixed wireless services,[25] which represent alternatives to AT&T's POTS network, meaning they are appropriately included in the analysis of voice alternatives available to customers within AT&T's service territory, as they would be service options even in the absence of POTS. Notably, while a customer with access to a broadband connection can obtain voice services from many providers, including, for example, multiple VOIP providers (as well as multiple mobile resellers), I conservatively count each connecting network as a *single* option for obtaining voice service (so, for example, I do not separately count multiple resellers of the same underlying network).

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22. Both fixed broadband service area maps and mobile broadband service area maps are available at https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/broadband-mapping-program/cpuc-annual-collected-broadband-data. The data are as of December 31, 2020.

23. Voice services can be provided over broadband, and broadband providers frequently provide stand-alone voice service as well; "broadband" is simply availability of data service of at least 200 kbps in at least one direction, so for mobile service providers, the "broadband" footprint is essentially just the mobile service footprint. California Broadband Data Processing and Validation, data as of December 31, 2020 (available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/broadband-mapping/california-broadband-data-processing-and-validation--2021-v22.pdf.)

24. The CPUC provides fixed broadband data aggregated to the 2020 CB level. Technology codes follow FCC nomenclature (available at https://www.fcc.gov/general/technology-codes-used-fixed-broadband-deployment-data).

25. The fiber-optic network is identified by technology code "50," and fixed wireless service is identified by technology code "70."

31. The CPUC Mobile Broadband Map data consist of GIS shapefiles showing mobile coverage boundaries of five facilities-based wireless service providers: AT&T Mobility, Sprint, T-Mobile, U.S. Cellular, and Verizon Wireless.[26] I overlay each mobile provider's coverage map with the 2020 CB boundaries and count how many mobile providers offer services in each CB within AT&T service territory. I define CBs for which the mobile provider covers at least 50 percent of the area of the CB as within the mobile footprint of the given carrier.[27] Consistent with the discussion above, I include AT&T Mobility in my analysis as its services constitute an alternative option available to customers residing within AT&T's service footprint, which would be available even in the absence of POTS service.

32. Finally, AT&T has provided me addresses and geographic coordinates for all its current POTS customer locations,[28] and I have mapped them to 2020 CBs.[29] As a result, I can quantify the alternatives available in CBs with AT&T POTS lines.

33. The result that comes out of this analysis is clear: *Almost 100 percent of existing and potential customers residing within AT&T's POTS service territory have one or more*

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26. Throughout this declaration, T-Mobile means combined Sprint and T-Mobile because T-Mobile has acquired Sprint.

27. The FCC uses a 50 percent threshold when aggregating various area characteristics not lining up perfectly with Census maps from smaller CBs to Census Block Groups (CBGs) or Census Block Tracts (CBT). See, *e.g.*, FCC 2018 Broadband Deployment Report (available at https://docs.fcc.gov/public/attachments/FCC-18-10A1.pdf). Nevertheless, because most CBs either overlap with AT&T service territory completely or do not overlap at all, using a higher 90 percent cutoff would produce virtually identical results.

28. POTS_Report_Busines_ao12312022_anon.xlsx, POTS_Report_Consumer_ao12312022_anon_v2.xlsx. The geographic coordinates were missing for some customers. I geocoded addresses for those customers.

29. Most likely due to address matching issues, such as issues caused by differences between billing and service addresses for business customers, a small number of customer addresses map into CBs outside of AT&T's POTS service territory: several hundred residential POTS lines (or 0.08 percent) and several thousand of business POTS lines (or 1.8 percent) have address geocodes outside of the AT&T's POTS service territory. I exclude these lines from my analyses.

alternative facilities-based options for voice service.[30] In particular, 99.9 percent of the total population within AT&T's POTS service territory has at least *two alternative options* (generally a cable provider and a wireless option), and 99.7 percent of the total has at least *three alternative options*. (See Table 1.)

34. Similar conclusions hold for actual AT&T POTS customer lines.

- For residential POTS lines, 99.8 percent are located in CBs with at least one alternative voice service option, 99.5 percent have at least two alternative options, and 98.7 percent have at least three alternative options.
- For business POTS lines, 99.9 percent are located in CBs with at least one alternative option, 99.8 percent have at least two alternative options, and 98.6 percent have at least three alternative options.[31,32]

30. Some providers may be counted in the data twice if they have both fixed broadband and mobile wireless coverage. For instance, a provider will count as two alternative providers if it offers both fiber wireline and mobile connections in a given CB. In instances where a CB is covered by fixed wireless and mobile technologies from the same provider, I only count that provider once.

31. For a small number of lines (fewer than a thousand) there are alternatives to POTS but they are only available from AT&T and/or AT&T Mobility.

32. The data exclude internal business POTS lines, i.e., lines at AT&T-owned business locations.

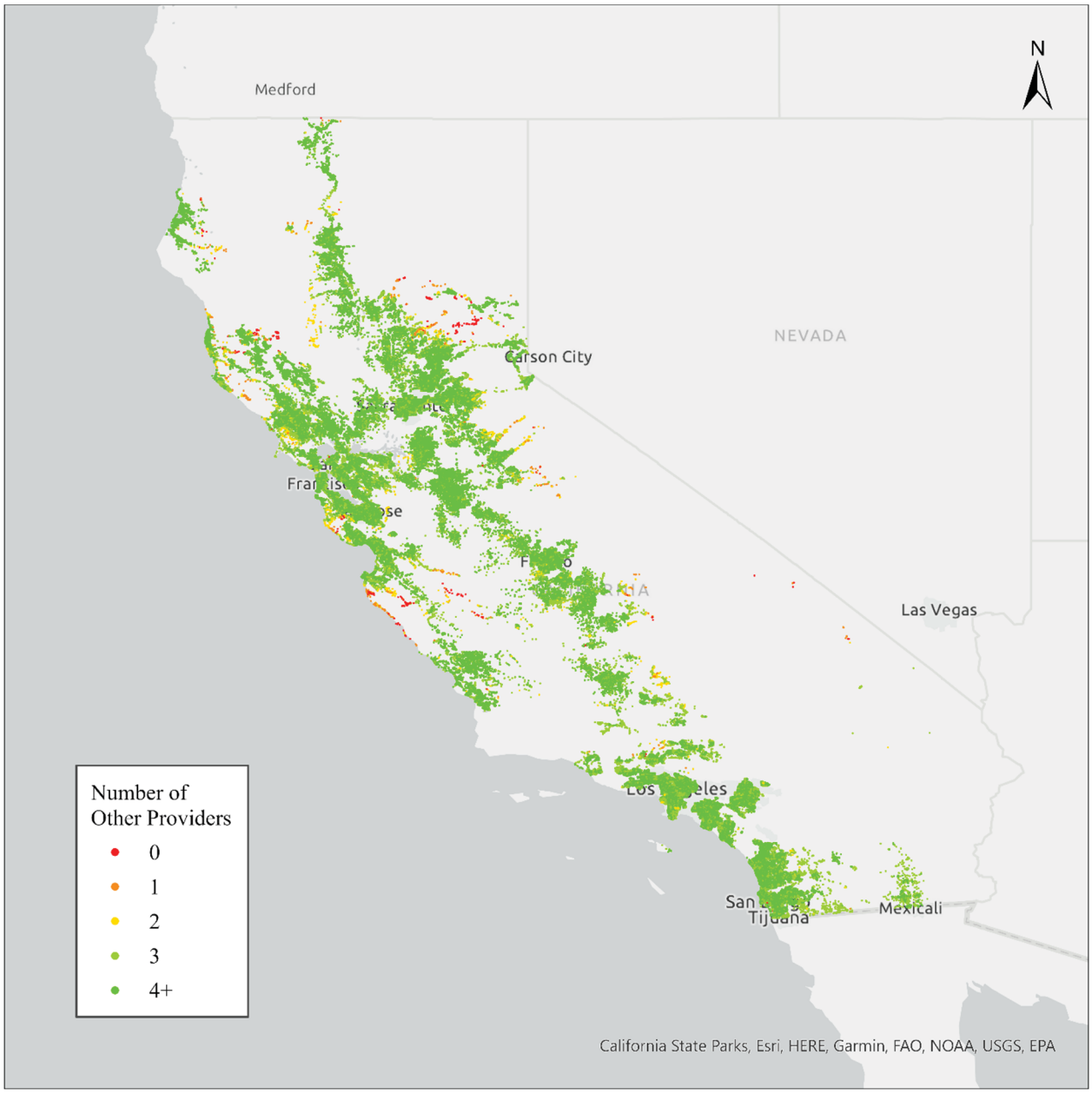
Table 1: Facilities-Based Fixed and Mobile Broadband Coverage of AT&T California's POTS Service Territory

	Census Blocks	Population	AT&T POTS Residential Customers	AT&T POTS External Business Customers
AT&T's POTS Service Territory	353,222	29,603,944	580,631	515,460
Fixed or Mobile Broadband Carriers Other than AT&T POTS				
1+	351,081 *99.4%*	29,589,107 *99.9%*	579,472 *99.8%*	515,137 *99.9%*
2+	348,743 *98.7%*	29,567,874 *99.9%*	577,719 *99.5%*	514,443 *99.8%*
3+	341,655 *96.7%*	29,501,922 *99.7%*	573,090 *98.7%*	508,471 *98.6%*

Sources: Census maps and population estimates 2020, FCC Study Areas maps, CPUC fixed and mobile broadband maps, AT&T POTS customer data.

35. Figure 2 below illustrates the prevalence of service alternatives on a map. It displays each AT&T POTS line within AT&T's POTS service territory as a dot, the color of which is determined by how many alternative voice options are available at the location of that line (based on the CB of that location). The great majority of POTS lines are in CBs with multiple alternative voice options as shown by the prevalence of dark green on the map (4+ alternative providers).

Figure 2: AT&T California's POTS Lines



36. I also analyze voice alternatives available to consumers residing in rural areas, Tribal Lands, low income areas, and areas with a relatively low percentage of Non-Hispanic

White households[33] within AT&T's POTS service territory. (See Attachment C.) For the CBs identified as rural by Census,[34] 99.5 percent of potential customers, as measured by population, 98.7 percent of current residential POTS lines, and 99.3 percent of business POTS lines have at least one voice alternative. For the Tribal Lands CBs,[35] 99.8 percent of potential customers, as measured by population, and 100 percent of current residential and business POTS lines have at least one voice alternative. I classify areas (CBGs and their corresponding CBs) in the bottom quartile of the (CBG-level) median income as low income.[36] For the low-income CBs, 99.8 percent of potential customers, as measured by population, 99.4 percent of current residential POTS lines, and 99.8 percent of current business POTS lines have at least one voice alternative. I also analyze voice alternatives available in areas with relatively low proportion of Census-designated Non-Hispanic White households (those in the bottom quartile based on the percentage of Census-designated Non-Hispanic White households (at the CBG level)).[37] For CBs in this bottom quartile, 99.9 percent of potential customers, as measured by population, 100 percent of current residential POTS lines, and 99.9 percent of current business POTS lines have at least one voice alternative.

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33. I rely on the definitions of race and ethnic origin used by the Census in its American Community Survey ("ACS"). The ACS definitions are available at https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2021_ACSSubjectDefinitions.pdf.

34. The list of Census designated rural 2020 CBs is available at https://www2.census.gov/geo/tiger/TIGER_RD18/LAYER/TABBLOCK20/.

35. Tribal Lands were identified using Census TIGER Tribal Block Group national shapefiles (available at www2.census.gov/geo/pdfs/maps-data/data/tiger/tgrshp2020/TGRSHP2020_TechDoc.pdf). Tribal Land maps were overlayed with the 2020 Census Block boundaries. I classify each CB as being within the Tribal Land if at least 50 percent of the CB's area is covered by the Tribal Land.

36. Census (American Community Survey) estimates of median income are available at https://data.census.gov/table?q=B19013&d=ACS+5-Year+Estimates+Detailed+Tables&tid=ACSDT5Y2021.B19013.

37. Census (American Community Survey) estimates of the number of households, in total and by racial and ethnic group, are available at https://data.census.gov/table?q=B11001H&d=ACS+5-Year+Estimates+Detailed+Tables.

37. The voice alternatives available to consumers typically include at least one VOIP offering, most often from a cable company, as well as services from *two* or more facilities-based mobile providers (thus not counting resellers). In addition, many customers residing within AT&T's POTS service territory also have access to at least one fiber network, either AT&T's or a competitor's (AT&T is the largest provider of fiber broadband within its service territory). More specifically, 95.7 percent of the population resides in CBs (within AT&T service territory) that have at least one cable or fiber wireline or fixed wireless option, and 99.9 percent of the population resides in CBs that have services from at least two facilities-based mobile carriers.[38]

38. As previously mentioned, the counts presented thus far have conservatively omitted mobile resellers. The CPUC includes several such mobile resellers in its list of Eligible Telecommunications Carriers ("ETC").[39] Although these mobile resellers rely on the same physical infrastructure as the underlying facilities-based carriers, such as AT&T Mobility, Verizon Wireless, or T-Mobile, they provide independent competition for the same customers, meaning they serve as distinct competitive options from a consumer point of view. My analysis is also conservative in that I do not include satellite providers, such as HughesNet or ViaSAT, which provide satellite broadband, including voice service, in nearly all areas.[40] In addition, my

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38. As previously discussed, the CPUC Fixed Broadband Map data identify different wireline technologies available in each CB from each provider. I identify cable providers by technology codes "40," "41," "42," or "43," which indicate different versions of the DOCSIS cable modem standard, and I identify fiber alternatives by technology code "50." (Available at https://www.fcc.gov/general/technology-codes-used-fixed-broadband-deployment-data).

39. See Eligible Telecommunications Carrier (ETC) (available at https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/service-quality-and-etc/eligible-telecommunications-carrier).

40. Both HughesNet and ViaSAT offer voice plans for $29.99 a month with lower introductory pricing (https://www.hughesnet.com/get-started/hughesnet-voice and https://www.viasat.com/satellite-internet/additional-services/voip/). Another entrant in the provision of satellite broadband, Space Exploration Technologies (SpaceX), allows for WiFi calling and announced a partnership with T-Mobile to allow emergency calling service (https://www.starlinkhardware.com/does-starlink-offer-satellite-phone-service/). FCC describes planned launches of next-generation satellites to both low orbit and geo-stationary orbit which should offer better quality broadband services (higher speed and

analysis is also conservative in that it does not account for DISH's entry into provision of mobile services. In fact, as a part of the T-Mobile-Sprint merger, DISH made commitments to "become a new entrant into the wireless industry, offering cutting-edge 5G service to over two-thirds of Americans within four years."[41]

IV. ALTERNATIVE SUPERIOR TECHNOLOGIES ARE GROWING WHILE POTS IS DECLINING

39. POTS is declining because the technology has been surpassed and thus the market has moved on. The economic inefficiencies and competitive distortions from the COLR obligation come about because of the investments required to maintain availability of a legacy network, which has been surpassed technologically (like the horse and buggy), and which fewer and fewer customers actually use. Consumers have overwhelmingly moved to newer and superior technologies, as have all competing voice providers, and a requirement to maintain POTS service under these conditions inefficiently prevents investment dollars from following consumer demand, as would happen in an efficient marketplace.

A. POTS IS DECLINING AS THE MARKET MOVES TOWARDS NEW TECHNOLOGIES

40. POTS, once the only voice service available, is rapidly declining. Today most consumers not only do not use POTS, but they also do not even use landlines, preferring instead to use mobile voice service. The market evidence is clear that POTS' time has come and gone. This fact is commonly recognized and reported on by the FCC among others.[42]

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lower latency). FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, ¶ 200.

41. "FCC Approves Merger of T-Mobile and Sprint," FCC Press Release, November 5, 2019 (available at https://docs.fcc.gov/public/attachments/DOC-360637A1.pdf). DISH has already spent $960 million in wireless capital expenditure in 2021. FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, ¶ 112.

42. FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, ¶ 172.

41. Figure 3 below demonstrates these trends based on FCC Voice Telephone Services Reports data.[43] The figure shows that the number of switched access lines (which the FCC defines as "the basis of plain old telephone service (POTS)"), denoted by the blue line, in California has declined by more than *80 percent*, from more than 18.7 million in 2008 to less than 3.7 million in 2021. In contrast, VOIP lines in service, denoted by the orange line, increased by about *260 percent*, from about 2.2 million in 2008 to more than 8 million in 2021. The number of mobile connections, denoted by the red line, was already greater than the number of switched access lines and VOIP lines combined as of 2008 and has only grown further since then, increasing by another 40 percent from about 32 million to about 45 million.

42. The POTS penetration percentage (meaning POTS lines per household) declined even faster. In 2005, residential POTS penetration in the United States was 96 percent (108.3 million POTS lines divided by 113.3 million households).[44] In 2020, POTS penetration fell to 11 percent (13.8 million POTS lines divided by 128.5 million households).[45] This is an enormous decline of 85 percentage points over 15 years. AT&T estimates indicate that the penetration within its service territory in California, i.e., number of residential POTS lines relative to households residing within its service territory, is even lower in 2022 at 6.5 percent.[46]

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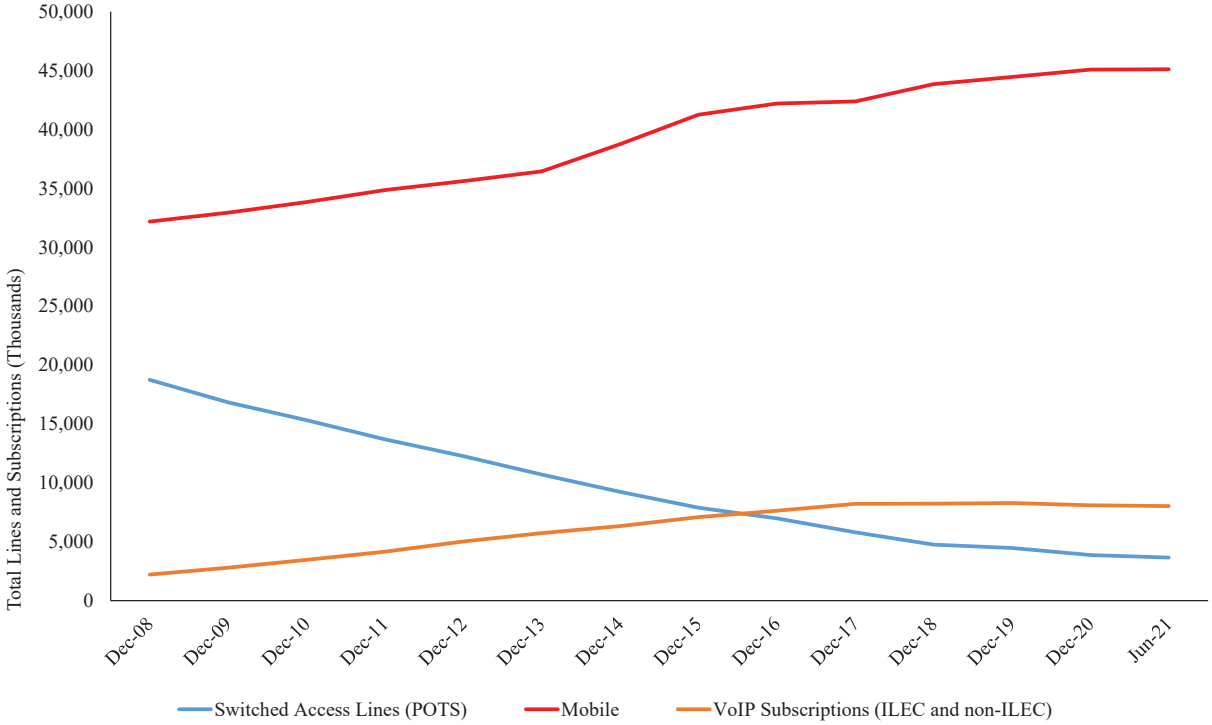
43. Voice Telephone Services: Status as of December 31, 2020 (available at https://www.fcc.gov/voice-telephone-services-report).

44. POTS lines based on data from FCC Local Telephone Competition: Status as of December 31, 2005 (available at https://docs.fcc.gov/public/attachments/DOC-266595A1.pdf). Residential lines are obtained by multiplying ILEC and CLEC total lines by their respective percentage of residential lines. Household estimates are from Census (available at https://www.census.gov/data/tables/time-series/demo/families/households.html).

45. POTS lines based on data from FCC Voice Telephone Services: Status as of December 31, 2020 (available at https://docs.fcc.gov/public/attachments/DOC-385812A1.pdf). Household estimates are from Census (available at https://www.census.gov/data/tables/time-series/demo/families/households.html).

46. AT&T analysis.

Figure 3: Switched Access (POTS), VoIP, and Mobile Lines in California (December 2008 – June 2021)



Sources: "Historical Voice Telephone Services Subscriptions – Nation and States – December 2008 to June 2021," Federal Communications Commission, Updated: Wednesday, August 01, 2022, distributed by the Federal Communications Commission, https://www.fcc.gov/sites/default/files/vts_june21_hist.zip (biannual, for all telephony lines & subscribers).

43. Strikingly, the majority of households do not have landline voice service *of any type*. For example, the National Health Interview Survey Early Release Program found that as of 2020—two years ago—64.2 percent of California adults were already living in "wireless-only" households, *i.e.*, households without a landline.[47] A further 19 percent of California adults were "wireless mostly" users, *i.e.*, users who have both wireless and landline connections but who answer all or almost all calls on wireless phones. Nationally, the FCC estimates that "[a]pproximately 68.7 percent of adults lived in a wireless-only household in late 2021.[48] In

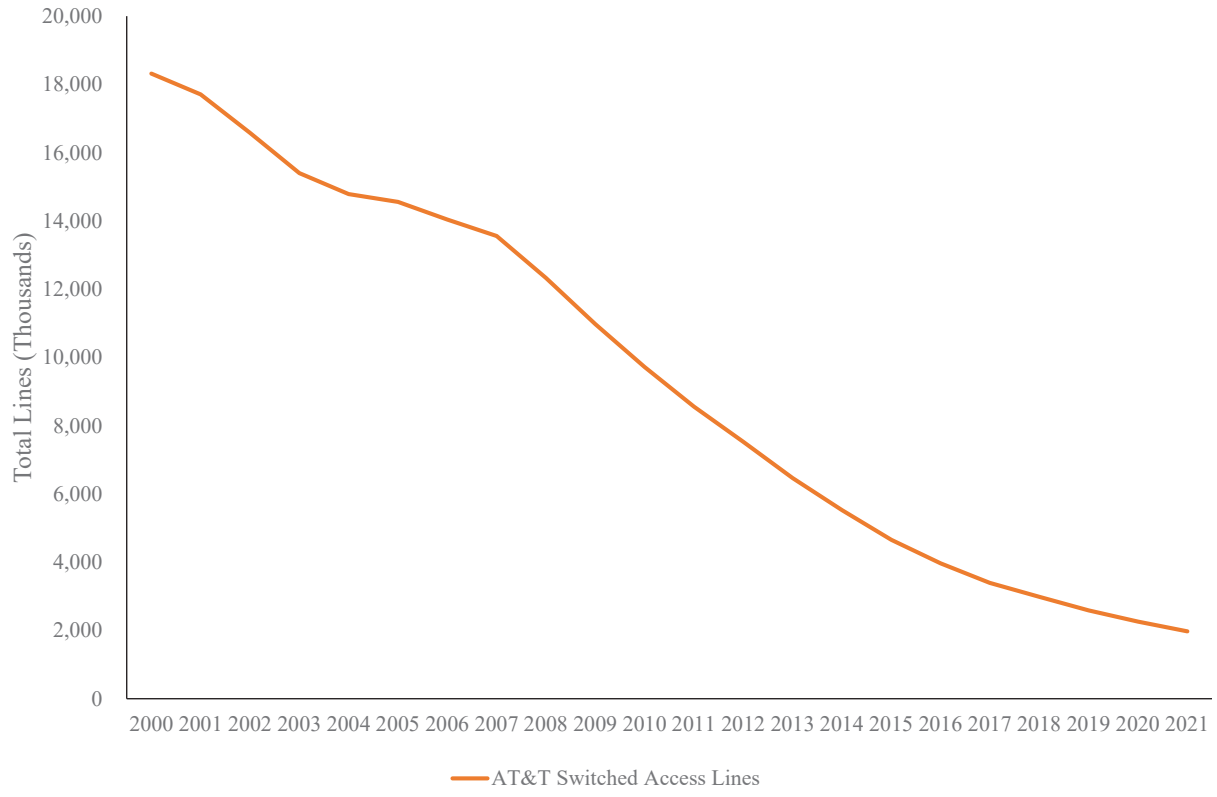
47. National Health Interview Survey Early Release Program, 2020, released 12/2022.

48. FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, ¶ 172.

general, the percentages of wireless-only adults are higher among younger generations, which indicates that the observed trends are likely to accelerate going forward.

44. AT&T's own data indicate that its POTS lines have been declining in California since at least 2000 (Figure 4 below). AT&T had 18.32 million residential and business POTS lines in 2000. In 2021, that number was 1.97 million, *a decline of 89 percent*.

Figure 4: AT&T California Switched Access Lines (POTS), 2000 – 2021



Sources: AT&T data.

B. RETIREMENT OF POTS WILL NOT CAUSE ANY SIGNIFICANT CONSUMER DISRUPTION

45. As discussed above, it is economically inefficient to require a firm to maintain legacy technology that would otherwise have been displaced by market-driven competitive alternatives. And in the present case, the market has spoken: Competition has made alternative services available to the overwhelming majority of the population in California, those services are vastly more popular than POTS, and those technologies are available to the few remaining

POTS subscribers at reasonable prices and with a variety of attractive features. As I discuss in Section V, I understand that AT&T is also committing to protections for existing POTS customers to smooth the transition from the legacy network to the more modern networks.

46. Notably, the high quality alternatives to POTS are available at prices that are comparable to or lower than that for AT&T's POTS service. Table 2 below, drawn from AT&T's internal Competitive Intelligence Reports from January 2023,[49] shows prices in California Designated Market Areas ("DMAs") where AT&T is offering its POTS service.[50] It shows that there are both bundled and non-bundled voice alternatives costing a similar amount or less than the current $34.50 price of AT&T residential POTS service in California.[51] Many of the alternatives also include long distance calling as part of the price, while AT&T's POTS plan does not, making them that much more affordable than POTS.[52]

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49. AT&T collects competitive intelligence data on pricing for alternative voice services for residential customers in the ordinary course of business. See AT&T Competitive Intelligence Reports, January 2023.

50. The table is based on DMAs that cover at least a part of California and have at least one AT&T POTS plan listed in AT&T Competitive Intelligence Reports from January 2023.

51. When multiple plans from a single provider were listed, I selected the lowest-price option. The AT&T Competitive Intelligence Reports from January 2023 list a monthly price of $44 for its POTS, which refers to the price offered in certain areas outside of California. The current residential POTS monthly price is $34.50 in most AT&T California's exchanges. See AT&T California ILEC Guidebook (available at https://cpr.att.com/pdf/ca/a005.pdf).

52. VOIP services generally require additional equipment, such as a modem, which is not required for POTS. Some providers give customers the option of either providing their own equipment or renting it from the provider. For example, Comcast allows customers to use their own equipment or offers to rent a Xfinity Gateway for $15 a month. Xfinity Gateway provides additional functionality in addition to handling voice traffic—it also serves as a broadband modem and wireless router. See, https://www.xfinity.com/learn/home-phone-services/equipment.

Table 2: Prices of VOIP Services Competing with AT&T POTS

Type of VOIP Plan	Provider	Price per Month
	AT&T POTS	$34.5
Not Bundled	Comcast	$20
	Cox	$20
	Mediacom	$30
	Optimum	$51
Bundled	AT&T	$35
	Astound Broadband	$36
	Charter	$20
	Fidium Fiber	$15
	Google Fiber	$10
	Mediacom	$20
	Optimum	$15
	Verizon (Fixed Wi-Fi)	$20

Sources: AT&T California ILEC Guidebook (https://cpr.att.com/pdf/ca/a005.pdf); AT&T Competitive Intelligence Reports, January 2023.

Notes:
Shows cheapest VOIP plan; based on DMAs with AT&T POTS plans offered and at least partial California coverage; based on plans with standard monthly charge available in the data.

47. Similarly, major facilities-based mobile providers—AT&T Mobility, Verizon Wireless, T-Mobile, and U.S. Cellular—as well as mobile resellers offer a variety of prepaid and postpaid mobile wireless plans at price points below those for AT&T's POTS service.[53] Mobile wireless plans also generally include many features not available on POTS, such as bundled data allowances, device discounts, ability to tether other devices by using hotspot features of smartphones, free or discounted video streaming services, and free or discounted cloud storage.[54] Prepaid plans typically have fewer additional features, but even the most basic prepaid plans typically include at least some bundled data service, making them superior to POTS on that

53. AT&T Competitive Intelligence Reports, January 2023.

54. AT&T Competitive Intelligence Reports, January 2023.

dimension. However, because they usually have fewer additional features (including less data, which drives the cost and price of most postpaid mobile wireless plans), prepaid plans are more comparable to POTS, making them the natural basis for comparing mobile pricing to POTS pricing. Following this logic, Table 3 below shows prices of basic prepaid plans offered by several mobile carriers in the United States as of January 2023, including prepaid plans from AT&T Mobility, Verizon Wireless, and T-Mobile, as well as prepaid plans from several resellers. As demonstrated by the table, prepaid plans are readily available from many carriers at price points comparable to POTS service.

Table 3: Prices of Prepaid Mobile Wireless Services Competing with AT&T POTS

Data Allowance	AT&T POTS	Metro by T-Mobile	Boost Mobile	Straight Talk	Cricket Wireless	Verizon Prepaid	T-Mobile Prepaid	AT&T Prepaid
No Data	$34.5					$35		
1 - 5GB	$34.5	$30	$8.33 - $15 (**)	$30	$30		$10 - $15	$30
6 - 16 GB	$34.5		$20 - $35 (**)		$40	$45 (*)	$25 - $40 (*)	$25 - $40 (*),(**)

Sources: AT&T California ILEC Guidebook (https://cpr.att.com/pdf/ca/a005.pdf); AT&T Competitive Intelligence Reports, January 2023.
Notes:
(*) Some plans Include Hotspot;
(**) Some plans based on 3, 6, or 12 Month Bundle.

48. As noted above, when quantifying alternative voice options, I conservatively counted only facilities-based mobile carriers. However, I included resellers in Table 3 above because, from a pricing point of view, omitting resellers is overly conservative: Prepaid plans offered by Metro, Boost, Straight Talk, and Cricket, among others, are viable POTS alternatives available at comparable price points to POTS service. For example, Metro's plan costs less than AT&T POTS at $30, while also providing the customer 5 Gb data allowance, which is a benefit not available with AT&T's POTS.

49. Some of AT&T's POTS customers qualify for a LifeLine discount.[55] However, as I noted above, there are several mobile services resellers designated ETCs in California that are also offering LifeLine services that qualify for the same discount.[56] Some of these mobile services resellers already have more LifeLine customers in California than AT&T, including: Assurance Wireless with more than 392,000 Lifeline customers, TruConnect with more than 171,000 LifeLine customers, and TracFone with about 168,000 LifeLine customers, compared to about 120,000 LifeLine customers served by AT&T.[57]

50. These VOIP and mobile technologies offer high-quality voice service with a range of features not offered with POTS. For example, the distinction between long distance and local calls is effectively eliminated with VOIP and mobile plans.[58] (To clarify, VOIP is a technology and mobile is a mode of delivery of voice services. However, modern mobile plans also rely on a similar packet-switched technology—Voice Over LTE or "VOLTE"—and thus have similar technological advantages.) In addition, VOIP and mobile providers typically include many other standard features such as three-way calling, caller ID, voicemail, and various call and voice mail management tools accessible either via phone or via Internet.[59] This is in part because scaling of networks and integration of new features is more straightforward using modern technologies than using legacy POTS networks.

51. Mobile wireless technology—the voice service used by the vast majority of consumers today—has another obvious advantage over landline voice service: the ability to have

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55. In California, wireline LifeLine customers may qualify for a discount of up to $17.90. See, *e.g.*, https://www.cpuc.ca.gov/consumer-support/financial-assistance-savings-and-discounts/lifeline/california-lifeline-eligibility.

56. The monthly discount is the same for mobile service—it is up to $17.90. See, *e.g.*, https://www.cpuc.ca.gov/consumer-support/financial-assistance-savings-and-discounts/lifeline/california-lifeline-eligibility.

57. https://www.cpuc.ca.gov/consumer-support/financial-assistance-savings-and-discounts/lifeline/lifeline-related-forms-and-notices-for-carriers. The data are as of December 2022.

58. See, *e.g.*, Guffey, Mary Ellen and Dana Loewy, "Essentials of Business Communication." 10th Ed., Cengage Learning, 2014, p. 8.

59. See, *e.g.*, https://www.geeksforgeeks.org/difference-between-voip-and-and-pots/.

a phone connection both at home and away from home. This advantage contributed to a substantial growth of mobile lines in service (Figure 3 above) in recent years. And while older mobile wireless technologies such as 2G or 3G suffered from some quality issues, modern mobile voice communications that rely on IP packet-switched networks have largely eliminated the issues that existed with older generations of mobile service.[60] Notably, the VOLTE technology, which relies on IP packet-switching (and has the associated quality benefits), is projected to account for more than 80 percent of all LTE and 5G wireless subscriptions globally in 2023.[61, 62]

C. AT&T IS NOT A DOMINANT PROVIDER OF VOICE SERVICES IN CALIFORNIA

52. As noted above, COLR requirements are vestiges of a time when ILECs were local monopolies in the provision of phone service, and the goal was to make sure such monopolies did not deny service to any consumers, who would have no competitive recourse. Such conditions are far from the current reality in which AT&T is not a dominant provider of either fixed broadband or mobile wireless broadband: AT&T Mobility is one of the three roughly equal-sized nationwide facilities-based mobile wireless providers (along with Verizon Wireless and T-Mobile), and AT&T's share of broadband subscribers (broadband which can be used for voice service) is far lower than the cable companies with which it competes.

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60. See, *e.g.*, Gibbs, Colin, "T-Mobile sees more than 300M VoLTE calls a day, 'well over half' of all calls," Fierce Wireless, April 6, 2016 (available at https://www.fiercewireless.com/wireless/t-mobile-sees-more-than-300m-volte-calls-a-day-well-over-half-all-calls). See, also, Andersen, Dave, "UK operators continue to improve the end-user mobile call experience," 24 May 2022 (available at https://rootmetrics.com/en-GB/content/UK-mobile-call-trends-2022). See, also, Contreras, Samuel, "VoLTE: How to use it and why you should care," December 19, 2022 (available at https://www.androidcentral.com/volte). See, also, "Five benefits of VoLTE over traditional CS voice calls," GSMA Member Press Release, 14 June 2022 (available at https://www.gsma.com/membership/resources/five-benefits-of-volte-over-traditional-cs-voice-calls/).

61. See, *e.g.*, https://www.ericsson.com/en/reports-and-papers/white-papers/voice-and-video-calling-over-lte--securing-high-quality-communication-services-over-ip-networks.

62. See, *e.g.*, https://www.gsma.com/membership/resources/five-benefits-of-volte-over-traditional-cs-voice-calls/. See also https://www.ericsson.com/en/volte/volte-deployment.

53. The three largest facilities-based wireless providers, AT&T Mobility, Verizon Wireless, and T-Mobile have similar size and scope. Each provider's network covers the vast majority of population in the United States.[63] And all three have a similar number of subscribers (with some variations depending on the specific time period, which connections are counted, etc.).[64]

54. Table 4 below presents AT&T's estimates of wireline broadband shares in Q3 2022 in California.[65] Among the providers of wireline broadband, AT&T is substantially smaller than the incumbent cable company in each relevant area. In Southern California, AT&T's ****BEGIN CONFIDENTIAL [redacted] END CONFIDENTIAL**** percent share is substantially lower than Spectrum's ****BEGIN CONFIDENTIAL [redacted] END CONFIDENTIAL**** percent share. In Northern California, AT&T's ****BEGIN CONFIDENTIAL [redacted] END CONFIDENTIAL**** percent share is substantially smaller than Comcast's ****BEGIN CONFIDENTIAL [redacted] END CONFIDENTIAL**** percent share.[66]

63. FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, ¶ 64.

64. For example, AT&T has the highest share of reported total connections while Verizon Wireless has the highest share of prepaid subscribers. FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022, Fig. II.B.3 and ¶ 103.

65. Wireline broadband subscriber shares based on data excluding fixed wireless, the data for which are not available for California.

66. Of course, the relative subscriber shares within AT&T's service territory may differ from the shares calculated for Northern and Southern California because AT&T's service territory, as well as footprints of cable companies, do not overlap perfectly.

Table 4: Wireline Broadband Residential Subscriber Share Estimates, California, Q3 2022

Provider	Subscriber Share	
	Southern California	Northern California
	**BEGIN CONFIDENTIAL	
AT&T Total	[redacted]	[redacted]
Spectrum		
Comcast		
Cox		
Frontier		
Altice USA		
Century Link		
Other Cable Internet		
Other DSL		
Other home Internet service		
	**END CONFIDENTIAL	

Source: AT&T Analysis.
Notes: Other home Internet service includes Other home Internet, Google Fiber, and Satellite. Excludes fixed wireless.

V. AT&T'S COMMITMENTS WILL PROTECT POTS CUSTOMERS WITH NO ALTERNATIVES AND SMOOTH THE TRANSITION IN AREAS WITH ALTERNATIVE VOICE OPTIONS

55. The discussion thus far demonstrates that, because of its inefficient distortion of investment and competition, AT&T's COLR obligation is not only unnecessary in the current competitive environment, but it is also harmful to consumers. As a matter of economics, that implies that the obligation should be lifted even if there could be some short-run service disruptions. But in the present case, I understand that AT&T is doing even more to ensure that such a policy would be beneficial to all consumers, as the few customers without alternative options will be protected by AT&T service commitments.

A. THERE ARE VERY FEW CUSTOMERS IN AREAS WITH NO VOICE ALTERNATIVES AND THEY WILL RETAIN SERVICE

56. There are only a handful of customers in California that lack voice alternatives: According to the data described above, there are currently 1,159 residential POTS lines and 323 business POTS lines in CBs without any fixed or mobile voice options. Red dots in Figure 2

above show the locations of these lines. Most of them are located in areas such as the Sierra Nevada mountains or remote coastal areas. Critically, AT&T is not asking for COLR relief in those areas: AT&T stands ready to serve as the carrier of last resort in areas that truly do lack alternatives for voice services.

B. AT&T'S CONTINUED SERVICE COMMITMENT WILL SMOOTH THE TRANSITION PERIOD FOR CURRENT POTS CUSTOMERS WITH ADDITIONAL VOICE OPTIONS

57. The remaining areas, aside from the very small number described in part A, do have reasonably priced alternatives available to consumers. While some consumers continue to use POTS in those areas with alternatives, the economic goal of COLR was to ensure access to affordable voice service generally—in a setting with a monopoly voice provider—*not* to ensure access to POTS specifically, particularly not in a world that is far from a monopoly, where other services are near-ubiquitous, technologically superior to POTS, and affordably priced. Therefore, mere existence of current POTS customers cannot be used as a justification for COLR if such customers have other reasonably priced and technologically superior options available to them.

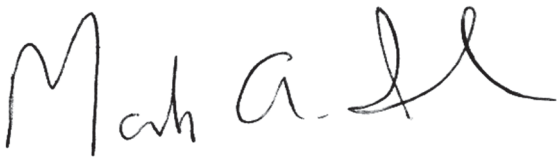
58. Nevertheless, I understand that AT&T commits to continue to provide POTS service for those current POTS customers with alternative voice options available for at least six months following the CPUC's grant of AT&T's application to remove the COLR obligation. The commitment with respect to existing customers further ensures that removing the COLR obligation will be beneficial to all consumers in California, as it will ease the process of transitioning to the other, superior and affordable options.

VI. CONCLUSIONS

59. The economic justification for COLR no longer exists: Voice service alternatives are near-ubiquitous in California, meaning that consumers have alternatives and the justification for COLR—to ensure access to affordable phone service in the presence of a monopoly—no longer exists. In the extremely rare cases where there are no such alternatives, AT&T is not asking for COLR relief. The alternative voice services are available at reasonable rates and are based on superior technologies. Allowing AT&T to relinquish its COLR obligation with respect to its legacy POTS would eliminate regulatory distortions, allow for efficient re-allocation of

scarce resources, incentivize investment by AT&T's competitors in order to compete with a more efficient AT&T, and thus enhance competition, benefit consumers, and serve the public interest.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.



Mark A. Israel

2/28/2023

Date

ATTACHMENT A: CURRICULUM VITAE

Mark A. Israel **February 2023**

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Member of Global Executive Committee, Compass Lexecon

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AREAS OF ECONOMIC EXPERTISE

- Antitrust and competition economics; industrial organization economics
- Applied econometrics
- Economic and econometric analysis of horizontal and vertical mergers
- Economic and econometric analysis of antitrust litigation topics, including: Class certification, damages, and liability issues in cases involving price fixing, exclusive dealing, monopolization, bundling, price discrimination, and exclusionary practices

INDUSTRIES OF PARTICULAR EXPERTISE AND CASE HIGHLIGHTS

- Particular expertise in industries including: Wireline and wireless telecommunications, media, advertising, sports, airlines, railroads, and other transportation services.
- Additional extensive experience in industries including: Internet, software, and other high technology markets; financial markets; credit cards; insurance markets; healthcare; biotech; distribution services; energy markets; metals; hotels; rental cars, and consumer retail.
- Selected case highlights: CCB v. Rogers/Shaw; NFL Sunday Ticket Antitrust Litigation; DOJ v. Google Search Litigation; DOJ v. AA/JetBlue JV; PGA Tour v. LIV Golf; Viamedia v. Comcast; Capacitors Price Fixing Jury Trial; Rail Fuel Surcharge Litigation; Verizon-Tracfone Hearings; Sprint-T-Mobile Hearings; DOJ v. AT&T/Time Warner; AA-US Airways Merger; Comcast-NBCU Merger; DOJ Oneworld Airline Alliance Investigation.
- Research published in leading scholarly and applied journals including *The American Economic Review*, *The Rand Journal of Economics*, A*ntirust Law Journal, The Journal of Competition Law and Economics, and The Review of Network Economics.*

- Co-author of the chapter on Econometrics and Regression Analysis in the ABA Treatise, *Proving Economic Damages: Legal and Economic Issues,* 2017.

EDUCATION

- Ph.D., Economics, STANFORD UNIVERSITY, June 2001.
- M.S., Economics, UNIVERSITY OF WISCONSIN-MADISON, August 1992.
- B.A., Economics, ILLINOIS WESLEYAN UNIVERSITY, Summa Cum Laude, May 1991.

EMPLOYMENT HISTORY

Compass Lexecon: *Senior Managing Director and Member of Four-Person Global Executive Committee*.

(Previously: *Head of Compass Lexecon North American Antitrust Practice*, January 2016 – December 2022; *Executive Vice President*, April 2013 – January 2016; *Senior Vice President*, January 2009 – March 2013; *Vice President*, January 2008 – December 2008; *Economist*, January 2006 – December 2007.)

Kellogg School of Management, Northwestern University: *Assistant Professor of Management and Strategy*, 2000 – 2006; *Associate Professor of Management and Strategy*, 2007 – 2008.

State Farm Insurance: *Research Administrator*, 1992 – 1995.

RECENT PROFESSIONAL RECOGNITIONS

Global Competition Review Who's Who Legal, Global Elite Thought Leader, 2022.

Global Competition Review Who's Who Legal, Thought Leader in Competition: 2019, 2020, 2022.

Global Competition Review Who's Who Legal, Competition Economists: 2020, 2021.

Global Competition Review Who's Who Legal, Global Leader in Competition – Economists 2020; Experts – Financial Advisory and Valuation – Quantum of Damages 2020.

Global Arbitration Review's International Who's Who of Commercial Arbitration, Leading Expert Witness, 2018.

LIVE TESTIMONIAL EXPERIENCE

Testimony as Economic Expert on behalf of Rogers Communications Inc. In the Matter of the *Competition Act*, R.S.C. 1985, c. C-34 as amended; and In the Matter of the proposed acquisition by Rogers Communications Inc. of Shaw Communications Inc.; and In the Matter of an application by the Commissioner of Competition for one or more orders pursuant to section 92 of the *Competition Act*, Between the Commissioner of Competition and Rogers Communications Inc. and Shaw Communications Inc., the Competition Tribunal, CT-2022-002, Live Trial Testimony: November 30, 2022; December 1, 2022.

Testimony as Economic Expert on behalf of National Football League, *In Re National Football League Sunday Ticket Antitrust Litigation*, In the United States District Court Central District of California, Case No. ML 15-02668-PSG (JEMx), Deposition: November 23, 2022.

Testimony as Economic Expert on behalf of Express Scripts Inc, In the Matter of *City of Rockford v. Mallinckrodt ARD, Inc., et al.* (Case No. 3:17-cv-50107), and *Series 17-03-615, a designated series of MSP Recovery Claims, Series LLC, et al. v. Express Scripts Inc., et al.* (Case No. 3:20-cv-50056), In the United States District Court for the Northern District of Illinois Western Division, Deposition: November 18, 2022.

Testimony as Economic Expert on behalf of Google, LLC, In the Matter of *United States of America, et al. v. Google LLC* (Case No. 1:20-cv-03010-APM), and *State of Colorado, et al. v. Google LLC* (Case No. 1-20-cv-03715-APM), In the United States District Court for the District of Columbia, Deposition: November 3, 2022; November 4, 2022.

Testimony as Economic Expert on behalf of American Airlines, Inc., In the Matter of *United States of America, et al. v. American Airlines Group Inc. and JetBlue Airways Corporation*, In the United States District Court for the District of Massachusetts, Civil Action No. 1:21-cv-11558-LTS, Deposition: August 22, 2022; Live Trial Testimony: October 17, 2022; October 24, 2022.

Testimony as Economic Expert on behalf of Comcast Corporation, In the Matter of *Viamedia, Inc. v. Comcast Corporation and Comcast Spotlight, LP*, In the United States District

Court Northern District of Illinois Eastern Division, Case No. 16-cv-5486, Deposition: January 5, 2018; October 21, 2022.

Testimony as Economic Expert on behalf of KOA Corporation and KOA Speer Electronics, Inc., In the Matter between *Sean Allott and Panasonic Corporation; Panasonic Corporation of North American; Panasonic Canada Inc.; KOA Corporation; KOA Speer Electronics, Inc., et al.,* In the Ontario Superior Court of Justice, Court File No. 1899-2015 CP, Deposition: August 16, 2022.

Testimony as Economic Expert on behalf of Arconic, Inc. et al., In the Matter of *Arconic, Corp., and Howmet Aerospace, Inc. v. Novelis, Inc., and Novelis, Corp.,* United States District Court for the Western District of Pennsylvania, Case No. 2:17-cv-014340-JFC, Deposition: April 29, 2022.

Testimony as Economic Expert on behalf of Norfolk Southern Railway Corporation, "Reciprocal Switching," In Front of the Surface Transportation Board, Docket No. EP 711 (Sub-No. 1), Live Testimony: March 16, 2022.

Live testimony in front of arbitration panel in confidential arbitration regarding wholesale roaming rate for wireless telecommunications: December 13, 2021; December 14, 2021.

Testimony as Economic Expert on behalf of Nippon Chemi-Con and United Chemi-Con, *In Re Capacitors Antitrust Litigation,* United States District Court for the Northern District of California Division, No. 3:14-CV-03264, Deposition: March 14, 2020; Live Jury Trial Testimony: December 8, 2021.

Testimony as Economic Expert on behalf of Norfolk Southern Railway Company, *In Re Rail Freight Fuel Surcharge Antitrust Litigation*, In the United States District Court for the District of Columbia, MDL No. 1869, Case No. 07-0489 (PLF/GMH), Deposition: November 18, 2021.

Testimony as Economic Expert on behalf of JPMorgan, Goldman Sachs and Glencore, *In Re Aluminum Warehousing Antitrust Litigation*, MDL 2481, In the United States District Court Southern District of New York, No. 16-CV-5955, Deposition: November 5, 2021.

Testimony as Economic Expert on behalf of Cox Automotive, Inc. et al., In the Matter between *Cox Automotive, Inc., Autotrader.com, Inc., Dealer Dot Com, Inc., Dealertrack, Inc.;*

Homenet, Inc.; Kelley Blue Book Co., Inc.; Vauto, Inc.; Vinsolutions, Inc.; and Xtime, Inc. vs. The Reynolds and Reynolds Company, American Arbitration Association, Case No. 01-19-0000-4548, Deposition: October 21, 2021.

Testimony as Economic Expert on behalf of the Joint Defense Group, In the Matter between *Cygnus Electronics Corporation and Sean Allott and Panasonic Corporation et al.*, In the Ontario Superior Court of Justice, Court File No. 3795-14 CP, Deposition: September 29, 2021.

Testimony as Economic Expert on behalf of American Express, In the Matter of *B & R Supermarket, Inc., d/b/a Milam's Market, et al., Individually and on Behalf of All Others Similarly Situated v. Visa, Inc., et al.,* In the United States District Court Eastern District of New York, Case No. 117-cv-02738-MKB-VMS, Deposition: August 6, 2021.

Testimony as Economic Expert on behalf of Bio-Rad Laboratories, Inc., In the Matter of *Bio-Rad Laboratories, Inc. and President and Fellow of Harvard College v. 10X Genomics, Inc., and 10X Genomics, Inc. v. Bio-Rad Labs, Inc. and President and Fellow of Harvard College as Counterclaimants,* In the United States District Court for the District of Massachusetts, Civil Action No. 1:19-cv-12533-wgy, Deposition: June 1, 2021.

Testimony as Economic Expert on behalf of Joint Applicants, In the Matter of *TracFone Wireless, Inc. (U4321C), América Móvil, S.A.B. de C.V. and Verizon Communications, Inc. for Approval of Transfer of Control over TracFone Wireless, Inc.*, Public Utilities Commission of the State of California, Application 20-11-001, Opening Testimony: March 12, 2021; Rebuttal Testimony: April 9, 2021; Live Trial Testimony: May 5, 2021; Supplemental Testimony: May 28, 2021.

Testimony as Economic Expert on behalf of Peabody Energy Corporation and Arch Coal, Inc., In the Matter of *Federal Trade Commission v. Peabody Energy Corporation and Arch Coal, Inc.*, In the United States District Court for the Eastern District of Missouri, Civil Action No. 4-20-cv-000317-SEP, Deposition: June 29, 2020; Live Trial Testimony: July 24, 2020.

Testimony as Economic Expert on behalf of Authenticom, Inc., *In Re Dealer Management Systems Antitrust Litigation*, MDL 2817, United States District Court for the Northern

District of Illinois Eastern Division, No. 1:18-CV-864, Deposition: January 16, 2020; January 17, 2020.

Testimony as Economic Expert on behalf of Trinity, In the Matter of *Jackson County, Missouri, Individually and on behalf of a class of others similarly situated, v. Trinity Industries, Inc., and Trinity Highway Products, LLC*, In the Circuit Court of Jackson County, Missouri at Independence, Case No. 1516-CV23684, Stage 1 Testimony: May 24, 2017; Stage 2 Deposition: November 14, 2019.

Testimony as Economic Expert on behalf of Joint Applicants, In the Proposed Merger of T-Mobile US, Inc. and Communications, Inc., Public Utilities Commission, State of California, San Francisco, California, Docket Nos. A.18-07-011 and A.18-07-012, Direct Rebuttal Testimony: January 29, 2019; Live Testimony: February 7, 2019; Direct Supplemental Testimony: November 7, 2019.

Testimony as Economic Expert on behalf of Turner Network Sales, Inc., In the Matter of *DISH Network L.L.C. v. Turner Network Sales, Inc.*, JAMS Arbitration No. 1100103066, Deposition: August 9, 2019; Live Trial Testimony: August 29, 2019.

Testimony of Economic Expert on behalf of Marriott Vacations Worldwide Corporation, et al., In the Matter of *RCHFU, LLC, et al. v. Marriott Vacations Worldwide Corporation, et al.*, In the United States District Court for the Eastern District of Colorado, Civil Action No. 1:16-cv-01301-PAB-GPG, Deposition: July 12, 2019.

Testimony as Economic Expert on behalf of Oscar Insurance Company of Florida, In the Matter of *Oscar Insurance Company of Florida v. Blue Cross and Blue Shield of Florida, Inc., d/b/a/ Florida Blue; Health Options Inc., d/b/a/ Florida Blue HMO; and Florida Health Care Plan Inc., d/b/a/ Florida Health Care Plans*, In the United States District Court Middle District of Florida Orlando Division, Case No. 6:18-cv-01944, Live Preliminary Injunction Hearing Testimony: January 23, 2019.

Testimony as Economic Expert on behalf of Wilh. Wilhelmsen Holding ASA, In the Matter of the *Federal Trade Commission v. Wilh. Wilhelmsen Holding ASA Wilhelmsen Maritime Services As Resolute Fund II, L.P. Drew Marine Intermediate II B.V. and Drew Marine Group, Inc.*, In the United States District Court for the District of Columbia, No. 1:18-cv-

00414-TSC, Deposition: May 24, 2018; Live Trial Testimony: June 12, 2018; June 13, 2018.

Testimony as Economic Expert on behalf of Joint Sports Claimants, In the Matter of *Determination of Cable Royalty Funds*, United States Copyright Royalty Judges in the Library of Congress, Docket No. 14-CRB-0010-CD (2010-2013), Live Testimony: March 12, 2018.

Testimony as Economic Expert on behalf of Energy Solutions, Inc., In the Matter of the *United States of America v. Energy Solutions, Inc., Rockwell Holdco, Inc., Andrews County Holdings, Inc., and Waste Control Specialists, LLC*, In the United States District Court for the District of Delaware, Civil Action No. 16-cv-01056-SLR, Deposition: April 17, 2017; Live Trial Testimony: May 2, 2017; May 3, 2017.

Testimony as Economic Expert on behalf of Facebook, Inc., In the Matter of *Social Ranger, LLC v. Facebook, Inc.*, In the District Court of Delaware, C.A. No. 14-1525-LPS, Deposition: March 6, 2017.

Testimony as Economic Expert on behalf of Regal Entertainment Group, In the Matter of *iPic – Gold Class Entertainment, LLC et al., v. Regal Entertainment Group, AMC Entertainment Holdings, Inc., et al.*, In the District Court of Harris County, Texas, 234th Judicial District, No. 2015-68745, Deposition: January 12, 2016; February 15, 2017; Live Trial Testimony: January 21, 2016.

Testimony as Economic Expert on behalf of Anthem Inc., In the Matter of the *United States of America et al. v. Anthem Inc. and Cigna Corp.*, In the District Court of the District of Columbia, No. 16-cv-01493 (ABJ), Deposition: November 9, 2016; Phase 1 Live Trial Testimony: December 1, 2016; December 2, 2016; Phase 2 Live Trial Testimony: December 22, 2016.

Testimony as Economic Expert on behalf of Defendants, In the Matter of *Darren Ewert v. Nippon Yusen Kabushiki Kaisha et al.*, Supreme Court of British Columbia, No. S-134895, Deposition: September 14, 2016.

Testimony in Commercial Arbitration on Issues Related to Mobile Wireless Competition, New York, NY, April 12, 2016.

Testimony as Economic Expert on behalf of Federal Trade Commission, In the Matter of *Federal Trade Commission et al. v. Sysco Corporation and USF Holding Corp.*, Civil Action No. 15-cv-00256 (APM), Deposition: April 28, 2015; Live Trial Testimony: May 7, 2015; May 8, 2015; May 14, 2015.

Appearances in Federal Communications Commission, Economists Panels:

- Comcast/Time Warner, January 2015
- AT&T/T-Mobile, July 2011
- Comcast/NBCUniversal, August 2010

Appearance before California Public Utility Commission, Public Hearings on Comcast/Time Warner Merger, Los Angeles, April 2015.

Appearance as Economic Expert in front of Department of Justice, Federal Trade Commission, Federal Communications Commission, and State Regulatory Agencies in many additional transactions, including: Danaher/NetScout, AT&T/Leap Wireless, T-Mobile/MetroPCS, American Airlines/US Airways, SpectrumCo/Cox/Verizon Wireless, oneworld antitrust immunity application, PepsiCo/bottlers, Houghton Mifflin/Harcourt, Chicago Mercantile Exchange/Chicago Board of Trade.

EXPERT REPORTS, AFFIDAVITS, AND DECLARATIONS

Expert Report of Mark A. Israel, Ph.D., *In Re National Football League Sunday Ticket Antitrust Litigation*, In the United States District Court Central District of California, Case No. ML 15-02668-PSG (JEMx), November 4, 2022.

Expert Reports of Mark A. Israel, In the Matter of the *Competition Act*, R.S.C. 1985, c. C-34; and In the Matter of the proposed acquisition by Rogers Communications Inc. of Shaw Communications Inc.; and In the Matter of an application by the Commissioner of Competition for one or more orders pursuant to section 92 of the *Competition Act,* Between Commissioner of Competition and Rogers Communications Inc. and Shaw Communications Inc. and the Attorney General of Alberta and Videotron Ltd., the Competition Tribunal, CT-2022-002, Initial Report: September 23, 2022; Reply Report: October 20, 2022.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *City of Rockford, on behalf of itself and all others similarly situated v. Mallinckrodt ARD, Inc. formerly known as Questcor Pharmaceuticals, Inc., et al.*, In the United States District Court for the Northern District of Illinois Western Division, Case No. 3:17-cv-50107, October 17, 2022.

Expert Reports of Mark A. Israel, In the Matters of *United States of America, et al. v. Google LLC* (Case No. 1:20-cv-03010-APM), and *State of Colorado, et al. v. Google LLC* (Case No. 1-20-cv-03715-APM), In the United States District Court for the District of Columbia, Initial Report: June 4, 2022; Rebuttal Report: August 5, 2022; Reply Report: September 23, 2022.

Reports of Dr. Mark A. Israel, In the Matter of *Viamedia, Inc. v. Comcast Corporation and Comcast Cable Communications Management, LLC*, In the United States District Court for the Northern District of Illinois Eastern Division, Case No. 16-cv-5486, Rebuttal Report: November 30, 2017; Errata Sheet for Rebuttal Report: January 4, 2018; Rebuttal Report: September 21, 2022.

Expert Declaration of Mark Israel, In the Matter of *Phil Mickelson, Taylor Gooch, Hudson Swafford, et al. v. PGA Tour, Inc.*, In the United States District Court for the Northern District of California San Jose Division, Civil Action No. 5:22-cv-04486-BLF, August 7, 2022.

Expert Report of Mark A. Israel, Ph.D., In the Matter of *United States of America, et al. v. American Airlines Group Inc. and JetBlue Airways Corporation*, In the United States District Court for the District of Massachusetts, Civil Action No. 1:21-cv-11558-LTS, July 11, 2022.

Expert Reports of Mark A. Israel, Ph.D., *In Re Rail Freight Fuel Surcharge Antitrust Litigation*, In the United States District Court for the District of Columbia, MDL No. 1869, Case No. 07-489, Initial Report: April 15, 2021; Surrebuttal Report: May 10, 2022.

Expert Reports of Mark A. Israel, Ph.D., In the Matter of *Arconic Inc. v. Novelis Inc., Novelis Corp.*, In the United States District Court for the Western District of Pennsylvania, No. 2:17-CV-01434, Initial Report: February 11, 2022; Reply Report: March 18, 2022.

Verified Statement of Mark A. Israel, Ph.D., "Reciprocal Switching," Surface Transportation Board, Docket No. EP 711 (Sub-No. 1), February 14, 2022.

Expert Report of Mark A. Israel, In the Matter between *Sean Allott and Panasonic Corporation; Panasonic Corporation of North American; Panasonic Canada Inc.; KOA Corporation; KOA Speer Electronics, Inc., et al.,* In the Ontario Superior Court of Justice, Court File No. 1899-2015 CP, January 17, 2022.

Expert Reports of Mark A. Israel, Ph.D., *In Re Aluminum Warehousing Antitrust Litigation*, In the United States District Court Southern District of New York, MDL No. 2481, Initial Report: September 17, 2021; Supplemental Declaration: January 14, 2022.

Expert Report of Mark Israel, In the Matter of *Chase Manufacturing, Inc. d/b/a Thermal Pipe Shields v. Johns Manville Corporation*, In the United States District Court for the District of Colorado, Civil Action No. 1:19-cv-00872-MEH, November 20, 2021.

Affidavits in confidential arbitration regarding wholesale roaming rate for wireless telecommunications, Initial Affidavit: August 23, 2021; Reply Affidavit: November 15, 2021.

Expert Report of Mark A. Israel, In the Matter of *Bio-Rad Laboratories, Inc. and President and Fellow of Harvard College v. 10X Genomics, Inc., and 10X Genomics, Inc. v. Bio-Rad Labs., Inc. and President and Fellow of Harvard College as Counterclaimants*, In the United States District Court for the District of Massachusetts, Civil Action No. 1:19-cv-12533-wgy, May 14, 2021.

Expert Report of Mark A. Israel, In the Matter of *B & R Supermarket, Inc., d/b/a Milam's Market, Grove Liquors LLC, Strouk Group LLC, d/b/a Monsieur Marcel, and Palero Food Corp. and Cagueyes Food Corp., d/b/a Fine Fare Supermarket v. Mastercard International Inc., Visa Inc., Visa U.S.A., Inc., Discover Financial Services, and American Express Company*, In the United States District Court for the Eastern District of New York, Case No. 17-CV-02738 (MKB) (JO), March 22, 2021.

Expert Report of Dr. Mark A. Israel, In the Matter of *Joshua M. Harman Qui Tam v. Trinity Industries, Inc., et al.,* In the Commonwealth of Massachusetts, Superior Court Department, Civil Action No. 2014-02364-D, February 26, 2021.

Verified Statement of Mark Israel, "Review of Commodity, Boxcar, and TOFC/COFC Exemptions," Surface Transportation Board, Docket No. EP 704 (Sub-No. 1), January 29, 2021.

Expert Report of Mark A. Israel, Ph.D., *In Re Comtech/Gilat Merger Litigation*, Court of Chancery of the State of Delaware, Consolidated C.A. No. 2020-0605-JRS, September 24, 2020.

Declaration of Mark Israel and Allan Shampine, In the Matter of *AMC Networks Inc. v. AT&T Inc.*, Before the Federal Communications Commission, MB Docket No. 20-254, File No. CSR-8993, August 20, 2020.

Expert Report of Mark A. Israel, In the Matter between *Ryan Kett and Mitsubishi Materials Corporation, Mitsubishi Cable Industries, Ltd., Mitsubishi Shindoh Co., Ltd., Mitsubishi Aluminum Co., Ltd., Tachibana Metal Mfg. Co., Ltd., and Diamet Corporation,* In the Supreme Court of British Columbia, Case No. VLC-S-S-1813758, July 15, 2020.

Expert Reports of Mark A. Israel, Ph.D., In the Matter of *Federal Trade Commission v. Peabody Energy Corporation and Arch Coal, Inc.*, In the United States District Court for the Eastern District of Missouri, Civil Action No. 4-20-cv-000317-SEP, Initial Report: May 26, 2020; Reply Report: June 19, 2020.

Expert Reports of Mark A. Israel, Ph.D., *In Re Dealer Management Systems Antitrust Litigation*, United States District Court for the Northern District of Illinois Eastern Division, MDL 2817, No. 1:18-CV-864, Initial Report: August 26, 2019; Reply Report: December 19, 2019.

Expert Reports of Mark A. Israel, Ph.D., *In Re Domestic Airline Travel Antitrust Litigation*, United States District Court for the District of Columbia, MDL Docket No. 2656, Misc. No. 15-1404 (CKK), Initial Report: September 30, 2019; Rebuttal Report: November 14, 2019.

Expert Reports of Mark A. Israel, In the Matter of *DISH Network L.L.C. v. Turner Network Sales, Inc.*, JAMS Arbitration No. 1100103066, Initial Report: July 23, 2019; Reply Report: August 2, 2019.

Submission of Mark A. Israel, Maya Meidan, and Robert J. Calzaretta, Jr., "The Atlantic Joint Business Generates Substantial Consumer Benefits," Competition and Markets Authority, United Kingdom, July 1, 2019.

Submission of Philip Haile and Mark Israel, "Alternative Approaches to Airport Slot Allocation: Objectives and Challenges," Department for Transport, United Kingdom, June 20, 2019.

Submission of Mark A. Israel, Maya Meidan, and Robert J. Calzaretta, Jr., "The Atlantic Joint Business Has Not Harmed Competition on Nonstop Overlap Routes, Including Focus Routes," Competition and Markets Authority, United Kingdom, June 14, 2019.

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Submission of Mark Israel, "The Fidelity/Stewart Merger Does Not Raise Competitive Concerns in the New York Title Insurance Industry," Revised Section 1506 Application Regarding the Proposed Acquisition of Stewart Title Insurance Company by Fidelity National Financial, Inc., New York State Department of Financial Services, April 12, 2019.

Second Report of Dr. Mark A. Israel, Between *UK Trucks Claim Limited and (1) – (5) Fiat Chrysler Automobiles NV and (1) – (4) MAN Truck & Bus AG & ORS*, In the Competition Appeal Tribunal, Case No. 1282/7/7/18, April 11, 2019.

Expert Report of Mark A. Israel, In the Matter between *Ryan Kett, Erik Oun and Jim Wong and Kobe Steel, Ltd., Shinko Metal Products Co., Ltd., Shinko Aluminum Wire Co., Ltd., Shinko Wire Stainless Company, Ltd., Kobelco & Materials Copper Tube Co., and Nippon Koshuha Steel Co., Ltd.*, In the Supreme Court of British Columbia, Case No. S-1710805, March 28, 2019.

Expert Report of Dr. Mark A. Israel, Between *Road Haulage Association and (1) – (10) MAN SE and Others and (1) Daimler AG, (2) Volvo Lastvagnar Aktiebolag*, In the Competition Appeal Tribunal, Case No. 1289/7/7/18, March 22, 2019.

Submission of Robert J. Calzaretta, Jr., Mark A. Israel, and Maya Meidan, "Assessing the Effects of ATI and JV Overlaps on Nonstop Fares: An Event Study Approach," submitted as part of a Supplement to Joint Motion to Amend Order 2010-7-8 for Approval of and Antitrust Immunity for Amended Joint Business Agreement, In the Application of American Airlines, Inc., British Airways PLC, OpenSkies SAS, Iberia Líneas Aéreas de España, S.A., Finnair OYJ, Aer Lingus Group DAC, Before the U.S. Department of Transportation, Washington, DC, Docket DOT-OST-2008-0252-, January 11, 2019.

Declarations of Mark A. Israel, In the Matter of *Oscar Insurance Company of Florida v. Blue Cross and Blue Shield of Florida, Inc., d/b/a Florida Blue; Health Options Inc., d/b/a Florida Blue HMO; and Florida Health Care Plan Inc., d/b/a Florida Health Care Plans,* In the United States District Court Middle District of Florida Orlando Division, Case No. 6:18-cv-01944, Declaration: November 19, 2018; Supplemental Declaration: December 21, 2018.

Reply Declaration of Mark Israel, Michael Katz, and Bryan Keating, In the Matter of Applications of T-Mobile US, Inc. and Sprint Corporation, Consolidated Applications for Consent to Transfer Control of Licenses and Authorizations, Federal Communications Commission, WT Docket No. 18-197, September 17, 2018.

Expert Report of Gustavo Bamberger, Robert Calzaretta, and Mark Israel, In the Joint Application of Hawaiian Airlines, Inc. and Japan Airlines, Co., Ltd., Appendix 6 to "Joint Application for Approval of and Antitrust Immunity for Alliance Agreements," Department of Transportation, Case No. DOT-OST-2018-0084, June 13, 2018.

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Expert Report of Mark A. Israel, In the Matter of the *Federal Trade Commission v. Wilh. Wilhelmsen Holding ASA Wilhelmsen Maritime Services As Resolute Fund II, L.P. Drew*

Marine Intermediate II B.V. and Drew Marine Group, Inc., In the United States District Court for the District of Columbia, No. 1:18-cv-00414-TSC, May 11, 2018.

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Expert Report of Mark Israel and Bryan Keating, "Economic Analysis of Dr. Evans' Claims as They Relate to *Restoring Internet Freedom*," Federal Communications Commission, WC Docket No. 17-108, October 31, 2017.

Written Rebuttal Testimony of Dr. Mark A. Israel, In the Matter of *Distribution of Cable Royalty Funds*, Before the Copyright Royalty Judges, Washington, D.C., No. 14-CRB-0010-CD, September 15, 2017; Written Direct Testimony: December 22, 2016.

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Declarations of Mark Israel, Daniel Rubinfeld, and Glenn Woroch, "Analysis of the Regressions and Other Data Relied Upon in the Business Data Services FNPRM And a Proposed Competitive Market Test," Federal Communications Commission, WC Docket Nos. 16-143, 15-247, 05-25, RM-10593, Second Declaration: June 28, 2016; Third Declaration: August 9, 2016.

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Expert Report of Mark A. Israel, In the Matter of *La Crosse County, Individually, and on behalf of all others similarly situated v. Trinity Industries, INC. and Trinity Highway Products, LLC*, In the United States District Court, Western District of Wisconsin, Case No. 3:15-cv-00117-scl, May 27, 2016.

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Declaration of Mark Israel, Daniel Rubinfeld, and Glenn Woroch, "Competitive Analysis of the FCC's Special Access Data Collection," Federal Communications Commission, WC Docket No. 05-25, January 26, 2016.

Declaration of Dr. Mark Israel, In the Matter of *iPic – Gold Class Entertainment, LLC et al., v. Regal Entertainment Group, AMC Entertainment Holdings, Inc., et al.*, In the District Court of Harris County, Texas, 234th Judicial District, No. 2015-68745, January 18, 2016.

Declaration of Dennis Carlton, Mark Israel, Allan Shampine & Hal Sider, "Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans," Federal Communications Commission, WC Docket No. 15-247, January 7, 2016.

Declaration of Mark A. Israel, Attached to "Response of AT&T Mobility LLC to Notice of Apparent Liability for Forfeiture," Federal Communications Commission, File No. EB-IHD-14-00017504, July 17, 2015.

Reports in the Matter of *Federal Trade Commission et al. v. Sysco Corporation and USF Holding Corp.*, In the United States District Court for the District of Columbia, Civil Action No. 1:15-cv-00256 (APM), Declaration: February 18, 2015; Report: April 14, 2015; Rebuttal Report: April 21, 2015.

Declaration of Mark A. Israel, Bryan G. M. Keating, and David Weiskopf, "Economic Analysis of the Effect of the Comcast-TWC Transaction on Voice and Broadband Services in California," December 3, 2014.

Expert Report of Mark A. Israel, "Economic Analysis of the Effect of the Comcast-TWC Transaction on Broadband: Reply to Commenters," Federal Communications Commission, MB Docket No. 14-57, September 22, 2014.

Supplemental Declaration of Mark Israel and Allan Shampine, In the Matter of *Amendment of the Commission's Rules Related to Retransmission Consent, Appendix A to "Reply Comments of the National Association of Broadcasters*," Federal Communications Commission, MB Docket No. 10-71, July 24, 2014.

Declaration of Mark Israel and Allan Shampine, In the Matter of *Amendment of the Commission's Rules Related to Retransmission Consent, Appendix B to "Comments of the National Association of Broadcasters*," Federal Communications Commission, MB Docket No. 10-71, June 26, 2014.

Expert Report of Mark A. Israel, "Implications of the Comcast/Time Warner Cable Transaction for Broadband Competition," Federal Communications Commission, MB Docket No. 14-57, April 8, 2014.

Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Sprint's Proposed Weighted Spectrum Screen Defies Economic Logic and Is Inconsistent with Established Facts," Federal Communications Commission, WT Docket No. 12-269, March 14, 2014.

Reply Declaration of Mark A. Israel, "Competitive Effects and Consumer Benefits from the Proposed Acquisition of Leap Wireless by AT&T: A Reply Declaration," Federal Communications Commission, WT Docket No. 13-193, October 23, 2013.

Declaration of Mark A. Israel, "An Economic Analysis of Competitive Effects and Consumer Benefits from the Proposed Acquisition of Leap Wireless by AT&T," Federal Communications Commission, WT Docket No. 13-193, August 1, 2013.

Supplemental Reply Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Comments on Appropriate Spectrum Aggregation Policy with Application to the Upcoming 600 MHz Auction," Federal Communications Commission, WT Docket No. 12-269, June 13, 2013.

Reply Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Comment on the Submission of the U.S. Department of Justice Regarding Auction Participation Restrictions," Federal Communications Commission, WT Docket No. 12-269, June 13, 2013.

Reply Declaration of Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, "Spectrum Aggregation Policy, Spectrum-Holdings-Based Bidding Credits, and Unlicensed Spectrum," Federal Communications Commission, GN Docket No. 12-268, March 12, 2013.

Declaration of Igal Hendel and Mark A. Israel, "Econometric Principles That Should Guide the Commission's Analysis of Competition for Special Access Service," Federal Communications Commission, WC Docket No. 05-25, February 11, 2013.

Declarations of Mark A. Israel and Michael L. Katz, "Economic Analysis of Public Policy Regarding Mobile Spectrum Holdings," Federal Communications Commission, WT Docket No. 12-269, Declaration: November 28, 2012; Reply Declaration: January 7, 2013.

Declaration of Mark Israel, "An Economic Assessment of the Prohibition on Exclusive Contracts for Satellite-Delivered, Cable-Affiliated Networks," Federal Communications Commission, MB Docket Nos. 12-68, 07-18, & 05-192, September 6, 2012.

Expert Report of Mark Israel, "Implications of the Verizon Wireless & SpectrumCo/Cox Commercial Agreements for Backhaul and Wi-Fi Services Competition," Federal Communications Commission, WT Docket No. 12-4, August 1, 2012.

Expert Report of Mark A. Israel, Michael L. Katz, and Allan L. Shampine, "Promoting Interoperability in the 700 MHz Commercial Spectrum," Federal Communications Commission, WT Docket No. 12-69, July 16, 2012.

Affidavits of Dr. Mark A. Israel in the Matter of *Bloomberg L.P. v. Comcast Cable Communications, LLC*, Federal Communications Commission, MB Docket No. 11-104, Declaration: June 21, 2012; Declaration: June 8, 2012; Supplemental Declaration: September 27, 2011; Declaration: July 27, 2011.

Expert Report of Robert Willig, Mark Israel, Bryan Keating, and Jonathan Orszag, "Response to Supplementary Comments of Hubert Horan," Docket DOT-OST-2009-1055, October 22, 2010.

Expert Report of Robert Willig, Mark Israel, Bryan Keating, and Jonathan Orszag, "Measuring Consumer Benefits from Antitrust Immunity for Delta Air Lines and Virgin Blue Carriers," Docket DOT-OST-2009-1055, October 13, 2010.

Expert Report of Mark Israel and Michael L. Katz, "Economic Analysis of the Proposed Comcast-NBCU-GE Transaction," Federal Communications Commission, MB Docket No. 10-56, July 20, 2010.

Expert Report of Mark Israel and Michael L. Katz, "The Comcast/NBCU Transaction and Online Video Distribution," Federal Communications Commission, MB Docket No. 10-56, May 4, 2010.

Expert Report of Mark Israel and Michael L. Katz, "Application of the Commission Staff Model of Vertical Foreclosure to the Proposed Comcast-NBCU Transaction," Federal Communications Commission, MB Docket No. 10-56, February 26, 2010.

Expert Report of Robert Willig, Mark Israel, and Bryan Keating, "Competitive Effects of Airline Antitrust Immunity: Response of Robert Willig, Mark Israel, and Bryan Keating" in Docket DOT-OST-2008-0252, January 11, 2010.

Affidavit of Dr. Mark A. Israel on Class Certification in the Matter of Puerto Rican Cabotage Antitrust Litigation, in the United States District Court for the District of Puerto Rico, MDL Docket No. 3:08-md-1960 (DRD), December 10, 2009.

Expert Report of Robert Willig, Mark Israel, and Bryan Keating, "Competitive Effects of Airline Antitrust Immunity," Docket DOT-OST-2008-0252, September 8, 2009.

Expert Report and Supplemental Expert Report of Dennis W. Carlton and Mark Israel in the Matter of *Toys "R" Us-Delaware, Inc., and Geoffrey Inc. v. Chase Bank USA N.A.*, in American Arbitration Association New York, New York, Commercial Arbitrations No. 13-148-02432-08, Expert Report: February 27, 2009; Supplemental Expert Report: March 20, 2009.

Expert Reports of James Levinsohn and Mark Israel, In the Matter of *2006 NPM Adjustment Proceeding pursuant to Master Settlement Agreement*, October 6, 2008; January 16, 2009; March 10, 2009.

SELECTED OTHER EXPERT WORK IN REVIEW OF MERGERS/TRANSACTIONS

Successful merger of Sony's Cruncyhroll and AT&T's Funimation anime streaming platforms. 2021. Served as lead economic expert for AT&T. Made multiple presentations to DOJ, demonstrating lack of significant competitive interaction between the parties, including extremely limited consumer switching between them, as well as extensive competition with a broader marketplace including Netflix, Amazon, and others. DOJ closed the investigation allowing the merger to proceed with no conditions.

Successful acquisition of Innovative Industries, Inc. by Ex Libris. 2020. Served as lead economist in interactions with FTC. Demonstrated that the acquisition would not harm competition due to the *de minimis* extent of head-to-head competition between Ex Libris and Innovative and the recent decline of Innovative' s business. FTC closed investigation allowing acquisition to proceed with no conditions.

Successful acquisition of TD Ameritrade by Charles Schwab. 2020. Served as lead economist in interactions with DOJ. Presented analyses demonstrating broad market for investor dollars rather than narrow market for RIA Custodian Services. DOJ closed investigation allowing acquisition to proceed with no conditions.

Successful acquisition of Reinhart Foodservice by Performance Food Group Company. 2019. Served as lead economics expert on behalf of the parties in the FTC's investigation of the merger. Presented detailed data analyses showing ample competition and lack of harm to competition in any geographic market. FTC closed the investigation with no divestitures required in late 2019.

Successful acquisition of SGA's Food Group of companies by US Foods. 2019. Served as lead economic expert on behalf of the parties in the FTC's investigation of the merger. Presented detailed economics and econometric analyses showing ample competition and

lack of harm to competition in any geographic market. FTC cleared the merger subject to divestitures in three geographic markets in the Fall of 2019.

Successful acquisition of Time Warner by AT&T Inc. 2017-2019. Lead economist throughout the DOJ investigation. Then director of all economic work during trial, serving as the central connection point between all experts and counsel and directing development of all aspects of the economic case. Defendants ultimately prevailed in trial and the merger closed in June 2018.

Successful acquisition of Keystone Foods by Tyson Foods, Inc. 2018. Served as lead economic expert for U.S. jurisdiction. Presented economic analyses demonstrating that competition would remain strong post-merger. Ultimately, antitrust agencies in the U.S., China, Japan, and Korea cleared the transaction.

Successful acquisition of NEX Group PLC by CME Group Inc. 2018. Co-lead economic expert with Thomas Stemwedel. Presented several econometric analyses demonstrating that Treasury futures contracts and cash Treasury securities were economic complements rather than substitutes. Based heavily on these Compass Lexecon submissions, the DOJ and CMA closed their investigations without requiring any divestitures.

Successful acquisition of VCA Inc. by Mars, Inc. 2017. Co-lead economic expert with Mary Coleman. Made multiple presentations to FTC demonstrating ample competition in general, emergency, and specialty veterinary services, including econometric analyses showing lack of direct competitive impact of Mars and VCA on one another. Transaction was ultimately cleared subject to a small number of divestitures.

Successful acquisition of Mobileye by Intel. 2017. Served as lead economic expert for Intel. Assisted counsel in preparing FTC presentations and materials demonstrating lack of significant head-to-head competition and lack of valid vertical foreclosure theories. Investigation was closed without Second Request.

FTC litigation against DraftKings, Inc. and FanDuel Inc. (Civil Action No. 17-cv-1195 (KBJ)). 2017. Served as lead economic expert for FTC and prepared to serve as FTC's testifying expert against the merger, prior to the parties' abandonment of the proposed merger. Developed economic and econometric evidence that the merging parties were closest

substitutes and thus likely would have increased prices as a result of their proposed merger.

Successful merger of ASE Group and SPIL. 2017. Lead economic expert on behalf of ASE Group. Submitted reports and testified to the Taiwan Fair Trade Commission, which ultimately cleared the transaction, then made multiple presentations to U.S. FTC, which also cleared the transaction. Economic analyses focused on implications of profit margins for market definition and competitive effects, ultimately demonstrating that the transaction was unlikely to cause significant harm to competition.

Successful acquisition of Alarm.com of two business units (Connect and Piper) from iControl Networks. 2017. Led team that demonstrated substantial and growing competition in home security and connected home marketplace and thus lack of competitive harm from acquisition. Work focused on importance of downstream market definition as well as empirical evidence of impact of competition on Alarm.com pricing and profitability.

Successful acquisition of Samsung Electronics, Ltd.'s printer business by HP Inc. 2016. Led team in evaluating the competitive effects of the acquisition, including assessing shares and competitive effects in overlap areas. Notably, the transaction gained regulatory approval in the U.S. during the initial review period without issuing a Second Request.

Successful acquisition of Sun Products Corp. by Henkel AG. 2016. Led team demonstrating lack of competitive impact despite overlaps in laundry detergent and related products.

Successful acquisition of Starwood Hotels & Resorts by Marriott International. 2016. Led team that performed detailed analysis of competitive conditions, extensive econometric analysis of pricing, and full review of Marriott's internal pricing models to demonstrate that Starwood and Marriott were not close competitors, combined ownership of the brands would not lead to upward pricing pressure, and competition would remain robust post-merger.

Successful acquisition of PR Newswire by GTCR. 2016. Lead economic expert for GTCR. Made presentations to DOJ showing lack of competitive harm from the transaction, based on detailed analysis of win/loss data, including calculations showing no possible upward pricing pressure (UPP) concerns regardless of the level of margins.

Successful acquisition of Schurz Communications' Broadcast Stations by Gray Television. 2015. Lead economic expert for Gray. Made presentations to DOJ demonstrating output expanding effects of proposed transaction in light of the scale economies in television production and advertising and the small size of the DMAs affected by the transaction.

Successful acquisition of the Communications Business of Danaher Corporation by NetScout Systems. 2015. Lead economic expert for NetScout. Made presentations to DOJ describing proper economic framework for analysis of competition and potential merger harms, and demonstrated that the presence of multiple viable competitors and numerous other credible threats to be used by powerful buyers in a dynamic industry made theories of anti-competitive harm from the merger implausible.

Successful acquisition of Windmill Distribution Co. by Manhattan Beer Distributors. 2015. Lead economic expert for Manhattan Beer Distributors. Submitted White Paper to DOJ demonstrating, based on margin data, that the merger would be highly unlikely to lead to anti-competitive effects. Transaction was granted early termination from the Hart Scott Rodino process by the DOJ.

Proposed acquisition of Time Warner Cable by Comcast Corporation. 2014-2015. Served as lead economic expert on broadband issues on behalf of Comcast Corporation. Submitted multiple Declarations and made multiple presentations to DOJ and FCC, explaining lack of horizontal, bargaining, or vertical/foreclosure concerns with regard to broadband competition as a result of the transaction.

Successful acquisition of Leap Wireless by AT&T. 2014. Lead economic expert for AT&T. Submitted multiple Declarations to FCC and made presentation to DOJ, demonstrating the transaction would generate substantial consumer benefits, while generating at most minimal upward pricing pressure in a properly defined mobile wireless services market and no issues related to spectrum concentration or other competitive concerns.

Successful merger of American Airline and US Airways. 2013. Lead consulting expert, managing Compass Lexecon team of over 25 economists supporting multiple experts. Made multiple presentations to DOJ, worked on expert reports in litigation, and assisted counsel with the analysis leading to settlement of litigation, permitting transaction to close.

Successful merger of T-Mobile USA and MetroPCS. 2013. Lead economic expert for T-Mobile USA. Conducted economic analyses of competitive effects of the transaction, as well as consumer benefits from reduced costs and increased network quality. Presented analyses to both DOJ and FCC.

FTC investigation of acquisition of Dollar Thrifty Automotive Group by Hertz. 2012. Served as a lead economic expert for FTC and prepared to serve as FTC's testifying expert against the merger, prior to case settlement. Conducted empirical analyses based on previous rental car mergers demonstrating likely price increases from the transaction.

Decision by Federal Communications Commission not to extend the ban on exclusive contracts for satellite-delivered, cable-affiliated networks. 2012. Lead economic expert for National Cable and Telecommunications Association. Submitted economic analysis demonstrating that the ban on exclusive distribution of satellite-delivered, cable affiliated networks is no longer warranted given increased marketplace competition. FCC made decision to allow the ban to sunset.

Successful sale of wireless spectrum by SpectrumCo and Cox ("Cable Companies") to Verizon Wireless and successful completion of related commercial agreements. 2012. On behalf of the Cable Companies, performed economic analyses demonstrating lack of competitive harm from the transaction on markets for backhaul and Wi-Fi services. Presented analyses to FCC.

Successful acquisition by LIN Media of broadcast television stations from NVTV. 2012. Lead economic expert for LIN Media. Prepared economic analysis demonstrating lack of competitive concern over potential issues related to Shared Service and Joint Sale Arrangements.

Proposed acquisition of T-Mobile USA by AT&T. 2011. Served as one of the lead economists, initially for T-Mobile (along with Michael Katz) and ultimately for both parties (along with Michael Katz and Dennis Carlton). Made multiple presentations to DOJ and FCC. Appeared in FCC Workshop, ex parte meeting.

S*uccessful application for antitrust immunity by Delta and Virgin Blue*. 2010. Together with Robert Willig, Bryan Keating, and Jon Orszag, prepared economic analyses

demonstrating substantial net consumer benefits from antitrust immunity. Submitted results in expert reports to Department of Transportation.

Successful joint venture between Comcast and NBC Universal (and ultimate full acquisition of NBC Universal by Comcast). 2010. Served as one of the lead economists (along with Michael Katz) on behalf of the merging parties. Wrote multiple reports submitted to FCC (with Michael Katz) demonstrating lack of significant competitive concerns from the transaction. Made multiple presentations to DOJ and FCC. Appeared in FCC Workshop of economists, ex parte meeting.

Successful application for antitrust immunity for oneworld alliance and associated joint venture of American Airlines, British Airways, and Iberia Airlines. 2009-2010. Together with Robert Willig and Bryan Keating, prepared economic analyses demonstrating substantial net consumer benefits associated with antitrust immunity for the joint venture. Submitted results in expert reports to Department of Transportation.

Successful acquisition by PepsiCo of bottlers, PBG and PAS. 2009. Performed econometric and simulation analyses demonstrating pro-competitive effect of merger on PepsiCo's own brands, other brands distributed by PBG and PAS, and overall marketplace. Presented results to FTC (together with Dennis Carlton).

Successful merger of Delta Airlines and Northwest Airlines. 2008. In support of Dennis Carlton, developed empirical and theoretical analyses to demonstrate merger's pro-competitive nature. Work focused on (ultimately settled) private litigation opposing the merger.

Successful acquisition of Harcourt Education by Houghton Mifflin. 2007. Along with Daniel Rubinfeld and Frederick Flyer, developed econometric analyses demonstrating lack of competitive harm from proposed merger. Presented results to DOJ.

Successful acquisition of Chicago Board of Trade by Chicago Mercantile Exchange. 2007. Along with Robert Willig and Hal Sider, developed and presented multiple empirical analyses demonstrating lack of competitive harm from merger. Submitted multiple white papers and made multiple presentations to DOJ.

SELECTED OTHER EXPERT/CONSULTING WORK

Led team supporting Dennis Carlton's testimony in Toshiba/Hannstar TFT-LCD Antitrust litigation vs. Plaintiff Best Buy, 2013.

Led team supporting Dennis Carlton's testimony in Toshiba's TFT-LCD Class Action Antitrust litigation. Named Litigation Matter of the Year for 2012 by *Global Competition Review*, 2012.

As economic expert for US Airways, developed econometric analysis of air traffic at major US airports, presented to Philadelphia Airport management team, 2011.

Prepared analysis of the competitive impact of low-cost-carrier competition in Washington, D.C. and New York airports. Filed with DOT, 2011.

ON BEHALF OF MAJOR PHARMACEUTICAL FIRM, DEVELOPED ECONOMETRIC MODEL TO FORECAST PHARMACEUTICAL EXPENDITURES, 2009.

Developed econometric model to measure of the importance of network effects in credit cards in the context of measuring damages incurred by a major credit card issuer, 2007-2008.

OTHER CONFIDENTIAL CONSULTING WORK IN THE FOLLOWING INDUSTRIES

Automobiles and Components

Consumer Durables

Consumer Services

Financial Services

Energy

Food, Beverage, and Tobacco

Healthcare Equipment and Services

Media

Pharmaceuticals, Biotechnology, and Life Sciences

Retail

Semiconductors and Semiconductor Equipment

Software and Related Services

Technology: Hardware and Equipment

Telecommunication Services

Transportation

Utilities

PUBLICATIONS

"New Merger Guidelines Should Keep the Consumer Welfare Standard" (with Jonathan Orszag and Jeremy Sandford), *CPI Antitrust Chronicle*, November 2022.

"The Economics of the LCD Cartel: Organization, Incentives, and Practical Challenges," *Cartels Diagnosed: New Insight on Collusion* (with Dennis W. Carlton, Ian MacSwain, and Allan Shampine), available at *https://ssrn.com/abstract=4190535*, August 15, 2022.

"Cheap Exclusion In Markets with Multiple Complements," (with Erica Benton and Daniel P. O'Brien), available at *https://ssrn.com/abstract=4328818*, April 1, 2022.

"A Retrospective Analysis of the AT&T/Time Warner Merger" (with Dennis W. Carlton, Georgi V. Giozov, and Allan L. Shampine), Forthcoming in the *Journal of Law and Economics*, available at *https://ssrn.com/abstract=3911492*, October 1, 2021.

"Vertical Mergers with Bilateral Contracting and Upstream and Downstream Investment," (with Daniel P. O'Brien), available at *https://ssrn.com/abstract=3886048*, July 15, 2021.

"International Broadband Price Comparisons Tell Us Little about Competition and Do Not Justify Broadband Regulation," working paper (with Michael Katz and Bryan Keating), commissioned by NCTA – The Internet & Television Association, May 11, 2021.

"Effects of the 2010 Horizontal Merger Guidelines on Merger Review: Based on Ten Years of Practical Experience," (with Dennis W. Carlton), Volume 58, Issue 2, in the *Review of Industrial Organization*, March 2021.

"Lessons from *AT&T/Time Warner,*" (with Dennis W. Carlton and Allan L. Shampine), *Competition Policy International*, July 2019.

"Are You Pushing Too Hard? Lower Negotiated Input Prices as a Merger Efficiency," (with Thomas A. Stemwedel and Ka Hei Tse), Volume 82, Issue 2, Pages 623-642, in the *Antitrust Law Journal*, April 2019.

"Vertical Integration in Multichannel Television Markets: Revisiting Regional Sports Networks Using Updated Data," (with Georgi Giozov, Nauman Ilias, and Allan Shampine), Volume 4:1 in *The Criterion Journal on Innovation*, 2019.

"Are Legacy Airline Mergers Pro- or Anti-Competitive? Evidence from Recent U.S. Airline Mergers," (with Dennis Carlton, Ian MacSwain, and Eugene Orlov), Volume 62, Pages 58-95, in the *International Journal of Industrial Organization*, January 2018.

"Competitive Effects of International Airline Cooperation," (with Robert J. Calzaretta and Yair Eilat), Volume 13, Issue 3, Pages 501-548, in the *Journal of Competition Law & Economics*, September 2017.

"Econometrics and Regression Analysis," (with Chris Cavanagh, Paul Denis, and Bryan Keating), Chapter 6 in the *American Bar Association's Proving Antitrust Damages: Legal and Economic Issues, Third Edition*, 2017.

"Do Premiums Increase After Health Insurance Mergers? – A Reassessment of Guardado Et Al.'s Findings," (with Robert C. Bourke, Ben Wagner, and David A. Weiskopf), available at *https://ssrn.com/abstract=2933062*, March 16, 2017.

"Complementarity without Superadditivity," (with Steven Berry, Philip Haile, and Michael Katz), Volume 151, Pages 28-30, in *Economics Letters*, February 2017.

"Antitrust in a Mobile World," (with Yonatan Even, Jonathan M. Jacobson, Scott Martin, and Dr. Helen Weeds), Chapter 17 of *International Antitrust Law & Policy: Fordham Competition Law 2015*, Edited by James Keyte, Juris Publishing, Inc., 2016.

"Buyer Power in Merger Review," (with Dennis W. Carlton and Mary Coleman), Chapter 22 of *The Oxford Handbook of International Antitrust Economics*, Volume 1, Roger D. Blair and D. Daniel Sokol, eds, Oxford University Press, 2015.

"The Evolution of Internet Interconnection from Hierarchy to 'Mesh': Implications for Government Regulation," (with Stanley M. Besen), *Information Economics and Policy*, December 2013.

"Airline Network Effects and Consumer Welfare," (with Bryan Keating, Dan Rubinfeld, and Robert Willig), *Review of Network Economics*, November 2013.

"The Delta-Northwest Merger: Consumer Benefits from Airline Network Effects (2008)," (with Bryan Keating, Daniel L. Rubinfeld, and Robert D. Willig), *The Antitrust Revolution*, Sixth Edition, Edited by John E. Kwoka, Jr. and Lawrence J. White, Oxford University Press, New York, July 2013.

"Proper Treatment of Buyer Power in Merger Review," (with Dennis W. Carlton), *Review of Industrial Organization*, July 2011.

"Response to Gopal Das Varma's Market Definition, Upward Pricing Pressure, and the Role of the Courts: A Response to Carlton and Israel," (with Dennis W. Carlton), *The Antitrust Source*, December 2010.

"Will the New Guidelines Clarify or Obscure Antitrust Policy?" (with Dennis W. Carlton), *The Antitrust Source,* October 2010.

"Should Competition Policy Prohibit Price Discrimination?" (with Dennis W. Carlton), *Global Competition Review*, 2009.

"The Empirical Effects of Collegiate Athletics: An Update Based on 2004-2007 Data," (with Jonathan Orszag), Paper commissioned by National Collegiate Athletic Association, available *at* http://www.epi.soe.vt.edu/perspectives/policy_news/pdf/NCAASpending.pdf, February 2009.

"Services as Experience Goods: An Empirical Examination of Consumer Learning in Automobile Insurance," *The American Economic Review*, December 2005.

"Tenure Dependence in Consumer-Firm Relationships: An Empirical Analysis of Consumer Departures from Automobile Insurance Firms," *The Rand Journal of Economics*, Spring 2005.

"The Impact of Youth Characteristics and Experiences on Transitions Out of Poverty," (with Michael Seeborg), *Journal of Socio-Economics*, 1998.

"Racial Differences in Adult Labor Force Transition Trends," (with Michael Seeborg), *Journal of Economics*, 1994.

SELECTED RECENT PRESENTATIONS

American Bar Association Section of Antitrust Law, "Nuts & Bolts of Presenting Economic Evidence to the Agencies: Common Pitfalls and Best Practices, Panelist, October 2019.

Dechert LLP, 2019 Annual Antitrust Spring Seminar, Keynote Speaker, March 2019.

Concurrences Review and The George Washington University Law School, 6th Bill Kovacic Antitrust Salon: Where is Antitrust Policy Going?, "A Judge's Eye View on Antitrust: Mergers, Cartels, Remedies…," Panelist, September 2018.

Fordham Competition Law Institute, 45th Annual Conference on International Antitrust Law and Policy, "Merger Remedies," Panelist, September 2018.

Georgetown Center for Business and Public Policy, "Airline Competition Conference," Panelist, July 2017.

J.P. Morgan Special Situations Investor Forum, "The Antitrust Merger Review Process," Panelist, March 2017.

American Bar Association Section of Antitrust Law, "Economic Issues Raised In The Comcast – Time Warner Cable Merger," Panelist, February 2016.

Fordham Competition Law Institute, 42nd Annual Conference on International Antitrust Law and Policy, "Antitrust in a Mobile World," Panelist, October 2015.

American Bar Association Section of Antitrust Law, "Merger Practice Workshop," Faculty Member, October 2015.

Searle Center Conference on Antitrust Economics and Competition Policy, Panel on Recent Transactions in the Telecom Industry, Panelist, September 2015.

National Bureau of Economic Research, Summer Institute 2015, Industrial Organization Meetings, "Panel Discussion of the Comcast-Time Warner Merger," Panelist, July 2015.

Federal Communications Bar Association, "How the Antitrust Agencies and the FCC are Likely to Analyze Vertical Mergers," Panelist, November 2014.

The Coca Cola Company Global Antitrust Forum, "Round Table Discussion on Use of Economics and Economists," Panel Chair, November 2014.

Compass Lexecon Competition Policy Forum, Lake Como Italy, "Consolidation of the Telecoms Industry in the EU and the U.S.," Panelist, October 2014.

The IATA Legal Symposium 2014, Aviation Law: Upfront and Center, "Merger Analysis – A sudden shift in approach by DOJ in the American Airlines and US Airways merger," Panelist, February 2014.

Georgetown Law 7th Annual Global Antitrust Enforcement Symposium, "Merger Enforcement and Policy," Panelist, September 2013.

American Bar Association Section of Antitrust Law, "Airline Mergers: First Class Results or Middle-Seat Misery?" Panelist, May 2013.

American Bar Association Section of Antitrust Law, "Go Low or Go Home! Monopsony a Problem?" Panelist, March 2012.

Federal Communications Bar Association Transactional Committee CLE Seminar, "The FCC's Approach to Analyzing Vertical Mergers," Panelist, October 2011.

The Technology Policy Institute Aspen Forum, "Watching the Future: The Economic Implications of Online Video," Panelist, August 2011.

American Bar Association Forum on Air & Space Law, 2011 Update Conference, "Antitrust Issues: What's on the Horizon for the Industry," Panelist, February 2011.

American Bar Association Section of Antitrust Law, "Antitrust in the Airline Industry," Panelist, September 2010.

GRANTS AND HONORS

Searle Fund for Policy Research Grant, 2004-2006, for "An Empirical Examination of Asymmetric Information in Insurance Markets."

Kellogg School of Management Chairs' Core Course Teaching Award, 2003 & 2005.

Bradley Dissertation Fellowship, Stanford University, 1999-2000.

Stanford University, Outstanding Second Year Paper Prize, 1997.

ADVISORY, EDITORIAL, AND TRUSTEE BOARDS

Global Competition Review, Editorial Board, Member

Holton-Arms School, Board of Trustees, Trustee

Illinois Wesleyan University, Board of Trustees, Trustee

ATTACHMENT B: MATERIALS RELIED UPON

Academic Literature & Texts

Almeida, Fernando, and José Cruz, "Mitigation of Security Concerns of VoIP in the Corporate Environment." In Organizational, Legal, and Technological Dimensions of Information System Administration, edited by Portela, Irene Maria, and Fernando Almeida, IGI Global, 2014

Kumar, Anuj, "Security and Risk Challenges of Voice over IP Telephony," *International Journal of Electronics Engineering*, 3(1), 2011

Guffey, Mary Ellen and Dana Loewy, "Essentials of Business Communication." 10th Ed., Cengage Learning, 2014

Data

FCC Study Area maps (https://www.fcc.gov/economics-analytics/industry-analysis-division/study-area-boundary-data, https://www.fcc.gov/file/18873/download)

CPUC fixed and mobile broadband maps: (https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/broadband-mapping-program/cpuc-annual-collected-broadband-data)

FCC Voice Telephone Services: Status as of December 31, 2020 (https://www.fcc.gov/voice-telephone-services-report)

Census 2020 population estimates (https://www2.census.gov/geo/tiger/TIGER2020/TABBLOCK20/)

Census TIGER Tribal Block Group national shapefiles (www2.census.gov/geo/pdfs/maps-data/data/tiger/tgrshp2020/TGRSHP2020_TechDoc.pdf)

Census Data on Rural Census Blocks (https://www2.census.gov/geo/tiger/TIGER_RD18/LAYER/TABBLOCK20/)

AT&T POTS business data (POTS_Report_Consumer_ao12312022_anon_v2.xlsx)

AT&T POTS customer data (POTS_Report_Busines_ao12312022_anon.xlsx)

AT&T Competitive Intelligence Reports, January 2023

AT&T California ILEC Guidebook (https://cpr.att.com/pdf/ca/a005.pdf)

AT&T Data on Switched Access Lines

Census data on the Number of Households (https://www.census.gov/data/tables/time-series/demo/families/households.html)

Census American Community Survey Data in Household Racial and Ethnic Composition (https://data.census.gov/table?q=B11001H&d=ACS+5-Year+Estimates+Detailed+Tables)

Census American Community Survey Data in Household Income (https://data.census.gov/table?q=B19013&d=ACS+5-Year+Estimates+Detailed+Tables&tid=ACSDT5Y2021.B19013)

Census ACS definitions (https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2021_ACSSubjectDefinitions.pdf)

FCC Reports and Information

FCC 2022 Communications Marketplace Report, FCC 22-103, December 30, 2022 (https://www.fcc.gov/document/2022-communications-marketplace-report)

FCC 2018 Broadband Deployment Report (https://docs.fcc.gov/public/attachments/FCC-18-10A1.pdf)

FCC Press Release, "FCC Approves Merger of T-Mobile and Sprint," November 5, 2019 (https://docs.fcc.gov/public/attachments/DOC-360637A1.pdf)

FCC Local Telephone Competition Status as of December 31, 2005 (https://docs.fcc.gov/public/attachments/DOC-266595A1.pdf)

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ATTACHMENT C: SUMMARIES OF FACILITIES-BASED FIXED AND MOBILE COVERAGE OF AT&T CALIFORNIA'S SERVICE TERRITORY: RURAL AREAS, TRIBAL LANDS, LOW INCOME, AND LOW PERCENTAGE OF NON-HISPANIC WHITE HOUSEHOLDS

Table 5: Facilities-Based Fixed and Mobile Broadband Coverage of AT&T California's POTS Service Territory (Rural Areas)

	Census Blocks	Population	AT&T POTS Residential Customers	AT&T POTS External Business Customers
AT&T's POTS Service Territory	80,974	1,567,200	89,789	40,466
Fixed or Mobile Broadband Carriers Other than AT&T POTS				
1+	78,945 *97.5%*	1,558,598 *99.5%*	88,632 *98.7%*	40,176 *99.3%*
2+	76,676 *94.7%*	1,537,468 *98.1%*	86,882 *96.8%*	39,505 *97.6%*
3+	71,407 *88.2%*	1,508,479 *96.3%*	82,574 *92.0%*	37,886 *93.6%*

Sources: Census maps and population estimates 2020, FCC Study Areas maps, CPUC fixed and mobile broadband maps, AT&T POTS customer data.

Table 6: Facilities-Based Fixed and Mobile Broadband Coverage of AT&T California's POTS Service Territory (Tribal Lands)

	Census Blocks	Population	AT&T POTS Residential Customers	AT&T POTS External Business Customers
AT&T's POTS Service Territory	653	12,535	281	651
Fixed or Mobile Broadband Carriers Other than AT&T POTS				
1+	645	12,506	281	651
	98.8%	*99.8%*	*100.0%*	*100.0%*
2+	633	12,475	281	651
	96.9%	*99.5%*	*100.0%*	*100.0%*
3+	574	10,878	213	636
	87.9%	*86.8%*	*75.8%*	*97.7%*

Sources: Census maps and population estimates 2020, FCC Study Areas maps, CPUC fixed and mobile broadband maps, AT&T POTS customer data, Tribal Lands maps.

Table 7: Facilities-Based Fixed and Mobile Broadband Coverage of AT&T California's POTS Service Territory (Areas in the Bottom Quartile of Median Income)

	Census Blocks	Population	AT&T POTS Residential Customers	AT&T POTS External Business Customers
AT&T's POTS Service Territory	88,449	6,725,338	110,467	142,478
Fixed or Mobile Broadband Carriers Other than AT&T POTS				
1+	87,497 *98.9%*	6,712,622 *99.8%*	109,859 *99.4%*	142,249 *99.8%*
2+	86,408 *97.7%*	6,695,347 *99.6%*	108,859 *98.5%*	141,857 *99.6%*
3+	83,376 *94.3%*	6,659,621 *99.0%*	106,928 *96.8%*	139,465 *97.9%*

Sources: Census maps and population estimates 2020, FCC Study Areas maps, CPUC fixed and mobile broadband maps, AT&T POTS customer data, American Community Survey.

Table 8: Facilities-Based Fixed and Mobile Broadband Coverage of AT&T California's POTS Service Territory (Areas in the Bottom Quartile of Percentage Non-Hispanic White Households)

	Census Blocks	Population	AT&T POTS Residential Customers	AT&T POTS External Business Customers
AT&T's POTS Service Territory	88,315	10,124,196	125,893	146,738
Fixed or Mobile Broadband Carriers Other than AT&T POTS				
1+	88,166	10,112,826	125,893	146,605
	99.8%	*99.9%*	*100.0%*	*99.9%*
2+	88,107	10,098,841	125,892	146,496
	99.8%	*99.7%*	*100.0%*	*99.8%*
3+	86,905	10,075,766	125,800	144,992
	98.4%	*99.5%*	*99.9%*	*98.8%*

Sources: Census maps and population estimates 2020, FCC Study Areas maps, CPUC fixed and mobile broadband maps, AT&T POTS customer data, American Community Survey.

ATTACHMENT B

COLR RELIEF IN AT&T'S OTHER ILEC STATES

Alabama: Ala. Code § 37-2A-8 (relieving incumbent local exchange carriers of their "obligation to provide basic telephone service unless the incumbent local exchange carrier elects to retain the obligation and notifies the Public Service Commission")

Arkansas: 1997 Ark. Acts 77 (establishing telecommunications providers' state obligations, which do not include COLR requirements)

Florida: Fla. Stat. § 364.011 (exempting basic service from the oversight of the Florida Public Service Commission)

Georgia: Ga. Code Ann. §§ 46-5-1, 46-5-165, 46-5-169 (allowing telecommunications companies not receiving universal access funds to elect alternative regulation in order to discontinue basic service, including COLR obligation, upon notice to state commission)

Illinois: 220 Ill. Comp. Stat. 5/13-406(b), 13-406.1 (permitting certain telecommunications providers to discontinue basic service, including COLR obligation, after notifying state commission and customers)

Indiana: Ind. Code § 8-1-32.4-17 (permitting ILECs to withdraw as providers of last resort upon notice to state commission)

Kansas: Kan. Stat. § 66-2005 (deregulating telecommunications services)

Kentucky: Ky. Rev. Stat. Ann. § 278.5435 (deregulating retail telecommunications services)

Louisiana: *Petition for Modification of Rules & Regul. Necessary To Achieve Regul. Parity & Modernization*, General Order, Docket No. R-31839, 311 P.U.R. 4th 342 (La. PSC 2014) (granting request to eliminate AT&T Louisiana's COLR obligation)

Michigan: Mich. Comp. Laws § 484.2313 (permitting telecommunications providers to discontinue basic service, including COLR obligation, after notice to state commission, customers, and the public)

Mississippi: Miss. Code. Ann. § 77-3-35 (deregulating telecommunications providers' retail services)

Missouri: Mo. Rev. Stat. § 392.611 (deregulating retail telecommunications services provided to end-user customers)

Nevada: *Application of Nev. Bell Tel. Co. d/b/a AT&T Nev. & AT&T Wholesale for Relief from Designation as a Provider of Last Resort in Portions of Nev. Pursuant to NRS 704.68886*, Docket No. 16-03021, Order, 2016 Nev. PUC LEXIS 144 (2016) (approving application for relief from designation as a provider of last resort except in limited portions of its service territory)

North Carolina: N.C. Gen. Stat. §§ 62-110, 62-133.5 (permitting local exchange carriers to elect alternative regulation without COLR obligations upon notice to state commission)

Ohio: *Comm'n's Rev. of Ohio Adm. Code 4901:1-6 Regarding Tel. Co. Procs. & Standards*, Case No. 14-1554-TP-ORD, Fourth Supplemental Finding and Order, 2022 WL 3368482, at *1 (Ohio P.U.C. 2022) (allowing providers to withdraw from COLR obligations pursuant to Ohio Rev. Code §§ 4927.10 and 4927.102 and 2022 Ohio Laws File 127 § 3 (Sub. H.B. 430))

Oklahoma: Okla. Admin. Code § 165:55-13-12 (designating as COLRs only ILECs "serving fewer than seventy-five thousand access lines")

South Carolina: S.C. Code Ann. § 58-9-576 (authorizing local exchange companies to elect alternative regulation without COLR obligation upon notice to state commission and customers)

Tennessee: 2013 Tenn. Pub. Acts 61 § 1 (removing COLR obligations)

Texas: *Sw. Bell Tel. Co. d/b/a AT&T Texas' Petition for a Certificate of Operating Auth. & To Rescind Its Certificate of Convenience & Necessity*, Docket No. 42741, Order, 2014 WL 5524286 (Tex. P.U.C. 2014) (deregulating AT&T Texas, thereby relieving it of provider of last resort obligations pursuant to Tex. Util. Code Ann. § 65.102)

Wisconsin: Wis. Stat. § 196.503 (sunsetting provider of last resort obligations in the state in 2013)