

# It's Working:

How the Internet Access and  
Online Video Markets  
Are Thriving in the Title II Era

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### Abstract

Financial and marketplace evidence demonstrates that the FCC's 2015 *Open Internet Order* is an absolute success, accomplishing its stated goal of preserving and promoting the online ecosystem's "virtuous cycle of investment." ISP investments accelerated following the vote (*e.g.*, aggregate capital expenditures by publicly traded ISPs have risen by more than 5 percent during the two-year period since the FCC's February 2015 vote; investments in core network technology at cable companies during that same time period are up by more than 48 percent). Investments in the edge, including those by online video providers and edge computing firms, are up as well (*e.g.*, capital expenditures by firms in the U.S. data-processing sector increased 26 percent in the year following the FCC's order while there was just 4 percent growth in the year prior). More new U.S. "over-the-top" video services launched in the two years following the vote than in the seven years prior. Furthermore, the certainty the FCC's action created spurred the entry of numerous pay-TV full replacement providers, with vertical carriers such as AT&T now distributing (and others poised to distribute) their pay-TV services via other ISPs' last mile networks.

In sum, the 2015 *Open Internet Order* and accompanying legal classification decision settled the prior uncertainty about open, nondiscriminatory broadband telecom service access. What followed that decision was a historic period of U.S. investment and innovation.

## Executive Summary

The U.S. broadband market is thriving. So are a wide variety of internet economy sectors, including the online video market and related markets. All of them are humming along nicely more than two years after the Federal Communications Commission voted to adopt Net Neutrality rules and reclassify broadband internet access as a Title II telecommunications service. Investments, capacities, revenues and subscribership are all at historic highs and are poised to continue this meteoric rise as the markets transition into the gigabit era.

To those who follow these industries closely, this growth comes as no surprise. The restoration of the FCC's authority under Title II of the Communications Act, and the adoption of the strong Net Neutrality rules that using this law makes possible, were positive developments in all respects. These FCC decisions brought certainty to all participants in these markets. Broadband carriers have clarity about their legal obligations. Just as importantly, the people and businesses that rely on broadband internet access have clarity about their rights. Whether they use the internet to conduct commerce, communicate with each other, organize for change, or produce or access news and media sources, internet users can be certain that carriers will transmit their data in a reasonably nondiscriminatory manner just as Title II requires.

By all metrics, the FCC's February 2015 Open Internet policy is a smashing success. And up until a few months ago, it was a settled matter. But with President Trump's appointment of longtime Net Neutrality foe Ajit Pai to chair the FCC, this successful policy is now under attack. Ideologues like Pai are peddling the demonstrably false claim that Title II has reduced investment. Their facts are wrong, and offered up as "proof" of an entirely implausible theory: that the mere possibility of future FCC intervention in the broadband internet access market would overcome all other positive market forces and create a decline in capital investment. This elusive future investment-crushing intervention would need to go beyond the specific open internet rules, for which all ISPs loudly proclaim support these days (even as they busily go about lobbying and litigating to undermine them).

The supposition made by Chairman Pai, and by his supporters inside Washington and cable-company lobbying shops, is that irrational fear of a hypothetical future intervention could kill off investment in an otherwise booming sector of the economy. Don't believe them. Other policymakers, and the reporters who cover this issue, should not accept Pai's alternate reality. There may be room for debate on the best policy framework for broadband telecommunications, but policymakers shouldn't base their views on Pai's mythology.

In this report we summarize the key financial and operational metrics of the U.S. broadband industry and the U.S. online video industry, comparing those statistics from time periods preceding and following the FCC's 2015 *Open Internet Order* vote. We present the financial results just as the companies reported them to their investors and to the Securities and Exchange Commission. We also present voluminous comments that cable- and telephone-company ISP executives made to investors concerning the impact (or, in reality, the lack of any appreciable negative impact) that Title II had on their broadband deployments. ISP lobbyists and paid-for analysts have twisted and manipulated the key facts and figures, but these numbers are not in serious contention.

## ISPs' Capital Investments Increased During the Two Years Following the FCC's Open Internet Vote.

Publicly available data indicates that ISP-industry capital investments increased following the FCC's *Open Internet Order* vote in February 2015. Specifically, the data shows:

- The total capital investment by publicly traded ISPs was 5 percent higher during the two-year period following the FCC's Open Internet vote than it was in the two years prior to the vote (*see* Figure 1).
- Capital investments were higher at 16 of the 24 publicly traded ISP firms (or units) following the FCC's vote. These increases are due primarily to continued core network expansion as well as investments in capital equipment needed to expand lines of business that utilize the same network (*e.g.*, customer-premise equipment such as modems or IP-based video set-top boxes).
- As we document in Part III, any increases or decreases in capital spending at each individual firm were clearly explained by each company before, during and after the FCC's Open Internet vote. None of the firms that saw declines attributed them to any FCC action.
- Any declines were uniformly due to earlier completion of cyclical upgrades and/or completion of the more capital-intensive portion of upgrades. And all publicly traded ISPs, including those few with temporarily declining capital investments, continue to increase broadband-network capacity.
- Chairman Pai's claims of an investment decline are based on estimates that improperly remove billions in capital spending by Sprint and AT&T.
  - Such removal of Sprint's (and only Sprint's) leased-equipment capital investments is arbitrary and inappropriate. Sprint risked billions of dollars to purchase and then lease handsets. That is a key part of its broadband business strategy, and no different than a cable ISP's purchasing and leasing of modems.
  - AT&T has not reported figures excluding the impact of its recent DirecTV merger on its investments. But it did publicly disclose in November 2012 that it was entering a temporary period of increased spending to complete its 4G LTE nationwide build and upgrade many of its DSL lines. AT&T also told investors nearly a year after the FCC's Open Internet vote that its capital investments had decreased due to the completion of those projects and associated productivity gains – not because of any changes to FCC policies.
  - Because AT&T alone accounts for nearly a third of the total ISP industry's investments, any cyclical shift at AT&T can impact the aggregate in a manner that swamps the overall actual trend.
  - The 22 publicly traded ISPs other than AT&T and Sprint saw capital investments increase 9 percent after the FCC's vote. This shows why it's irresponsible to judge the impact of Title II by looking only to one simplistic (and manipulated) aggregate total, which is subject to large swings based on cyclical changes at just a few firms.

These publicly traded ISPs account for nearly the entire market, but a number of private ISPs do not publicly disclose financial and operational information. To understand trends across the entire industry, we also examined the most-recent data from the Census Bureau's Annual Capital Expenditures Survey ("ACES").

- This Census data indicates that total U.S. telecom-industry capital investments during 2015 were \$87.2 billion, more than \$553 million higher than in 2014 (*see* Figure 2).
- Capital investment by all U.S. telecom carriers offering wired broadband internet access service (which includes cable modem, fiber-to-the-home ("FTTH"), and DSL) was up nearly \$2.7 billion during 2015, nearly a 6 percent increase over 2014.
- Capital spending was down in the wireless sector in 2015, according to the ACES. However, the amount of this aggregate decline is close in value to the estimated decline in AT&T's wireless segment during 2015. AT&T directly attributed this decline to the completion of its nationwide 4G LTE deployment during 2014.

As the Census data shows, capital spending rose in aggregate following the FCC's Open Internet vote. The data also reflects a reality that anti-Title II ideologues never acknowledge: Capital investments are cyclical, and not every industry sector (much less every individual company) is on the same investment cycle. As technology changes and demand shifts, companies will invest more or less at different times based on a host of factors. Regulation is just one of these, and by no means the most important. Demand for a company's services, and the competition (if any) that it faces to meet that demand, are far more important drivers of investment decisions. So are factors such as tax policy, interest rates and depreciation allowances, not to mention the age and utility of the companies' networks. On that last score, a company (like AT&T) that builds a network one year does not need to spend money building that same network the next year just to please an FCC bureaucrat.

The aggregate data summarized above disproves the "Title II harms investment" mantra. The Census data indicates that during 2015, wired ISP capital investments rose in the aggregate while wireless ISP capital investments declined in the aggregate, even as capital investment at three of the country's four largest wireless ISPs increased. If the anti-Title II theories were plausible, the change in policy and legal framework would produce a systemic response. It did not. Twice as many publicly traded ISPs increased their investment levels as the relatively small number that reduced them. There is no reason to suspect that Title II's restoration would curtail spending by AT&T when Comcast, T-Mobile and Verizon have all spent more in the two years since the FCC's vote than they had before.

The totality of the evidence – the financial data, and the voluminous record of statements by ISPs on the lack of any negative Title II impact – is irrefutable. The restoration of Title II, and the welcome adoption of basic but strong Open Internet rules founded on that law, has had no negative impact on broadband-industry investments.

### **Investment in Core Broadband-Network Infrastructure Is Up Sharply Following the FCC's Vote.**

The data summarized above represents total capital spending, which includes billions of dollars in investments made for infrastructure and equipment related to but not directly used to provide broadband internet access service. Because the central policy question explored here is the impact of the FCC's rules on broadband-network capacities and availability, we can and should look beyond total capital investments when possible. Fortunately, most cable ISPs report capital expenditures in a manner that separates network from non-network spending. This data reveals a huge increase in cable ISPs' core network spending following the FCC's 2015 vote.

- During the two years following the *Open Internet Order* vote, cable-industry physical-network investments increased 48 percent compared to the amount invested during the two prior years.
- Cable's core network investments accelerated dramatically during 2016 (a \$2.1 billion increase over 2015, compared to 2015's \$0.8 billion increase over 2014).
- That one-year increase in cable-industry core network investments during 2016 marked the biggest single-year jump since 1999.

Though telephone-company ISPs do not publicly report the amount of capital they invest in their core network infrastructure, other data sources suggest strong growth in telco next-generation investments after Title II reclassification. Their investments in DSL ports went down by more than 20 percent during 2016, but legacy telephone-company ISPs' spending on fiber-network terminals and terminal ports rose nearly 50 percent.

In sum, the claim that Pai and a few other industry insiders have made is that fears about potential future Title II-based interventions (beyond the Open Internet rules themselves) have reduced investment. But the observed large increases in network spending by most ISPs show that this claim is false. Anyone suggesting otherwise is demonstrably wrong. Furthermore, even if aggregate capital spending does go down in the future, it does not follow that such a decline would stem from fears about vague and unspecified FCC interventions. Any such claim flies in the face of copious amounts of evidence on each company's reasoning for changes to its capital spending. And that evidence is freely available to anyone interested in the truth. That truth, which actual investors in the sector well understand, is that capital spending is primarily a function of macroeconomic realities outside the FCC's ambit.

#### **ISP-Industry Revenue Growth Continues to Outpace Broader Economic Growth.**

Capital investments are just one metric of ISP-industry growth (and a poor one when viewed solely in aggregate, as discussed above). To understand the market's trajectory, it's equally important – if not more important – to consider metrics like revenues, subscribership, capacities and profits.

ISP-industry aggregate revenues continue to grow at a rapid pace.

- Total revenues at publicly traded ISPs grew at a compound annual growth rate (“CAGR”) of 5 percent during 2013–2016.
- Cable-company revenues were 11.3 percent higher during 2015–2016 compared to revenues earned during 2013-2014.
- Revenue growth was 3.6 percent for legacy telephone-company ISPs (“Local Exchange Carriers” or “LECs”) in the two years since the FCC's Title II restoration.
- Post-Open Internet vote revenue growth was 4.6 percent for the five publicly traded wireless carriers.

This data reports total industry revenues. The positive growth shown above is from a combination of high growth in revenues for internet access and other broadband segments, lessened to some degree by the much slower growth (or declines) in revenue from these companies' traditional pay-TV and voice segments.

- High-speed internet revenues grew at a CAGR of more than 12 percent during 2013–2016, more than two times the rate of overall revenue growth at these companies.

- Average data revenues per subscriber grew at a CAGR of 9.4 percent during 2013–2016, only slightly less than the 12 percent growth rate for total data revenues. This suggests that the total data revenue growth is due primarily to these higher average-subscriber revenues, with only a small portion due to overall broadband-market growth.
- With a CAGR of 9.4 percent, consumer expenditures for wired home internet grew at a rate that was approximately five times the core inflation rate during the same period.

Again, this data should come as no surprise. Nothing about the FCC's 2015 *Open Internet Order* altered any of the factors driving ISP-revenue growth. That growth continues unabated as the public's demand for open and nondiscriminatory internet access services grows, as does demand for the almost limitless content, apps and online services reachable via broadband internet access.

### **ISPs, Especially the Ones Offering Next-Gen Services, Continue to Add Subscribers and Grow Profits.**

Though several recent user surveys suggest that wired home-broadband adoption has stalled, this is not reflected in the subscriber totals that ISPs themselves report and that analysts generate.

- From 2013–2016, the number of wired-internet subscriptions at publicly traded ISPs increased by 7.5 million, a CAGR of 3.1 percent.
- Net growth was seen only in the cable sector, however, as legacy telephone-company ISPs collectively continued to shed DSL customers. People are dropping cheaper but slower DSL lines in favor of faster, more expensive cable-modem service. Telephone-company ISPs that invested in next-generation services like Very High Bit Rate DSL ("VDSL") and FTTH generally saw better subscriber growth than peers that are still reliant on first-generation DSL.
- Wireless carriers enjoyed continued healthy subscriber growth even as the market saturates. The number of wireless subscriptions at publicly traded carriers grew at a CAGR of 5.9 percent during 2013–2016. Wireless-industry subscriber growth was relatively steady during each of those past four years, with 2015 the peak year for growth.
- Cable-ISP customer growth accelerated following the FCC's 2015 vote, in part reflecting increased customer demand for connections capable of delivering high-quality streaming-video content.

ISP subscriber growth and revenue growth are helping boost the bottom line. Broadband-industry profits – whether measured in terms of operating cash flows, operating income or Earnings Before Interest, Taxes, Depreciation and Amortization ("EBITDA") – were higher during the two-year period following the FCC's Open Internet vote than in the two years preceding it.

### **Online Content-Company Innovation and Investment Are Booming in the Title II Era.**

Anti-Title II ideology has led its adherents to ignore not only the broadband market's successes in the two years since the FCC's vote, but also the historic investment and competition happening on the open internet. That growth is possible only because of the continued existence – preserved by the *Open Internet Order* – of nondiscriminatory telecommunications services that provide broadband internet access.

Capital investments in edge-computing industry sectors grew dramatically in the wake of the FCC's restoration of its authority to protect these nondiscriminatory telecom services.

- Total capital expenditures in the U.S. “data processing, hosting and related services” sector, which includes app-hosting services like Amazon Web Services (“AWS”) and video-streaming services like Netflix, increased 26 percent in the year following the FCC’s Open Internet vote.
- Amazon’s AWS business (which serves a substantial portion of the web’s content) saw tremendous growth in the two years following the adoption of the *Open Internet Order*.
  - AWS revenues were up nearly 160 percent for the two-year period after the February 2015 vote compared to revenues for the two-year period before that vote.
  - Amazon’s AWS-related capital investment increased 36 percent during this same time period following the FCC’s vote.
  - Amazon’s AWS-related non-capital “development” investments are up 81 percent in the same time period following the vote.

The recent proliferation in higher-capacity broadband networks is helping drive growth in the entire internet-content economy, but online video is a particularly strong area of growth.

- In the two years since the FCC’s 2015 vote, which restored the legal foundation for broadband telecommunications nondiscrimination rules, the United States saw a 133 percent increase in launches of over-the-top (“OTT”) online-video services compared to the number launched in the two years prior to that vote.
- More U.S. online-video services have launched in the two years since the FCC’s 2015 Open Internet vote than in the seven years preceding that vote.

Traditional subscription video on demand (“SVOD”) services like Netflix, Amazon Prime Video and Hulu are expanding rapidly in this era of “big open pipes” – high-capacity broadband internet access networks protected by Title II, and by the strong Net Neutrality rules that the law in Title II allows.

- Netflix’s capital, content and technology investments all accelerated following the FCC’s adoption of the *Open Internet Order* in early 2015.
  - During the two years following the FCC’s vote, Netflix spent \$14.4 billion on streaming programming, more than double the \$6.8 billion it spent during the 24 months preceding the vote.
  - Netflix’s reported expenditures for “technology and development” nearly doubled in that time.
  - Netflix’s capital expenditures increased 60 percent following the vote.
- Amazon’s investment in acquired and original content rose substantially following the FCC’s vote.
  - During the two years since the vote, Amazon’s programming spending more than doubled, with spending on original content increasing five-fold.



- Hulu, one of the internet’s original streaming-video pioneers, is expanding rapidly too.
  - Hulu’s largest year of subscriber growth came in the year of the FCC’s Open Internet vote.
  - Hulu’s paid-subscription revenues in 2016 alone were higher than the paid revenues it earned during the two years preceding the FCC’s vote.
  - Hulu’s investment in acquired and original content also rose substantially following the FCC’s vote, increasing 43 percent in 2015 and another 35 percent in 2016.

The post-2015 online-video expansion has been driven by the entry of several high-profile Virtual Service Providers (“VSPs”), such as Sling TV and DirecTV Now. These VSPs offer OTT pay-TV services that are direct competitors to the traditional channel packages that incumbent cable and satellite companies offer. The U.S. VSP market did not exist prior to the FCC’s 2015 vote, but it exploded in the months thereafter. Sling TV launched the same month as the FCC’s vote. PlayStation Vue followed in March 2015. YipTV launched in May 2015. Perhaps the biggest potential disruptor, DirecTV Now, began offering service in November 2016. LeEco followed that same month. FuboTV’s 70-plus channel service entered beta in December 2016. Premium VSP Layer3 TV now sells service in three markets, with more to follow. Google’s YouTube TV and Hulu With Live TV replacement also launched in early 2017.

And more VSPs are coming. Media reports suggest that other ISPs such as Comcast and Verizon are also considering taking the once unthinkable step of selling their pay-TV services outside of the existing “footprints” for their cable systems.

Noncommercial, user-generated video content – driven by platforms like Facebook Live, Periscope and YouTube Live – has also experienced massive growth since Title II’s restoration.

The rapid increase in the availability of online video choices is also driving demand for standalone broadband. Thus, it’s not surprising that the number of broadband-only households increased 37 percent in the two-year period following the vote, compared to 19 percent growth in such broadband-only subscribers during the two years prior.

To analyze Title II’s real impact, along with the effect of putting Net Neutrality rules back on solid legal ground to safeguard the open internet, we must focus on the entire internet ecosystem. Analysis that looks only at ISP capital expenditures tells just a fraction of the story. It ignores not just the ISP market’s non-capital contributions to economic growth, but also the capital and non-capital contributions to the economy from internet “edge” businesses.

When we consider all of these factors, it’s clear that the FCC’s policy choices for preserving and promoting the internet’s virtuous cycle of investment under Title II are producing the desired result.

**Individual Company Results Since the Open Internet Vote Show Continuation of Long-Term ISP Industry Trends: Cable Companies Expanded Their Dominance, ILECs Continued to Face Headwinds, and Wireless Growth Continued Even as the Smartphone Market Reaches Saturation.**

Because of the cyclical, company-specific and technology-specific nature of the broadband industry’s investments, the annual change in the aggregate total spent on capital expenditures is a poor tool for measuring the industry’s overall health. What conclusion can one draw from an aggregate number comprised of data that shows some companies with large increases in capital spending, some with large decreases, and many others with smaller changes in either direction?

That scenario is the norm in this industry, illustrating why looking solely for any change in aggregate annual capital spending is a terrible tool for measuring the industry's health, let alone its response to a single change in public policy. This is why it's important to consider what individual companies are telling investors. For example, while AT&T's 2015 decline in capital investment is noteworthy, that temporary dip in spending was a result the company repeatedly told Wall Street to expect in advance. After AT&T had largely completed its so-called "Project VIP" DSL and wireless upgrades in 2014, the company's spending naturally diminished. After completing its upgrade to nationwide 4G LTE coverage in 2014, AT&T had no need to maintain the same level of capital spending that it needed to make that upgrade in the first place.

In Part III of this report, we meticulously document the financial statements and public comments made by all publicly traded U.S. ISPs. That means companies ranging from 20,000 subscribers up to those with 25 million subscribers. We document each company's investments, explaining the guidance those companies gave investors ahead of the FCC's 2015 vote, as well as each ISP's explanations for any changes in investment in the two years since..

There are several highlights in this company-specific documentation:

- We found that not a single publicly traded U.S. ISP ever told its investors (or the SEC) that Title II negatively impacted its own investments specifically.
- While some ISP executives bemoaned the FCC's move ahead of the February 2015 vote, the topic of Title II's impact on investment disappeared almost completely from all ISP-investor calls following that vote until after the November 2016 election. During that interim period, most mentions of FCC policy and investment on such calls focused on Universal Service Fund subsidies.

Several ISPs noted that the Title II-based Net Neutrality policy did not cause any harm:

- In December 2015, AT&T's CEO told investors that the company would "deploy more fiber" in 2016 than it did in 2015, and that Title II would not impede its future business plans.
- In December 2016, Comcast's chief financial officer admitted to investors that any concerns it had about reclassification were based only on "the fear of what Title II could have meant, more than what it actually meant."
- That same month, Charter's CEO told investors, "Title II, it didn't really hurt us; it hasn't hurt us."
- Just a few days after the election, Cablevision and Suddenlink's parent company Altice reaffirmed its plan to deploy FTTH service to all of its customers, and told investors that it remained "focused on upgrading our broadband networks to drive increases in broadband speeds and better customer experience."

Many other company-specific examples prove that ISPs are confidently investing and expanding their broadband networks in the Title II era.

- In the two years since the FCC's February 2015 vote, Comcast's core network investments jumped a whopping 62 percent. These investments translate into higher-capacity services. The majority of Comcast's footprint will be DOCSIS 3.1 capable by the end of 2017, with symmetrical multi-gigabit services rolled out in 2018.

- Charter’s capital investments went up 15 percent after the FCC’s Open Internet vote (when we include the pre-merger investments made by Charter, Time Warner Cable and Bright House Networks). And not only are Charter’s investments up, they’re 12 percent higher than the estimates Charter gave to investors prior to closing that merger.
- During 2016, mid-sized cable ISP Mediacom announced and completed an entire system-wide gigabit upgrade.
- Eleven months after the FCC’s vote, Verizon’s CFO told investors, “we remain committed to consistently investing in our networks for the future.”
- Just nine months after the FCC’s vote, Windstream accelerated its planned fiber deployments, completing the project two years ahead of schedule.
- Cincinnati Bell’s capital investments – driven by the company’s large-scale fiber deployment – increased a whopping 50 percent in the two years after the FCC restored Title II. When asked how Net Neutrality would impact the company’s pricing, Cincinnati Bell’s CEO told investors “there is really no impact on how we think about pricing in Net Neutrality right now ... [It] is a non-issue, non-event.”
- Ahead of the FCC’s vote, small telephone-company ISP Consolidated Communications told investors it “understand(s)” Title II, and that the FCC’s policy “levels the playing field.”
- Also ahead of the vote, T-Mobile’s CEO stated on an investor call that regardless of Title II, the company would “continue to drive forward with our business as it is.”

Companies that decreased capital investments following the FCC’s vote made it clear that these declines were due either to the completion of prior deployments and/or reductions in non-network investments. They had nothing to do with Title II.

- CenturyLink’s CEO told investors that it is still “investing more capital to enable high bandwidth network connectivity.”
- Though total capital expenditures at Altice-owned Cablevision and Suddenlink declined from a 2013 peak, their parent company reports that its U.S. core physical-network investments actually increased during the year following the FCC’s vote. Altice is now upgrading its entire U.S. footprint to FTTH.
- Cable One increased capital spending during 2014–2015 to make its systems DOCSIS 3.1-ready. With these upgrades completed during 2015, Cable One’s 2016 capital spending declined to more “normal” levels. The company made it clear that these declines were due to the completion of upgrades that put it “ahead of the curve.”
- More than two years before the FCC’s vote, AT&T told investors that its capital expenditures would first increase and then decline. Its 2013–2014 capital increases were due to the company’s “Project VIP” upgrades, and the company made clear that the subsequent decline in 2015 was due solely to completing that upgrade, which expanded LTE coverage as well as wireline IP-DSLAM deployment. AT&T’s 2016 capital expenditures marked an all-time high, even as the company shut down its U-Verse TV business in favor of newly acquired DirecTV satellite service.

- Sprint's 2015 capital investments were up sharply, but declined in 2016. Numerous factors drove this decline, most notably Sprint's completion of its nationwide LTE rollout to cover more than 300 million people. Sprint is now expanding capacity by using a low-capital spectrum-bonding software-networking technology.
- U.S. Cellular's capital investments peaked in 2012 and have declined annually ever since as the company completed its own LTE rollout. The company made clear well ahead of the FCC's vote that a decline in capital investment would follow this project's completion.

Chairman Pai's only supposed justification for dismantling the FCC's Title II-based Open Internet framework is the utterly false claim that it dampens ISP investments. He has nothing but phony and non-specific evidence to support his irrational belief, which runs contrary to the stunning number of verifiable counterfactuals noted above (as well as many more detailed in Part III).

In the two years since the FCC's 2015 vote, we've seen an explosion in OTT video competition as well as a dramatic increase in next-generation broadband-network deployment. The FCC's 2015 decision is working as intended and creating incentives for growth, not scarcity. There's simply no good reason for the FCC to return the internet economy to the era of uncertainty that preceded the Title II decision. Chairman Pai is carrying out his crusade in service of warped ideology – not in service of internet users and certainly not in pursuit of the truth.

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## Part I

### The Broadband Market is Thriving

One of the oldest tropes in regulatory policy debates is that regulation creates uncertainty, which in turn reduces the regulated industry's investment. While there could be a plausible theoretical basis for this claim in some circumstances, it is rarely ever translated into reality. That's because regulation and regulatory uncertainty are just two among many factors impacting investment and overall market performance, and those other factors are actually more important.<sup>1</sup> If the economy is booming, consumer confidence is gaining, and interest rates are declining, then the presence of investment and growth is a given.

The data from the past quarter century bears this out in the telecom sphere. Regulation does not as a rule cause uncertainty or dampen investment in telecommunications infrastructure. There's no valid data to support this claim, nor any valid theory to suggest how it would operate. But policymakers whose actions are guided by anti-regulatory ideology continue making the claim that regulation – and even regulatory authority – harm investment. They hang onto their platitude, evidence be damned.

During the run-up to enactment of the Telecommunications Act of 1996 ("1996 Act"), Bell Companies and their defenders preached that the law's open access requirements would crater investment.<sup>2</sup> But the period following its adoption saw instead the largest-ever investment in global history in fiber optic, cable coaxial, and edge network computing technology infrastructure.<sup>3</sup> Nonetheless, shortly thereafter, the courts and the FCC moved away from the 1996 Act's blueprint. Progress slowed, with network investments crowded out by stock buybacks and other efforts to return value to shareholders.<sup>4</sup>

Frustration with this plodding pace begat the American Recovery and Reinvestment Act of 2009, and its directive for the FCC to devise a National Broadband Plan. When the FCC subsequently considered in 2010 the need to restore baseline Title II nondiscrimination obligations to broadband access networks, the fire-and-brimstone anti-regulatory preachers returned.<sup>5</sup> These seers all shouted that reclassification would sink network investment. Why, or by what mechanism, was never proffered: it was simply enough for these critics to complain that a regulatory body would have the ability to step in and stop the most egregious of monopoly abuses. They claimed that the mere possibility of intervention was a pernicious "overhang," and suggested that this alone would be enough to reduce investment. Never mind the actual functioning of the marketplace, the actual policy change, and the actual history of how the FCC has implemented Title II in this and other sectors.

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<sup>1</sup> See, e.g., Comments of Free Press, GN Docket Nos. 14-28, 10-127, 09-191, at 94 n.200 (filed July 18, 2014) ("Free Press 2014 Comments") ("[T]he five primary factors influencing the decision by an operator to invest as well as its ability to access debt capital are: 1) expectations about demand [ . . . ] 2) supply costs [ . . . ] 3) competition [ . . . ] 4) interest rates and corporate taxes [ . . . ] and 5) general economic confidence.").

<sup>2</sup> See, e.g., "Telecommunications Competition and Deregulation Act of 1995," Report of the Committee on Commerce, Science, and Transportation on S. 652, S. Rpt. 104-23, at 65 (1995) (reporting "additional views" of Senator Burns: "Congress should seek to foster, not discourage, domestic investment by Bell and other local exchange companies"). The Senate Report's "Economic Impact" analysis rejected the view that the open access and market entry provisions specific to LECs would hinder investment, noting that "[a] competitive local telephone exchange is likely to produce increased economic activity and investment." *Id.* at 16.

<sup>3</sup> See, e.g., Free Press 2014 Comments at 101 ("Yet despite all of this strong regulatory intervention to promote competition and open networks, the years following the adoption of the 1996 Act saw substantial growth in telecom industry revenues and jobs and even larger growth in investment.") (citations omitted).

<sup>4</sup> From 2006–2016, if we include Comcast's purchase of GE's remaining minority share of NBCU, the company spent \$68 billion on capital investments but essentially the same (\$64 billion) on dividend payments (\$14 billion) and share repurchases (\$33 billion public, \$17 billion to GE). If we add Verizon's \$129 billion purchase of Verizon Wireless shares from Vodafone to its other buybacks (\$11 billion) and dividends (\$65 billion) in that same period, Verizon's ratio of capital investment to buybacks/dividends was just \$0.90 spent on capex (\$186 billion in total) for every \$1 returned to investors.

<sup>5</sup> See Comments of Free Press, GN Docket No. 10-127, at 89–105 (filed July 15, 2010).

The cable and telecom lobby's assault on reason and reality was relentless during the 2010 debate about broadband classification. After it lost in court that year on Net Neutrality rules for the first time, the FCC merely suggested revisiting its prior decisions, which had deviated from the plain language of the 1996 Act by classifying high-speed access networks as information services under Title I. Cynical special interest politics won the day, and the FCC stuck with that same classification. The result was predictable; the DC Circuit Court of Appeals overturned Network Neutrality rules again in 2014, for the same lack of proper jurisdiction under Title I.

Fortunately, the FCC's ultimate response to this second loss was reasonable. The agency finally went back and revisited the central legal definitions. It asked whether broadband internet access services enable users to send and receive the information of their choosing between points of their choosing; and it asked whether ISPs offer these services to all comers on a non-individualized basis. The FCC in 2015 rightly chose the obvious answer: yes, broadband is a mass market service that transmits customers' data between their locations and the endpoints they chose. This means – under the law that Congress wrote and passed on an overwhelmingly bipartisan basis in 1996 – that broadband internet access is a common carrier telecom service, and at a minimum, must be not be offered on an unreasonably discriminatory basis. Contrary to some reporting, this did not mean the FCC classified “the internet” as a “utility,” nor that the FCC would impose “utility-style regulation.” The only regulations adopted at the time were basic Open Internet rules against blocking, throttling and paid-prioritization – behaviors that the entire ISP industry disavowed (and continues to disavow) as not in its plans.

The FCC thus merely preserved a very successful market dynamic, while taking steps to restore the agency's congressionally granted legal authority to prevent discriminatory abuses. Yet the anti-Title II ideologues screamed bloody murder, or at least they did so ahead of the FCC's vote. Once the matter was settled, the topic of Title II largely disappeared in the conversations ISPs had with investors and investor analysts. Only a few policymakers and paid-for analysts inside the Beltway continued to preach impending doom.

Prior to November 2016, the Open Internet status quo was humming along nicely. But as soon as the election results came in, the anti-Title II adherents sensed an opportunity to start anew. They dusted off their debunked talking points, and once again cranked up their fear campaign. And like most fear-mongers, these ideologues peddled their message without any regard for facts or reason.

Does the mere existence of core Title II authority curtail investment? This is a question that cannot be answered absent evidence, nor answered with a single data point. It is a question that must be evaluated against the broadest set of facts, and considered using logic. For this premise to have validity, there would need to be a reasonable mechanism that translates regulated entities' fear of such authority into a systemic effect. Because we are evaluating a large market with informed firms, highly motivated by their bottom lines, this fear could not be theoretical and irrational. That would not sustain a negative market-wide impact, because it would create arbitrage opportunities for rational actors. For example, a rational and practical fear would be firms worrying about pending interest rate increases or a collapsing housing bubble when those events were likely. A theoretical and irrational fear would be collective worry about a pending global pandemic or nationalization of infrastructure when such events were highly unlikely.

There should be no doubt: the fears about a negative impact from Title II on the successful trajectory of the U.S. broadband market are wholly irrational. That is why such fears are not actually held by the broadband market's firms collectively, nor by this market's individual firms. They are simply impractical fears espoused largely by third party agitators in service of these parties' larger goal of unthinking deregulation.

To illustrate this irrationality and impracticality, all stemming from false claims about Title II's alleged negative impact on investment from indeterminate further regulations or restrictions, consider the following basic truths – all of which the purveyors of the anti-Title II ideology ignore:

- 1) The FCC has (as directed by a 1993 law) applied a “light-touch” Title II approach to cellular services for a quarter century now, forbearing from several provisions of Title II and thus never regulating rates or requiring wholesale access of cellular voice providers.



- 2) The FCC never regulated the retail rates of DSL services prior to 2005 when it could have under Title II, before the agency (incorrectly) classified wireline broadband offerings as Title I information services.
- 3) Many Rural Local Exchange Carriers (“RLECs”) voluntarily kept their own DSL services under Title II following that 2005 classification change for DSL, and even then the FCC never dictated the retail rates of those RLECs’ monopoly Title II broadband services.
- 4) The FCC does not regulate the retail rates of the Baby Bells’ Title II enterprise broadband services (e.g., Ethernet), despite (correctly) keeping those services under Title II and applying the same “light-touch” Title II approach for more than a decade now.
- 5) In the 2015 *Open Internet Order* and accompanying Declaratory Ruling, the FCC applied a similar Title II light-touch framework to mass market broadband internet access services, mirroring the generally successful and now widely accepted approaches described above for CMRS, pre-2005 DSL, RLECs’ DSL, and enterprise services.
- 6) When the FCC adopted the 2015 *Open Internet Order*, it forbore from all of Title II’s open access provisions, interconnection provisions for arrangements among telecommunications carriers, prohibitions on cross-subsidization and numerous other provisions.
- 7) In the same order and declaratory ruling, the FCC explicitly stated it was not going to engage in *ex ante* rate regulation or otherwise prescribe broadband internet access service rates.
- 8) In sum, thanks in large part to the FCC’s extensive forbearance for broadband internet access, and its quarter-century of market experience with a highly deregulatory application of Title II to other market segments, the broadband status quo was undisturbed by the FCC’s February 2015 Open Internet vote.

As we document in Part III, discussion of the possible impact of Title II on ISP investment completely disappeared as a topic on investor calls following the FCC’s February 2015 vote, returning only after the November 2016 election. And even though the surprise result revived the topic, numerous ISP statements since then still reflect the reality that reclassification did not negatively impact broadband investments.

These facts alone strongly indicate that any supposed fear of regulatory “overhang” is nothing more than a fiction. The additional facts in this report demonstrate that these fears never diminished investment. Instead, the FCC’s framework cemented incentives for ISPs to grow through expansion, not profit from scarcity.

But the anti-Title II preachers are undaunted by reality. They manufacture evidence of a recent capital investment decline – while blaming it on the FCC’s 2015 vote – to support their belief system. That evidence is completely bogus, as we describe below. But even if it were valid in a vacuum, it is offered in support of a fantastical scenario: that the mere possibility of future FCC intervention in the broadband access market (beyond the specific Open Internet rules, which all ISPs claim to support) is enough to overcome all other positive market forces and create a decline in capital investment. This is a bold proclamation, and one that would require a plausible mechanism to cause that effect, plus supporting evidence too. This proclamation has neither.

The anti-Title II ideology leads its adherents to ignore not only to the successes of the broadband market in the two years since the FCC’s vote, but also the historic investment and competition happening on the Open Internet – growth that is only possible with the continued existence of nondiscriminatory telecommunications services. Any honest analysis of the impact of the FCC’s policy must consider all markets (edge, core, last mile) and all metrics (capital investment, non-capital investment, consumer surplus, producer surplus, job growth, etc.). Any appraisal of the 2015 decision solely focused on one aggregate metric from the ISP industry, and not the myriad industries conducting commerce over broadband infrastructure, is incomplete.

Title II’s restoration and the Open Internet rules brought certainty to all participants in the broadband market. Carriers have clarity about their legal obligations. The people and businesses using broadband to conduct commerce, to communicate their ideas, and to produce and consume media, all have certainty that carriers will transmit their data in a reasonably nondiscriminatory manner. That certainty is what the investment data reflects.

## **ISP Industry Capital Investments, Network Investments, and Deployment of Next-Generation Access Technologies Accelerated Following the FCC's 2015 *Open Internet Order*.**

Below we summarize the key financial and operational metrics of the U.S. broadband and online video industries, preceding and following the February 2015 *Open Internet Order*. We present these results as the companies reported the – unlike Chairman Pai, with the manipulated and completely opaque figures he cites.

In this section and the rest of Part I we discuss aggregate results for the ISP industry. In Part II, we discuss results and developments at edge network firms, focusing on the online video market. Finally, in Part III, we analyze all publicly traded ISPs individually, providing the necessary facts and context for their respective performances before and after the FCC's action – and relying on those ISPs' own explanations to their investors.

We begin with the metric that garners the most headlines: the ISP industry's aggregate capital investments. We caution however that focusing on aggregate industry changes in capital spending is at best mildly informative. Aggregate capital spending is just one piece of data that must be considered alongside the developments at individual firms. This is especially the case in this industry, which is so concentrated that cyclical changes at just one large firm could shift the direction of any change in the industry's aggregate capital spending.

Moreover, capital spending is only one element of contribution to economic activity. That is, capital spending is investment in future growth; but consumer spending is current growth, meaning that hypothetical present declines in capital spending but hypothetical growth in revenues could still be a very positive indicator. If the gains in revenue were due to increased consumer surplus, generated by the demand for networks constructed with prior capital investments and the services those networks already enable, this could produce a net growth in the sector's and any adjacent sector's contributions to overall GDP growth.

Thus, even if and when ISP industry capital spending declines – and we expect that it will at some point in the near- to medium-term future, as cable ISPs reach the end of the DOCSIS3.1 deployment cycle – it does not automatically follow that the mere existence of the FCC's congressionally granted legal authority is the cause of such a hypothetical decline. Nor is it remotely likely that the fantastical fears we describe above, supposedly stemming from the possibility that the FCC might exercise that authority in the future in ways that are out of step with the past two decades of reality, would be responsible for that eventual decline.

Capital investments are by their very nature cyclical: they are purchases of durable goods, which depreciate in value and utility over time. As technology improves in the ISP industry, the shelf-life of capital equipment lengthens, its productivity increases, and the cost of this equipment declines. What really matters is not just the raw total spent on network technology, but the progress in making that technology available to users and the total value of economic activity that the technology then enables.

Those fundamental truths notwithstanding, it is indeed possible to measure with some degree of accuracy the ISP industry's aggregate capital investments before and after the *Open Internet Order* and reclassification vote. While the result is only moderately informative without this other context, it is a metric capable of careful and honest assessment. Unfortunately, the anti-Title II ideologues – including the one who currently chairs the FCC – have no interest in such honest analysis.

Newly appointed FCC Chairman Ajit Pai has made headlines peddling the demonstrably false claim that ISP industry investment declined following the FCC's 2015 *Open Internet Order*. His claims are sourced to two similar analyses by ISP industry defenders, both of which selectively and improperly discount the spending of two firms (AT&T and Sprint) in order to manufacture a false net decline larger than the collective ramp-up in spending at most other ISPs. Even if these figures weren't manipulated, the theory would be hollow. It would be ridiculous to suggest a systemic effect if the aggregate decline stemmed completely from two firms, masking the growth at most others. But as we explain below, the figures and the narratives that these two ISP industry "studies" use for AT&T and Sprint are indeed manipulated and just plain wrong.

Looking to results for the individual firms tracked to compile the industry total, note in particular how many individual ISPs increased their capital expenditures. This alone does much to disprove Chairman Pai's fanciful "threat" from Title II to investment across the entire industry. In Figure 1, we present the total capital expenditures for publicly traded retail Internet Service Providers, as they reported or restated this data for the two years preceding the FCC's February 2015 vote (2013–2014) and the two years following it (2015–2016).

**Figure 1: Capital Expenditures by Publicly Traded Broadband Providers (2013–2016)**

Capital Expenditures (\$ thousands)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Comcast (cable)	\$5,403,000	\$6,156,000	\$7,040,000	\$7,596,000	\$11,559,000	\$14,636,000	26.6%
Charter+TWC+BHN (pro forma)	\$5,573,000	\$7,052,000	\$6,969,000	\$7,545,000	\$12,625,000	\$14,514,000	15.0%
Cablevision (excluding Newsday)	\$918,508	\$853,273	\$782,785	\$694,000	\$1,771,781	\$1,476,785	-16.6%
Suddenlink	\$359,307	\$420,605	\$478,446	\$327,184	\$779,912	\$805,630	3.3%
Mediacom	\$264,387	\$257,581	\$288,245	\$335,173	\$521,968	\$623,418	19.4%
Wide Open West	\$221,900	\$251,900	\$231,900	\$287,500	\$473,800	\$519,400	9.6%
Cable One	\$160,245	\$165,787	\$166,361	\$125,534	\$326,032	\$291,895	-10.5%
GCI	\$180,554	\$176,109	\$176,235	\$194,478	\$356,663	\$370,713	3.9%
AT&T	\$21,228,000	\$21,433,000	\$20,015,000	\$22,408,000	\$42,661,000	\$42,423,000	-0.6%
Verizon	\$16,604,000	\$17,191,000	\$17,775,000	\$17,059,000	\$33,795,000	\$34,834,000	3.1%
CenturyLink	\$3,048,000	\$3,047,000	\$2,872,000	\$2,981,000	\$6,095,000	\$5,853,000	-4.0%
Frontier	\$634,685	\$688,096	\$863,000	\$1,401,000	\$1,322,781	\$2,264,000	71.2%
Windstream	\$841,000	\$786,500	\$1,055,300	\$989,800	\$1,627,500	\$2,045,100	25.7%
Cincinnati Bell	\$196,900	\$182,300	\$283,600	\$286,400	\$379,200	\$570,000	50.3%
TDS (excluding US Cellular)	\$172,159	\$213,000	\$226,000	\$184,000	\$385,159	\$410,000	6.4%
Consolidated Communications	\$107,363	\$108,998	\$133,934	\$125,192	\$216,361	\$259,126	19.8%
Fairpoint	\$128,298	\$119,489	\$116,159	\$117,020	\$247,787	\$233,179	-5.9%
Shenandoah Telecom Co. (pro forma)	\$197,736	\$175,232	\$169,610	\$204,163	\$372,968	\$373,773	0.2%
Hawaiian Telecom	\$86,290	\$96,706	\$99,034	\$97,841	\$182,996	\$196,875	7.6%
Alaska Communications System	\$48,172	\$51,236	\$48,477	\$40,301	\$99,408	\$88,778	-10.7%
Otelco	\$6,229	\$6,015	\$6,612	\$6,881	\$12,244	\$13,493	10.2%
Sprint	\$6,987,000	\$5,445,000	\$7,729,000	\$4,241,000	\$12,432,000	\$11,970,000	-3.7%
T-Mobile	\$4,025,000	\$4,317,000	\$4,724,000	\$4,702,000	\$8,342,000	\$9,426,000	13.0%
US Cellular	\$737,501	\$558,000	\$533,000	\$446,000	\$1,295,501	\$979,000	-24.4%
<b>TOTAL PUBLICLY TRADED ISPs</b>	<b>\$68,129,234</b>	<b>\$69,751,827</b>	<b>\$72,782,698</b>	<b>\$72,394,467</b>	<b>\$137,881,061</b>	<b>\$145,177,165</b>	<b>5.3%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Values are as most recently reported (or restated). Comcast's values exclude NBCU capital expenditures. Charter's results are as-reported pro forma values for legacy Charter with Time Warner Cable and Bright House Networks. Cablevision's values exclude Newsday segment expenses. Shenandoah Telecom's pro forma values include reported values for nTelos. Note on key dates: President Obama publicly stated support for Title II restoration on 11/10/2014; FCC announced its pending vote on 2/4/15; FCC held its vote on 2/26/15; and the FCC's order was effective as of 6/12/15.

This data indicates that ISP industry aggregate capital investments actually increased following the FCC's 2015 vote and reclassification decision. Specifically, the data shows:

- Capital investments at publicly traded ISPs were 5 percent higher during the two-year period following the FCC's Open Internet vote than during the two-year period before it.

- Capital investments were higher at 16 of the 24 publicly traded ISP firms (or units) following the FCC's vote. These increases were due primarily to continued core network expansion and also to investments in capital equipment needed to expand lines of business that utilize the network (e.g., customer premises equipment such as modems or IP set-top boxes).
- As we document in Part III, the reasons for any increase or decrease in capital spending by each firm were clearly explained by each company before, during, and after those decisions were made. None of the firms that saw declines attributed these to any change in FCC policy. They uniformly attributed any declines to completion of prior cyclical upgrades, with the expectation that most of these firms would increase capital spending again in future years.
  - For example, Comcast's cable segment capital investments rose sharply following the FCC's 2015 vote, continuing a trend begun during 2013's heavy rollout of the firm's X1 platform.<sup>6</sup> This investment ramped up sharply in 2015, driven by that rollout and Comcast pushing fiber closer to its customers.<sup>7</sup> It is noteworthy that before this acceleration in investment that began in 2013 and carried through the two years following the FCC vote, Comcast's capital expenditures had actually declined during earlier years (from 2008 to 2011) when it was upgrading its network to an all-digital, DOCSIS3.0 system.<sup>8</sup> This illustrates the fallacy of using

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<sup>6</sup> See, e.g., Comments of Michael Angelakis, CFO & Vice Chairman, Comcast Corporation, Q4 2013 Comcast Corporation Earnings Conference Call (Jan. 28, 2014) ("At Cable Communications, 2013 capital expenditures increased 9.8% to \$5.4 billion equal to 12.9% of cable revenue. This capital plan primarily reflects higher spending on CPE, including our new X1 boxes and wireless gateways, our continued investments in network infrastructure to ensure our leadership in video and high-speed Internet, as well as the expansion of new services such as Business Services and Xfinity Home.").

<sup>7</sup> See, e.g., Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corporation, Q4 2015 Comcast Corporation Earnings Conference Call (Feb. 3, 2016) ("At Cable Communications, capital expenditures increased 10.2% to \$2.1 billion for the fourth quarter and 14.3% to \$7 billion for the year. This growth reflects higher spending on our customer premises equipment, including X1 and wireless gateways, increased investment in network infrastructure to increase network capacity, as well as the continued investment to expand Business Services. In 2016, we will continue to invest in each of these areas as they are driving positive results in our business."); see also Sean Buckley, "Comcast: DOCSIS 3.1 acceleration is being driven by new broadband competition," *FierceTelecom* (Oct. 14, 2015) (quoting Comcast VP of access Jorge Salinger's comments that Comcast is deploying "fiber deep technologies that makes the service groups smaller").

<sup>8</sup> Comcast's all-digital and DOCSIS 3.0 rollout started in 2008, with this next-generation cable modem standard reaching 30 percent of Comcast's footprint at the end of that year. Comcast had deployed DOCSIS 3.0 to 75 percent of its footprint by the end of 2009, 85 percent by 2010, and completed the deployment in 2011. During this time (2008–2011) Comcast's cable segment capital expenditures were \$5.5 billion, \$5.0 billion, \$4.9 billion, and \$4.8 billion. See Comments of Brian Roberts, Chairman and CEO, Comcast Corporation, on Q4 2007 Comcast Corporation Earnings conference call (Feb. 14, 2008) ("In high-speed data we have DOCSIS 3.0 or wideband which we'll begin to offer to millions of our 48 million homes later this year."); Comments of Steve Burke, COO & President, Comcast Cable Communications, on Q4 2008 Comcast Corporation Earnings conference call (Feb. 18, 2009) ("We are moving rapidly with all-digital. That rollout is not constrained by capital. That is constrained by just the human side of making that happen and DOCSIS 3.0, we are rolling out quite quickly. We have about 30% of the Company with DOCSIS 3.0. That number should double by the end of the year."); Comments of Brian Roberts, Chairman and CEO, Comcast Corporation, on Q4 2008 Comcast Corporation Earnings conference call (Feb. 18, 2009) ("Now we expect capital expenditures to decline in 2009 both in absolute dollars and as a percentage of revenue, even as we take the opportunity to make the investments that I described in the all-digital and the DOCSIS 3.0 transitions. We believe these investments put us in a strong position for when the economy recovers and supports the long-term growth and competitive positioning of the Company."); Comments of Steve Burke, COO & President, Comcast Cable Communications, on Q4 2009 Comcast Corporation Earnings conference call (Feb. 3, 2010) ("Moving on to DOCSIS 3.0, or Wideband, we've deployed this technology to over 75% of our footprint and plan to complete our DOCSIS 3.0 deployment in early 2010."); Comments of Brian Roberts, Chairman and CEO, Comcast Corporation, on Q4 2010 Comcast Corporation Earnings conference call (Feb. 16, 2011) ("Our key technical initiatives, All-Digital and DOCSIS 3.0, are nearing completion with All-Digital in 75% of our markets and DOCSIS 3.0 deployed in more than 85% of our footprint."); Comments of Brian Roberts, Chairman and CEO, Comcast Corporation, on Q4 2011 Comcast Corporation Earnings conference call (Feb. 15, 2012) ("Our major technical initiatives of DOCSIS 3.0, All-Digital, a content delivery network that works on all platforms is now complete and we have leveraged these investments to deliver

raw capital expenditure totals as the sole metric for progress, even for an individual ISP let alone across the entire industry.

- In contrast, cable segment capital expenditures declined at Cablevision during the two years following the FCC's February 2015 vote. But this was due to Cablevision's 2014 completion of its initial purchases of customer premises equipment ("CPE") related to its all-digital and DOCSIS 3.0 upgrades. Was the 2014 end of this CPE purchase cycle due to Title II? Of course not. In fact, though the CPE purchasing declines more than offset them, Cablevision actually increased its core network investments after the FCC's 2015 vote (*see* Figure 3).<sup>9</sup>

The data summarized in Figure 1 above shows the capital expenditures at publicly traded U.S. Internet Service Providers. But there are a few large, privately held ISPs (*e.g.*, Cox Communications, RCN Corporation, C-Spire) and numerous medium- and small-sized privately held carriers that do not publicly disclose their financial results. Figure 1 also does not include capital expenditures by companies whose primary business is reselling telecommunications services purchased on a wholesale basis (including, in part, services purchased at wholesale from some of the publicly traded ISPs tracked above). To get an even more complete picture of how telecom industry capital spending is changing over time, therefore, we present the information published by the U.S. Census Bureau (the "Bureau") in its Annual Capital Expenditures Survey ("ACES"). This survey collects data from nearly 45,000 enterprises with employees, to project total capital expenditures for the nearly 6 million such U.S. businesses.<sup>10</sup> The Bureau presents this data by industry category, based on the North American Industry Classification System ("NAICS"). There are three categories that encompass the U.S. internet access services market: wired telecommunications carriers; wireless telecommunications carriers (except satellite); and telecommunications resellers, satellite and other telecommunications.<sup>11</sup>

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more innovation faster than ever before."); *see also* Financial Supplements, Comcast Corporation, for periods ending 12/31/2008, 12/31/2009, 12/31/2010, and 12/31/2011.

<sup>9</sup> As Cablevision explained on its fourth quarter 2014 investor call, "[w]e had an increase in CPE in the fourth quarter, but a lot of what happens with CPE, as you know, is timing of expenditures. We ended up with additional purchases of boxes, of managed routers, some remotes in the fourth quarter. But it's not necessarily CPE that will keep capital expenditures roughly these levels. We continue to invest in WiFi. We continue across-the-board to invest in our network, and we're going to continue those efforts." *See* Comments of Gregg Seibert, Vice Chairman & CEO, Cablevision Systems Corporation, Q4 2014 Cablevision Systems Corp. Earnings Call (Feb. 25, 2015) (emphasis added). On Cablevision's final investor call, for second quarter 2015 and thus the quarter immediately following the FCC's vote, the company stated that "cable capital spending in the second quarter was \$186 million, a \$21 million decrease from the same period in 2014. This primarily reflects lower year-over-year spending on set-top box and modem purchases, as well as the timing of certain video-related projects. These declines were partially offset by higher project spending to support broadband and WiFi expansion. We expect increased CapEx spending in the back half of 2015 as we continue to invest in the evolution of our product offerings and ensure a quality service experience." Comments of Brian Sweeney, President & CFO, Cablevision Systems Corporation, Q2 2015 Cablevision Systems Corp. Earnings Call (Aug. 7, 2015) (emphasis added). As Cablevision stated in its 2015 10-K report to the SEC, "[c]apital expenditures for 2015 decreased \$75,282,000 -8% as compared to 2014. This decrease was due primarily to a decrease in purchases of customer equipment and network equipment, partially offset by increases in spending related to cable plant upgrades." Finally, as Cablevision's new owner Altice noted when explaining 2016's declines in capital investment at Cablevision, the prior owner had "already made a lot of investments in its network, as you can see on the left-hand side. It's 100% digital, almost wholly encrypted with an average of 300 homes per node." Comments of Dexter Goei, President, Altice NV, Q3 2016 Altice NV & SFR Group SA Earnings Call (Nov. 10, 2016).

<sup>10</sup> *See* United States Census Bureau, Annual Capital Expenditures Survey ("ACES"), Survey Description (Jan. 5, 2016).

<sup>11</sup> *See* Executive Office of the President, U.S. Office of Management and Budget, "North American Industry Classification System" (2017) ("OMB NAICS 2017"). These industry sectors are defined as follows:

Wired Telecommunications Carriers: "This U.S. industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. By exception,

The results from the Bureau's ACES are typically published and revised one and two years following the end of the prior year (*e.g.*, the Bureau published its 2015 results and its revised 2014 results in February 2016). Thus, we now have ACES data for the first year following the *Open Internet Order* and reclassification decision. The results are clear:

- Census data indicates that total U.S. telecom industry capital investments during 2015 were \$87.184 billion, more than \$553 million higher than in 2014 (*see* Figure 2).
- Capital investments by wired telecom carriers (which includes cable modem, fiber-to-the-home, and DSL ISPs) were up nearly \$2.7 billion during 2015, nearly 6 percent over 2014.
- Capital spending was down in the wireless telecom carrier sector. However, the amount of this decline is almost identical to the estimated decline at AT&T's wireless segment during 2015, which AT&T directly attributed to the 2014 completion of its nationwide 4G LTE deployment (*see* discussion of AT&T results in Part III). Data from CTIA, the wireless industry's trade association, indicates the sector's capital expenditures peaked in 2013, slowly declining through 2016.<sup>12</sup>

As the Census data shows, capital spending rose in aggregate following the FCC's Open Internet vote. The data also reflects the industry reality that anti-Title II ideologues never acknowledge: capital investments are cyclical, and not all industry sectors (much less all individual companies) are on the same investment cycle. For example, capital spending by wired carriers boomed during 2015, after a slight decline during 2014 – the year prior to the FCC's vote. Meanwhile, capital investment in the wireless sector peaked in 2014 when many U.S.

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establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.”

Wireless Telecommunications Carriers (except Satellite): “This U.S. industry comprises establishments primarily engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services, paging services, wireless Internet access, and wireless video services.”

Satellite Telecommunications: “This industry comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.”

Telecommunications Resellers: “This U.S. industry comprises establishments engaged in purchasing access and network capacity from owners and operators of telecommunications networks and reselling wired and wireless telecommunications services (except satellite) to businesses and households. Establishments in this industry resell telecommunications; they do not operate transmission facilities and infrastructure. Mobile virtual network operators (MVNOs) are included in this industry.”

Other Telecommunications: “This U.S. industry comprises establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or Voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.”

<sup>12</sup> *See* CTIA Annualized Wireless Industry Survey Results 2000–2016, CTIA Annual Wireless Survey (May 9, 2017). CTIA's capital expenditure data indicates carriers invested \$27.9 billion in 2004, declining to \$20.2 billion in 2008. Capital expenditures then increased annually until 2013, peaking at \$33.1 billion. CTIA shows subsequent annual declines, with \$26.4 billion invested in capital during 2016. CTIA's data reflects the 2010–2014 LTE deployment cycle, which peaked in 2013–2014 as AT&T's Project VIP's expenditures peaked.

carriers completed their nationwide 4G LTE deployments. The slight decline in wireless in 2015 simply reflects an aggregate ramp down of spending<sup>13</sup> prior to the upcoming 5G and small cell densification investment cycles.

This data also lays bare the hollowness of the “Title II harms investment” hypothesis. The FCC reinstated Title II in February 2015. The Census data indicates that during 2015, wired ISP capital investments rose in the aggregate while wireless ISP capital investments declined in the aggregate, even as capital investment by three of the country’s four largest wireless ISPs increased. If the anti-Title II ideologues’ theory were plausible, it would produce a systemic response. Plainly put, it did no such thing. The best that the anti-Title II crowd can point to is a decline solely at AT&T. This strongly suggests that their theory of harm is completely wrong. Combined with the totality of the evidence (e.g., statements made by the companies themselves on their investment plans ahead of and following the vote, and actual responses to the FCC’s policy change) it is clear that restoration of Title II and the adoption of basic Open Internet rules that depend on that legal framework had no negative impact on broadband industry investments.

**Figure 2: Capital Expenditures by All U.S. Telecommunications Firms  
(U.S. Census Bureau Annual Capital Expenditures Survey, 2008–2015)**

Industry Sector	Capital Expenditures for Structures and Equipment for Companies with Employees (\$ millions, nominal)							
	2008	2009	2010	2011	2012	2013	2014	2015
Wired telecommunications carriers, cable and other program distribution, broadband internet services providers	\$51,892	\$43,851	\$42,971	\$44,508	\$43,661	\$49,848	\$48,496	\$51,178
Wireless telecommunications carriers (except satellite)	\$25,272	\$20,651	\$23,052	\$25,283	\$32,949	\$34,040	\$35,046	\$32,794
Telecommunications resellers, satellite, and other telecommunications	\$3,487	\$2,760	\$4,200	\$3,740	\$4,428	\$3,352	\$3,089	\$3,212
<b>TOTAL</b>	<b>\$80,651</b>	<b>\$67,262</b>	<b>\$70,223</b>	<b>\$73,531</b>	<b>\$81,038</b>	<b>\$87,240</b>	<b>\$86,631</b>	<b>\$87,184</b>

Source: U.S. Census Bureau Annual Capital Expenditures Survey (“ACES”), Tables 4a (2015) and 4b (revised values for 2008–2014). Note: ACES data prior to 2008 represents different industry sectors and is not comparable to values from subsequent survey years.

<sup>13</sup> We note that 2015’s aggregate wireless decline was primarily driven by AT&T’s completion of its Project VIP upgrades. Verizon’s wireless segment spending actually increased by \$1.2 billion during 2015 (a 12 percent increase). Sprint’s total capital spending was also substantially higher in 2015 than 2014 (a 42 percent, \$2.3 billion increase). T-Mobile’s capital expenditures rose by \$400 million in 2015 to \$4.72 billion, a 9 percent increase. Offsetting these increases were declines at AT&T Mobility (which we must estimate, because AT&T no longer reports wireless segment capital expenses separately, as approximately \$2.3 billion lower in 2015), at U.S. Cellular, and potentially at non-publicly traded companies like C-Spire, all of which had completed LTE deployments during 2014. See, e.g., Verizon Communications Inc., Financial and Operational Supplements, for periods ending 12/31/2013, 12/31/2014, 12/31/2015, and 12/31/2016.

## Investments in Core Network Infrastructure Boomed Following the FCC's Title II Vote.

The data presented above for company-specific capital expenditures, and the U.S. Census Bureau's Annual Capital Expenditure Survey results, reflect the telecom industry's investments in all durable goods used in these companies' business operations. But only a portion of these expenditures are for the core, natural monopoly network infrastructure required to transmit data between a customer's location and an ISP's interexchange points with other carriers.

Capital investments in non-core network assets are critical to broadband providers' overall business success, but such expenditures do not necessarily reflect the trajectory for commercial availability of improved access services. For example, most ISPs operate in multiple lines of business. Incumbent Local Exchange Carriers ("ILECs") also serve large enterprises with managed voices services. The installation of a new Private Branch Exchange ("PBX") in an office building is a non-core capital expenditure that doesn't reflect positively on the status of the broadband market, just as a decline in such PBX expenditures doesn't reflect poorly on it.<sup>14</sup>

What's more, non-core network capital expenditures might decline because of the efficiency gains produced by past network investments. ISPs incur a capital expense when they purchase service vehicles. But if the need for large fleets of trucks declines due to growth in customer self-installation or advances in software defined networking ("SDN"), any commensurate declines in capex would not reflect negatively on overall broadband market development.<sup>15</sup> Indeed, the primary way wireless carriers will increase capacity ahead of 5G and small cell densification is using software to aggregate spectrum.<sup>16</sup> Spectrum can act as a substitute for capital spending, which is in part how Sprint could deploy its LTE network while lowering its network investment.<sup>17</sup>

Similarly, not all increases in capital outlay are an indicator of increased broadband infrastructure availability. A cable company multiple system operator's ("MSO") purchase of new satellite dishes for its headends arguably impacts its broadband business because the company almost certainly sells services in bundles, but such a purchase doesn't indicate how that MSO's broadband offerings are progressing. Cable company expenditures on new set-top boxes likewise may not seem directly relevant to its network capacity; yet purchasing the latest generation of all-digital, MPEG-4 capable set-top boxes enables an MSO to expand its plant capacity dedicated to broadband services by reducing the bandwidth requirements for pay-TV services.<sup>18</sup>

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<sup>14</sup> See, e.g., Nick Ismail, "Shift from premise telephony to the cloud to accelerate significantly in 2017," *Information Age* (Dec. 21, 2016); Sean Buckley, "Level 3 discontinues more TDM-based voice services in Idaho and Washington, but supports hybrid environments," *FierceTelecom* (Sept. 26, 2016).

<sup>15</sup> See Iain Morris, "Don't Count on 5G for a Capex Boost," *Light Reading* (Feb. 24, 2017) ("Networks have also become far more software-based in the last 15 years, allowing operators to make upgrades more easily and cost-effectively than when they were moving from 2G to 3G."); see also Comments of John Stephens, Senior EVP & CFO, AT&T Inc., Q2 2015 AT&T Inc. Earnings Call (July 23, 2015) ("I think there's a real opportunity with some of the activities that are going on in software-defined networks on a longer-term basis to actually bring that capital intensity to a more modest level.").

<sup>16</sup> See, e.g., Mike Dano, "Verizon, Sprint, others turn to carrier aggregation, small cells for remainder of 2015 capex," *FierceWireless* (Aug. 5, 2015) ("The nation's wireless carriers are expected to put the finishing touches on their respective LTE coverage buildouts, and then will use techniques including small cells and carrier aggregation to add density and capacity to their networks, according to industry experts. Specifically, Sprint [ ] and Verizon Wireless [ ] have pointed to both small cells and carrier aggregation as elements of their respective network buildout strategies for the remainder of this year.").

<sup>17</sup> See, e.g., Sarah Thomas, "Sprint Promises Better LTE on Lower Capex," *Light Reading* (Aug. 4, 2015) ("Sprint shed more light on its 'Next-Generation Network' Tuesday, promising it would significantly densify its network across all of its various spectrum bands via thousands of new macro sites, tens of thousands of new small cells and further 2.5GHz expansion. And it doesn't plan to spend more to make it happen. . . . Sprint also recently began using 2x20MHz carrier aggregation to improve capacity and speeds in its 2.5GHz spectrum on select sites across the country. It also called out its use of antenna beamforming to improve performance at the cell edge.").

<sup>18</sup> See, e.g., comments of Tom Rutledge, Chairman and CEO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017) ("We manage our network for the future based on the actual load on the network, as opposed to some theoretical issue, and there are other ways of getting capacity out of all-digital networks.



Fortunately, most cable MSOs report their capital expenditures in a manner that separates out network and non-network spending.<sup>19</sup> The segments most directly related to the last mile are “line extensions” (the network costs incurred from entering a new service area) and “upgrades/rebuilds” (replacement capital expenditures for improving the existing last mile lines). Capital investments in “scalable infrastructure” are also core-network investments, as they involve expenditures for items such as converged cable access platform (“CCAP”) equipment (which is, like wireless networks, becoming increasingly virtualized as a way of increasing bandwidth).<sup>20</sup> The other two segments of cable capex are critical to the business, but aren’t “core” network investments (customer premise equipment spending for set-top boxes and even modems are external to the core, as is capital investment in non-network assets such as office buildings).

The data reveals a huge increase in cable ISPs’ core network spending following the FCC’s February 2015 Open Internet vote (*see* Figure 3). During the two years after that vote, the U.S. cable industry’s core network infrastructure investments increased 48 percent compared to the amount invested during the two years preceding the vote. Cable’s core network investments accelerated dramatically during 2016 (a \$2.1 billion increase over 2015, compared to 2015’s \$0.8 billion increase over 2014). The one-year increase in cable industry core network investments during 2016 was the highest single year jump since 1999,<sup>21</sup> when the cable industry like the telecom industry was expanding rapidly during the “fiber bubble.”<sup>22</sup> It is important to note that this historic one-year jump in 2016 came after cable companies had ample time to digest the actual and potential impacts of Title II restoration and the FCC’s Open Internet rules, which were adopted a full year earlier in February 2015.

This cable industry core network investment rose substantially in the aggregate following the 2015 vote because most MSOs were either pushing fiber deeper into their networks in preparation for DOCSIS 3.1; expanding their enterprise services; replacing headends with the latest converged platform infrastructure; or engaging in a combination of all of these activities. But individual companies each had different experiences and trajectories (*see* Part III for a discussion of each company). Comcast continued its ramped-up spending driven by increases in both fiber deployment and headend upgrades.<sup>23</sup> Charter’s increase was mostly related to scalable infrastructure increases, but all network-related capital expenses (and CPE expenses) are expected to rise in 2017 yet again as Charter resumes its pre-planned efforts to convert the approximately 40 percent of TWC systems

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Like for instance, most of our set top boxes now are capable of IP delivery. They’re also capable of MPEG4 delivery, which means that we can squeeze the capacity out of our video business, and get more DOCSIS capability in our network, which means we can do more virtual or electronic node splitting than we might have done a couple of years ago. And that’s a function of our CPE strategy. So we’re managing all of those things together to get capacity.”

<sup>19</sup> Charter defines these five capital expenditure segments as follows: “Customer premise equipment includes costs incurred at the customer residence to secure new customers and revenue generating units. It also includes customer installation costs and customer premise equipment (e.g., set-top boxes and cable modems). Scalable infrastructure includes costs not related to customer premise equipment, to secure growth of new customers and revenue generating units, or provide service enhancements (e.g., headend equipment). Line extensions include network costs associated with entering new service areas (e.g., fiber/coaxial cable, amplifiers, electronic equipment, make-ready and design engineering). Upgrade/rebuild includes costs to modify or replace existing fiber/coaxial cable networks, including betterments. Support capital includes costs associated with the replacement or enhancement of non-network assets due to technological and physical obsolescence (e.g., non-network equipment, land, buildings and vehicles).” *See* Charter Communications Inc., 2016 10-K, at 50.

<sup>20</sup> *See, e.g.*, Mari Silbey, “Cable’s DAA Moment Is Here,” *Light Reading* (Mar. 27, 2017); Alan Breznick, “Big Year Ahead for Cable Network Capex,” *Light Reading* (Jan. 13, 2017); *see also* Karthik Sundaresan, “Evolution of CMTS/CCAP Architectures,” Cable Labs, 2015 Spring Technical Forum Proceedings (2015).

<sup>21</sup> *See* Ian Olgeirson and Paul Lauermaun, “Spending on set-tops leads cable’s \$200B investment since 1996,” *SNL Kagan* (July 24, 2013).

<sup>22</sup> *See, e.g.*, Jeff Hecht, *City of Light: The Story of Fiber Optics* 249–56 (1999).

<sup>23</sup> *See* Comcast Corp. 2016 Financial Supplement, at 5.

that are not yet all-digital.<sup>24</sup> By contrast, Cablevision's core-network spending declined from 2015 to 2016, after increasing in 2015 after the FCC's vote. The 2016 decline was largely due to Cablevision completing prior upgrade projects,<sup>25</sup> with its new owner's shift in strategy towards eventual (but not immediate) full fiber-to-the-home network architecture.<sup>26</sup>

**Figure 3: Cable ISP Network Investment, Publicly Reported and Estimated Totals (2013–2016)**

Network Investment* (\$ thousands)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Comcast (cable)	\$1,324,000	\$2,048,000	\$2,425,000	\$3,035,000	\$3,372,000	\$5,460,000	61.9%
Charter+TWC+BHN (pro forma)**	\$2,568,654	\$3,002,000	\$3,273,000	\$3,624,000	\$5,570,654	\$6,897,000	23.8%
Cablevision***	\$374,000	\$296,478	\$312,711	\$241,204	\$670,478	\$553,915	-17.4%
Suddenlink	\$44,000	\$89,577	\$127,532	\$83,565	\$133,577	\$211,097	58.0%
Mediacom****	N/A	\$95,663	\$98,258	\$150,867	\$191,326	\$249,125	30.2%
Cable One	\$68,204	\$91,952	\$91,529	\$69,062	\$160,156	\$160,591	0.3%
Other MSOs (SNL Kagan-estimated)	\$90,849	\$157,613	\$239,889	\$1,438,513	\$248,462	\$1,678,402	575.5%
<b>Total US Cable Companies*****</b>	<b>\$4,469,707</b>	<b>\$5,781,283</b>	<b>\$6,567,919</b>	<b>\$8,642,211</b>	<b>\$10,250,990</b>	<b>\$15,210,130</b>	<b>48.4%</b>

\* Includes capital expenditures for line extensions, upgrades/rebuilds, and scalable infrastructure

\*\* Pro forma results reported by Charter for combined companies for full year 2014, 2015 and 2016. 2013 values are as reported separately by Charter and TWC, with estimated values for BHN

\*\*\* Cablevision 2016 results are based in part on SNL Kagan estimates

\*\*\*\* Mediacom did not report network investment for 2013; 2013-2014 results are based on 2014. Mediacom's final 2016 results are based on an estimation of Mediacom LLC's portion of the total company's 4Q 2016 expenditures, as the LLC deregistered on Feb. 16, 2017

\*\*\*\*\* Total values are as estimated by SNL Kagan for U.S. cable MSOs; Values in table for Other MSOs are this total less the publicly reported amounts indicated for the companies as shown

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements); SNL Kagan Estimates.<sup>27</sup>

<sup>24</sup> See, e.g., Comments of Tom Rutledge, Chairman and CEO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017) ("In the second quarter, we'll restart our all-digital deployment, featuring fully two-way advanced set top boxes to video customers in the approximately 40% of TWC and 60% of Bright House that are not yet all-digital, which allows us to offer more HD, interactivity on every video outlet, faster data speeds, and reduced operating costs. We should be 100% all-digital in less than two years.").

<sup>25</sup> See, e.g., comments of Dexter Goei, Chairman and CEO, Altice USA, Q3 2016 Altice NV & SFR Group SA Earnings Call (Nov. 10, 2016) ("Optimum has already made a lot of investments in its network, as you can see on the left-hand side. It's 100% digital, almost wholly encrypted with an average of 300 homes per node."). Comments of Dexter Goei, Chairman and CEO, Altice USA, Full Year 2016 Altice NV & SFR Group SA Earnings Call (Mar. 9, 2017) ("[Y]ou can see that our initial upgrade to Optimum's network has led to a significantly higher number of customers taking higher speeds, from just 12% before Altice's control to about 60% today.").

<sup>26</sup> See, e.g., Jeff Baumgartner, "Altice USA to Skip DOCSIS 3.1, Roll Out All-Fiber Network," *Multichannel News* (Nov. 30, 2016); see also Altice USA, Press Release, "Altice USA Unveils 'Generation Gigaspeed,' A Full-Scale Fiber-to-the-Home Network Investment Plan to Enable 10 Gigabit Broadband Speeds" (Nov. 30, 2016).

<sup>27</sup> See Ian Olgeirson, "2016 spending surge punctuates US cable CapEx forecast," *SNL Kagan* (Nov. 4, 2016) (showing total industry estimates for each capital spending segment); see also Kamran Asaf, "Flat Q4 spending restricts FY 2016 cable CaEx to 5% YOY growth," *SNL Kagan* (Mar. 31, 2017) (recounting historical capital spending by segment at six MSOs).

The network investments by other, smaller MSOs (and by non-publicly traded companies like Cox) jumped sharply in 2016. This result reflects the economic reality of a market with a few very large companies and many smaller ones: smaller operators are not first-movers; they wait to see how larger MSOs fare when deploying new technologies, with those larger operators benefiting from their scale (*i.e.*, because equipment costs decline over time and with scale), and then the smaller operators learn from the bigger companies' experiences.

Unfortunately, phone company ISPs do not provide details on their allocation of capital investments to core network spending. However, SNL Kagan recently published data that tracks spending on telco networking components (such as fiber ports, optical network terminals, and telco ISP equipment revenues).<sup>28</sup> These telco data points, while not as comprehensive as the MSO data, are a reliable marker (along with FCC data and other available data) for how ILECs are investing in their core network. Kagan's analysis indicates that U.S. telco spending for DSL ports was down more than 20 percent during 2016, continuing a longstanding trend. But telecom company spending on fiber-to-the-home network terminals and terminal ports rose nearly 50 percent in 2016. In its analysis, SNL Kagan specifically noted the well understood reality that ISP investment is cyclical, that it's driven largely by broader market conditions, and that it "will occur whether net neutrality is in place or not."<sup>29</sup>

Below in Part III we report on and analyze the deployments for each publicly traded telephone company. The trend following the FCC's vote is essentially more of the same, with a ramp-up in targeted fiber-to-the-home deployments. The FCC's vote had zero impact on the underlying economic realities faced by Local Exchange Carriers: ("LECs") they compete with cable companies that only need to spend a couple of hundred dollars per passing to offer gigabit services, while the cost to upgrade LECs' copper last mile networks are five times that or higher. The simple fact that anti-Title II ideologues never acknowledge about LECs is that no discriminatory business model would increase cash flows enough to overcome these natural monopoly economics. This is why LECs target their fiber-to-the-home upgrades to dense multi-tenant developments or areas with aerial lines in which high-income customers reside. This is why LECs like AT&T pursued VDSL deployments in lieu of full fiber upgrades. And it's why the twin Bells (AT&T and Verizon) have adopted similar long-term strategies based on moving more into wireless and into content.

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<sup>28</sup> See Jeff Heynen, "Alternative facts on broadband investments threaten net neutrality," *SNL Kagan*, Mar. 10, 2017 (title later changed to "FCC concern over broadband investments threatens net neutrality").

<sup>29</sup> *Id.* We quote from Heynen's article at length because it summarizes so well the attitude of real-world ISPs, factoring competition and demand into their investment decisions – not overreacting to longstanding FCC policies and principles.

The long-held argument by Pai and the country's largest ISPs is that, by forcing network operators to open up their broadband pipes equally to competitive application and content providers, the network operators have no incentive to invest in upgrading and expanding their broadband networks. But the equipment and CapEx results from 2016 prove that is not the case at all. The biggest driver for ongoing investments in broadband infrastructure is competition. Network operators, faced with competitors upping the ante with DOCSIS 3.1, FTTH and high-speed copper deployments, must meet or exceed those offers in order to prevent customer defections, especially when other services in the standard bundle don't hold the same allure among consumers as they once did. Broadband speeds and customer service are the measures by which consumers make their choice among service providers these days. . . . [T]here is an ongoing cycle of investment in infrastructure required to ramp up the throughput offered to end consumers. Each network operator has approached this realization with a different philosophy. Verizon, for example, bit the bullet early with a high-cost rollout of FTTH infrastructure. That initial investment effectively lasted for over a decade. Meanwhile, AT&T chose to follow a less costly route of pushing fiber into neighborhoods, but continuing to rely on copper-based VDSL for the final connection to subscribers' homes, sparing them the high cost of trenching fiber through subscribers' yards. However, that investment lasted only five years, as the company's strategy shifted to focus on FTTH. Now, all network operators are in the middle of network upgrades to ensure their competitiveness with cable operators' DOCSIS 3.1 rollouts, which will push speeds to 1 Gbps and beyond. Those upgrades will occur whether net neutrality is in place or not, as reflected by the shipment numbers and revenue for broadband access equipment in 2016.

## Claims of ISP Industry Capital Decline After Reclassification Are Based on Manipulated Data, and are Disproven by Company-Specific Disclosures and the U.S. Census Bureau's Findings.

Numerous times during the past year, now-Chairman Ajit Pai has repeated the demonstrably false assertion that U.S. ISP industry capital investments have “declined”<sup>30</sup> or “flatlined.”<sup>31</sup> Chairman Pai’s falsehoods are based on analysis by the USTelecom Association (“USTA”)<sup>32</sup> and by industry consultant Hal Singer<sup>33</sup> (who received “three Pinocchios” from the *Washington Post* for his falsehoods concerning the tax impacts of Title II).<sup>34</sup>

Both Singer’s and USTA’s analyses and their shared conclusion that ISP industry capital investment declined following the FCC’s February 2015 vote are demonstrably false as we describe herein. First we consider USTA’s analysis of 2014 vs. 2015 ISP industry capital investments. USTA, like the Bureau’s ACES, purports to cover the entire industry – including both publicly traded and non-publicly traded firms. USTA claims a \$1 billion decline from 2014 to 2015. But this analysis is both wrong (contradicted by the U.S. Census Bureau’s analysis) and misleading.

First, USTA’s methodology is opaque. It claims to capture the entire industry, but does not indicate how it estimated results for non-publicly traded companies nor what those estimates were. Second and most important, USTA’s analysis by its own admission manipulated and reduced the publicly reported investments of two companies: Sprint and AT&T.

Sprint’s 2015 capital spending was up sharply from 2014, and this was due in large part to the company’s new strategy of purchasing smartphones and then leasing them to its customers. USTA simply excluded the capital Sprint spent to purchase these leased devices. But this is highly improper for an analysis that purports to present an apples-to-apples comparison of the amount of capital risked in the ISP industry. In 2015, Sprint shook up the industry’s status quo by offering customers “forever free” smartphones. It wanted to attract customers to its largely-built but underutilized LTE network. It was able to do this by purchasing the smartphones and then leasing them to subscribers (as opposed to the normal approach of offering device financing to customers, who then own the device). This change in Sprint’s handset approach represents a very risky capital investment scheme. Furthermore, purchasing equipment to lease is a real capital expense, recognized under Generally Accepted Accounting Principles (“GAAP”). Sprint, not its customers, owns these devices, and is on the hook for selling them on the secondary market if it wishes to recover the remaining capital value of these

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<sup>30</sup> See Remarks of Federal Communications Commission Chairman Ajit Pai at the Mobile World Congress, Barcelona, Spain (Feb. 28, 2017). In this speech Chairman Pai falsely claimed that “after the FCC embraced utility-style regulation, the United States experienced the first-ever decline in broadband investment outside of a recession. In fact, broadband investment remains lower today than it was when the FCC changed course in 2015.” As we showed in Figure 2, the gold standard for aggregate capital spending data (the Census Bureau’s Annual Capital Expenditures Survey) shows that investment increased following the FCC’s vote. The Census data also shows ISP industry capital investment declined slightly from 2013 to 2014, prior to the FCC’s vote, and outside of a recession.

<sup>31</sup> See Remarks of FCC Commissioner Ajit Pai before the Heritage Foundation, “The FCC and Internet Regulation: A First-Year Report Card” (Feb. 26, 2016).

<sup>32</sup> See USTelecom, Research Brief, “Broadband Investment Ticked Down in 2015” (Dec. 14, 2016).

<sup>33</sup> Singer’s most recent work, see Hal Singer, “Bad Bet by FCC Sparks Capital Flight From Broadband,” *Forbes* (Mar. 2, 2017), is a continuation of his selective editing also on display in his summary of 2015 investments. For an explanation of why his prior 2015 analyses were completely wrong, see Free Press, Fact Sheet, “The Truth About ISP Industry Investment After the FCC Net Neutrality Vote” (Sept. 10, 2015), available at <https://www.freepress.net/resource/107129/truth-about-isp-industry-investment-after-fcc-net-neutrality-vote>; Free Press, Fact Sheet, “Singer’s Scare Quotes and Scare Tactics Can’t Hide the Truth on Title II and Investment” (Sept. 15, 2015), available at <https://www.freepress.net/resource/107138/scare-quotes-and-scare-tactics-cannot-hide-truth-on-title-ii-and-investment>; Timothy Karr, Free Press “The Internet Investment ‘Meltdown’ That Isn’t” (Sept. 16, 2015).

<sup>34</sup> See Michelle Ye Hec Lee, “Will the FCC’s net neutrality decision cost Americans \$15 billion in new taxes? Nope,” *Wash. Post* (Jan. 16, 2015).

assets. Sprint's capital spending for leased devices is no different than a cable company's spending on set-top boxes it then leases. Therefore, by excluding Sprint's equipment purchases from its analysis while including all other companies' CPE capital spending, USTA produced a manipulated and biased result.

USTA's other manipulation involved artificial reductions to AT&T's 2015 capital investments. USTA claims it needed to do this in order to account for AT&T's mid-2015 acquisition of DirecTV. But USTA's removal of a portion of AT&T's capital investments in this manner is invalid, because the merger with DTV was a horizontal one. There's no way of producing an after-event *pro forma* estimate of what AT&T's capital investments would have been, because of the synergies from such a horizontal combination.<sup>35</sup> In other words, AT&T would have spent a substantial amount of capital on its standalone U-Verse business if it had not acquired DTV. (And since AT&T touted these savings as major reason justifying the merger, it is strange to suggest that AT&T's investment numbers must be further discounted in order to penalize the company for what it considered a smart business decision to achieve any such savings.) USTA's analysis also appears to incorrectly assume that DTV's 2015 capex would be equal to or higher than what the standalone company expended during 2014. The realization of these capital savings from its horizontal merger is, in part, the reason that AT&T has not reported and will not report *pro forma* results for 2015 (*i.e.*, results assuming DTV was acquired as of January 1, 2015, and not mid-2015 when it actually was). Any attempt to estimate what AT&T's spending would have been in the absence of the merger is analytically suspect.

USTA's analysis relied on these manipulated figures for Sprint and AT&T to manufacture lower investment totals for those two companies. But we also must examine the changes in investment at all other companies. Indeed, if there was an impact from Title II, that impact should have been felt not by AT&T and Sprint alone, but across the entire industry. As the data from Figure 1 above indicates, excluding AT&T and Sprint, capital investments at all other publicly traded ISPs increased by \$2.2 billion from 2014 to 2015, and the two year post-vote aggregate total for these other companies was nearly 10 percent higher than their total from the preceding two years. This strongly suggests the absence of any systemic negative effect from Title II. And when combined with the copiously documented fact that AT&T's post-2014 wireless capex decline was planned years before the FCC's vote, and the copiously documented fact that Sprint's non-handset capital declines were also pre-planned (and temporary), the evidence is overwhelming: USTA's analysis is irresponsible and demonstrably false.

AT&T alone typically accounts for nearly 30 percent of all publicly traded ISPs' capital expenditures, meaning any cyclical change at this one company could swamp the overall industry trend. For this reason alone, it is clear that we must treat aggregate industry results with caution, examining them only alongside individual company results and the reasons for them that each company gives investors. In AT&T's case, the company's overall decline in capital investment during 2015 was a result that it repeatedly told Wall Street to expect, as AT&T completed its so-called "Project VIP" DSL and wireless upgrades. With its nationwide 4G LTE coverage completed in 2014, there was simply no need for AT&T to maintain that same level of capital spending immediately after the project ended. (*See* discussion of AT&T in Part III below).

Singer's analysis of 2015 results, and now his 2016 ISP industry investment recap too, suffers from the same two flaws as USTA's piece. Singer manipulated AT&T's and Sprint's publicly reported capital investments, and he doesn't include publicly available data from numerous other ISPs.<sup>36</sup> Singer directly blames the FCC's 2015

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<sup>35</sup> *See* Comments of John Stephens, Senior EVP & CFO, AT&T Inc., AT&T Inc. Analyst Conference (Aug. 12, 2015) ("Other synergies include capital spending savings. Just one example. Today we have about 70 million set-top boxes in the market between our two platforms. That creates a need for two sets of engineering standards, two roadmaps for planning and two refurbishment groups to support customer needs. As we move to a single set-top box environment we can be much more efficient in these areas. Our new scale will also provide us the capital efficiency opportunity. On average we purchase about 25 percent of that embedded base for replacements in new sale ads.").

<sup>36</sup> Singer and USTA manipulate AT&T's published capital spending data, which they claim is necessary to produce the "right" analysis. But as we've explained previously, because of the horizontal nature of this pay-TV company merger, it is analytically inappropriate to imagine some dollar amount for investment that would have occurred if not for the merger.

vote for his invented aggregate investment declines, while conceding that numerous companies invested more after the vote than they did before the vote in the presence of the exact same (fictional) “threat” from Title II. But lest he acknowledge that these increases reflect the absence of a negative Title II impact, Singer argues that these companies would have invested even more in the alternative. Of course, he never explains how large this delta might be, because he cannot possibly do so. Nor does he explain how it would be possible for a company like Mediacom, which upgraded its entire footprint to gigabit service in less than a year’s time, to go even faster. Singer’s logic is no more sound than a man’s who thinks the sun rose in the morning because he opened his eyes.

This is the height of hackery. This totally unsupported claim – that fears about potential future Title II-based rules (beyond the immediate Open Internet rules) caused an industry-wide reduction in investment – simply cannot be squared with the observed, large increases in network spending at most ISPs. AT&T’s declines (exclusive of the impact of DirecTV) were planned well ahead of the FCC’s February 2015 vote, as were the increases at other ISPs. To assume Title II had a negative impact at all would require that the law uniquely impacted AT&T’s business, in a way that the company then blamed on cyclical project completion, and thus would assume that AT&T’s (and Sprint’s non-CPE capex) business is different from other similarly situated ISPs. This is an absurd proposition in light of voluminous statements to the contrary made by ISPs during 2015 and 2016, and it ignores the massive increase in deployment by other companies large and small during that time.

But even if we entertain the hypothetical that AT&T’s capital spending was “really” lower in 2015–2016, this still doesn’t prove in any way an impact from Title II. Because AT&T represents such a large percentage of the U.S. telecommunications market, any cyclical change in its spending can have an outsized impact on the overall industry’s aggregate result. Contrary to Singer’s assertion that “something happened” in 2015, and his strange attribution of that something to Title II, nothing out of the ordinary happened that year.<sup>37</sup> AT&T completed a period of accelerated investment, just as many other ISPs were beginning to ramp up their own investments.

AT&T’s CEO flatly stated in December 2015 that the year prior to the FCC’s vote was “the monster of all years,” and said that with the completion of Project VIP’s LTE and IP-DSLAM upgrades that “capex has come down rather dramatically.” He went on to list numerous ways in which productivity gains from these prior deployments would allow AT&T to continue expanding capacities but do so with lower total investment. As he put it, “we are going to deploy more fiber next year than we did this year, but the capital requirements are going down.”<sup>38</sup> Finally, when asked if Title II or the Open Internet rules impacted AT&T’s business plans, AT&T’s CEO said “no,” and assured investors that “everything that we are planning on doing fits within those rules.”<sup>39</sup>

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AT&T explicitly states that it does not report segment capital expenditures due to the integrated nature of its businesses. See AT&T Inc. Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 10-K), for the fiscal year ending December 31, 2016, at 51 (“We manage our assets to provide for the most efficient, effective and integrated service to our customers, not by segment, and, therefore, asset information and capital expenditures by segment are not presented.”). If an analyst starts manipulating the company’s reported results nonetheless, then the entire exercise loses meaning, as it is no longer an apples-to-apples comparison. The proper approach is to present the results as reported, and note the possible caveats. Before drawing any conclusions, the responsible analyst should then proceed to examine all available information, examining trends at other companies, looking at all the explanations of why spending at any particular company changed. The responsible analyst would then use reason and logic to reach a conclusion about the systemic impact of any one single factor on the broader market. This is the approach we took in this report, and the only logical conclusion from the wealth of available information is that Title II did not negatively impact ISP company investments – and may have possibly encouraged more rapid deployment of higher capacities, in response to increasing consumer demand for the exact type of content that ISPs had previously expressed interest in blocking or controlling (online video).

<sup>37</sup> See Mike Snider, “Do net-neutrality rules hurt the poor?,” *USA Today* (May 5, 2017).

<sup>38</sup> See Comments of Randall Stephenson, Chairman & CEO, AT&T Inc., at UBS Global Media and Communications Conference (Dec. 8, 2015) (“Yes, so capex, I have been saying for the last year and a half kind of pre-conditioning people that there is – I use the word downward bias on our capital spending and there’s a downward bias for a lot of reasons. Mainly 2014 was like the monster of all years. We finished off our VIP project, so the LTE deployment largely wrapped up in 2014. Our broadband expansion, we went out and deployed 57 million IP broadband homes and finished that in 2014. All of that stuff tailed off in 2014 and so our CapEx has come down rather dramatically. Now going forward, software-defined

The data shows that ever since AT&T closed on its DTV deal, its capital investments are trending higher. Yes, had the FCC rejected AT&T's takeover of DTV instead, then AT&T's capital expenditures still would likely have been slightly lower during 2015–2016 than they were during the peak years of Project VIP (2013–2014). But there's a reason that AT&T had a special investor meeting to announce Project VIP, and why the company called it a "project." It was an extraordinary period of accelerated investment. AT&T massively increased its capital spending to complete its nationwide 4G LTE rollouts (which, funnily enough, it had previously claimed would never happen without approval of its T-Mobile merger plans). It also accelerated IP-DSLAM deployments to give additional life to its otherwise dying DSL business. The data clearly shows that AT&T's capital expenditures peaked in the second quarter of 2014 and then started to decline during the third quarter of 2014, well ahead of the FCC's vote, as Project VIP wound down (see Appendix, Figure A9). And this was something AT&T made explicitly clear on its 2014 investor calls.<sup>40</sup>

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networking, this is not an inconsequential impact on capital requirements. It is a rather significant effect on our capital spend. So there's going to be a continual downward pressure on our capital spending just by virtue of SDN, virtualizing the core network. Think about the cloud moves out of the data center into the core network, so all of the economics that we've experienced in the data center by cloud computing is moving into the big iron core network at AT&T. That's consequential. That's significant. And we are experiencing those effects right now. Also LTE. We are now at a place where the LTE conversion is done and so we are adding capacity. LTE capacity runs about 30 percent to 40 percent cheaper than traditional UMTS capacity, downward bias on capital requirements. Rather than laying up T1s, DS1s and so forth, we are laying up Ethernet. The capital requirements of Ethernet versus a T1? About 40 percent lower. And I could just keep going on and on, but everything about this industry, we are actually starting to get on Moore's Law in this big iron telecom business. We are not quite on Moore's Law, but we are experiencing some of Moore's Law in the big iron and this is a really exciting deal. Now move into fiber deployment. We are going to deploy more fiber next year than we did this year, but the capital requirements are going down. It continues to get cheaper to deploy fiber, pre-spliced fiber and so forth. It is all getting cheaper. Now, once again, later on, 40 megahertz of fallow spectrum on top of the wireless spectrum. We were at dinner last night and somebody said so I should think of spectrum as just prepaid capital. That's exactly what it is. It is capital avoidance. The guy with the best spectrum position has the best cost position in terms of deploying capital in the network. So everything about how this is stacking up is lending ourselves to using this language downward bias. Our capital requirements are getting more and more efficient all the time." (emphasis added).

<sup>39</sup> See *id.* When asked, "So given that backdrop and the plans you've talked today about putting content together with wireless potentially as early as January, can you do everything that you've planned to do with that kind of ambiguity out there? Are these net neutrality or Title II rules an impediment to you moving forward with these products?" Stephenson replied, "No, we don't think so. In fact, there are two layers of what I will call regulations that constrain us right now in terms of things we – what can we do and what can't we do. Obviously, the net neutrality order that is currently before the courts, that is still the law of the land and so we need to comply with that. Everything that we are planning on doing fits within those rules and then we also agreed to some merger concessions in the DirecTV deal and all of this complies with that as well. So we think we are fine there and what is really to us interesting is what happens if the courts do invalidate a couple of pieces of this order. It seems to us it's not inconceivable that we end up at a worse place if you are the FCC than what we have with the 2010 agreement that we all signed that was invalidated by the Verizon case. So anyway stay tuned. This is going to be interesting." *Id.* (emphases added).

<sup>40</sup> See Comments of Randall Stephenson, Chairman & CEO, AT&T Inc., at the Morgan Stanley Technology, Media & Telecom Conference (Mar. 6, 2014). Stephenson was asked, "Randall, just from the standpoint of cash management, could you talk about – a little bit about 2015? It sounds like you are accelerating the spend a little bit more this year. Does that mean that next year could be a down year for capex and if so, could you give us a sense?" Stephenson replied, "So 2014 is the peak year, as I've said, so you would expect capex to move down in 2015 and I don't think we've characterized a quantification of that. But we do expect it to move down. People try to model out capex in our business and the industry and I just tell people, if you take your model and take revenues and multiply it by 15 percent or 16 percent and do a click and drag out as far as you want to go, that is kind of telecom. And I don't envision that changing radically. Although I think we are kind of at a peak end of that range right now." *Id.* (emphases added). Nearly a year and a half later, AT&T's CFO noted that the company expects capital intensities to be below the 15 percent level going forward. See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., AT&T Inc. Analyst Conference (Aug. 12, 2015) ("Capital intensity will remain unchanged in the 15% of revenue range or lower as we get the efficiencies from the software defined networks and the capital spending opportunities we've outlined.").

Furthermore, if we look at AT&T's capital expenses for the period after the company closed the DTV acquisition, we see that investments are trending upwards (see Appendix, Figure A10). AT&T's explanation for this uptick? It is in part due to increased fiber investments, which AT&T is making as it expands its FTTH service to 12.5 million locations (3.8 million reached as of the end of 2016) and as it densifies its cellular network with greater fiber backhaul capacity.

These are knowable facts. Anyone pretending that the truth about AT&T spending is unknowable is either lazy, dishonest, or both. And anyone like Chairman Pai who claims that Title II led to a decline in investment, and who points to the manipulated AT&T data as "proof" while ignoring all other information, is simply acting in bad faith.

In sum, both Singer and USTA manipulated evidence to support a false assertion that ISP capital investments declined following the FCC's 2015 vote. But even if aggregate capital spending does go down in the future, it would not logically follow that such a decline is due to fears of unspecified FCC market intervention. It especially would not follow in the face of copious amounts of evidence about each company's reasons for changes in its capital spending – evidence that is freely available to anyone interested in the truth.

### **Business is Booming: Improved Capacity and Edge Innovation Results in Higher Revenues.**

Wireless and wired internet access services are in high demand. This is because broadband is an essential means for two-way communications, as well as a conduit to an almost unlimited variety of media and entertainment content. This is why the service is present in three-quarters of U.S. homes, with non-adoption driven largely by income inequalities and racial inequalities.<sup>41</sup>

Broadband access is also a service offered in a marketplace with very little competition, particularly for wired home internet.<sup>42</sup> This combination of high demand for an essential service that is evolving at technology's rapid pace, in combination with suboptimal competition, means that broadband carriers have substantial pricing power. This pricing power exists at both the high- and low-ends of the market.

Thus it should come as no surprise that the ISP industry's aggregate revenues continue to grow at a rapid pace. As the data in Figure 4 below shows, total revenues for publicly traded ISPs grew at a compound annual growth rate ("CAGR") of 5 percent during 2013–2016.

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<sup>41</sup> See generally S. Derek Turner, Free Press, *Digital Denied* (Nov. 2016) ("*Digital Denied*").

<sup>42</sup> See *id.* at 107 (showing that the average household has access to 1.7 wired ISPs offering downstream speeds above 10 megabits per second, yet 32 percent of the population has just one ISP or no ISPs at this downstream threshold).



Figure 4: Total Revenues at Publicly Traded Broadband Providers (2013–2016)

Revenues (\$ thousands)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015-2016 vs. 2013-2014)	Compound Annual Growth Rate (2013-2016)
Comcast (cable)	\$41,836,000	\$44,165,000	\$46,928,000	\$50,048,000	\$86,001,000	\$96,976,000	12.8%	6.2%
Charter-TWC+BHN (pro forma)	\$33,864,653	\$35,610,000	\$37,394,000	\$40,023,000	\$69,474,653	\$77,417,000	11.4%	5.7%
Cablevision (excluding Newsday)	\$5,908,620	\$6,137,909	\$6,308,300	\$6,466,300	\$12,046,529	\$12,774,600	6.0%	3.1%
Suddenlink	\$2,183,301	\$2,330,697	\$2,420,312	\$2,573,160	\$4,513,998	\$4,993,472	10.6%	5.6%
Mediacom	\$1,617,475	\$1,660,081	\$1,721,072	\$1,810,255	\$3,277,556	\$3,531,327	7.7%	3.8%
Wide Open West	\$1,199,700	\$1,264,300	\$1,217,100	\$1,217,100	\$2,464,000	\$2,434,200	-1.2%	0.5%
Cable ONE	\$825,707	\$814,812	\$807,266	\$819,625	\$1,640,519	\$1,626,891	-0.8%	-0.2%
GCI	\$811,648	\$910,198	\$978,534	\$933,812	\$1,721,846	\$1,912,346	11.1%	4.8%
<b>TOTAL PUBLICLY TRADED CABLE MSOs</b>	<b>\$88,247,104</b>	<b>\$92,892,997</b>	<b>\$97,774,584</b>	<b>\$103,891,252</b>	<b>\$181,140,101</b>	<b>\$201,665,836</b>	<b>11.3%</b>	<b>5.6%</b>
AT&T (consolidated)	\$128,752,000	\$132,447,000	\$146,801,000	\$163,786,000	\$261,199,000	\$310,587,000	18.9%	8.4%
Verizon (consolidated)	\$120,550,000	\$127,079,000	\$131,620,000	\$125,980,000	\$247,629,000	\$257,600,000	4.0%	1.5%
AT&T (excl. video & mobility)	\$86,699,000	\$88,852,000	\$91,464,000	\$94,126,000	\$175,551,000	\$185,590,000	5.7%	2.8%
Verizon (wireline)	\$32,993,000	\$32,793,000	\$32,094,000	\$31,345,000	\$65,786,000	\$63,439,000	-3.6%	-1.7%
CenturyLink	\$18,095,000	\$18,031,000	\$17,900,000	\$17,470,000	\$36,126,000	\$35,370,000	-2.1%	-1.2%
Frontier	\$4,762,000	\$4,772,000	\$5,576,000	\$8,896,000	\$9,534,000	\$14,472,000	51.8%	23.2%
Frontier (excluding VZ 2016 acq.)	\$4,762,000	\$4,772,000	\$5,576,000	\$5,274,000	\$9,534,000	\$10,850,000	13.8%	3.5%
Windstream	\$5,988,100	\$5,829,500	\$5,765,300	\$5,387,000	\$11,817,600	\$11,152,300	-5.6%	-3.5%
TDS Telecom (ex. US Cellular)	\$982,400	\$1,116,691	\$1,179,388	\$1,165,352	\$2,099,091	\$2,344,740	11.7%	5.9%
Fairpoint	\$939,354	\$901,396	\$859,465	\$824,443	\$1,840,750	\$1,683,908	-8.5%	-4.3%
Cincinnati Bell	\$1,256,900	\$1,161,500	\$1,167,800	\$1,185,800	\$2,418,400	\$2,353,600	-2.7%	-1.9%
Consolidated Comm. (pro forma)	\$790,777	\$790,745	\$775,700	\$743,200	\$1,581,522	\$1,518,900	-4.0%	-2.0%
Shenandoah Telecom, Co. (pro forma)	\$668,708	\$687,080	\$678,475	\$646,769	\$1,355,788	\$1,325,244	-2.3%	-1.1%
Hawaiian Telecom	\$391,150	\$390,739	\$393,413	\$392,963	\$781,889	\$786,376	0.6%	0.2%
Alaska Comm. System (wireline)	\$199,237	\$215,093	\$219,802	\$226,866	\$414,330	\$446,668	7.8%	4.4%
Otelco	\$78,972	\$73,870	\$71,102	\$68,944	\$152,842	\$140,046	-8.4%	-4.4%
<b>TOTAL PUBLICLY TRADED LOCAL EXCHANGE CARRIERS</b>	<b>\$153,844,598</b>	<b>\$155,614,614</b>	<b>\$158,144,445</b>	<b>\$162,478,337</b>	<b>\$309,459,212</b>	<b>\$320,622,782</b>	<b>3.6%</b>	<b>1.8%</b>
AT&T (consumer mobility)	\$36,243,000	\$36,769,000	\$35,066,000	\$33,200,000	\$73,012,000	\$68,266,000	-6.5%	-2.9%
Verizon (wireless)	\$81,203,000	\$87,646,000	\$91,680,000	\$89,186,000	\$168,849,000	\$180,866,000	7.1%	3.2%
Sprint	\$35,493,000	\$35,125,000	\$32,391,000	\$32,879,000	\$70,618,000	\$65,270,000	-7.6%	-2.5%
T-Mobile	\$24,420,000	\$29,564,000	\$32,053,000	\$37,242,000	\$53,984,000	\$69,295,000	28.4%	15.1%
US Cellular	\$3,918,836	\$3,892,747	\$3,996,853	\$3,938,899	\$7,811,583	\$7,935,752	1.6%	0.2%
<b>TOTAL PUBLICLY TRADED WIRELESS CARRIERS</b>	<b>\$181,277,836</b>	<b>\$192,996,747</b>	<b>\$195,186,853</b>	<b>\$196,445,899</b>	<b>\$374,274,583</b>	<b>\$391,632,752</b>	<b>4.6%</b>	<b>2.7%</b>
<b>TOTAL PUBLICLY TRADED ISP</b> s	<b>\$435,533,538</b>	<b>\$454,970,358</b>	<b>\$479,222,882</b>	<b>\$504,724,488</b>	<b>\$890,503,896</b>	<b>\$983,947,370</b>	<b>10.5%</b>	<b>5.0%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Note: Verizon Wireline revenues for 2014–2016 are as reported in its 2016 10-K; 2013 revenues are restated to reflect impact of divested operations, as described in Verizon's 2015 10-K. Shenandoah Telecom's revenues are pro forma with nTelos (with the latter's 2013 pro forma values reflecting divestitures). The total shown for publicly traded local exchange carriers uses AT&T's reported total revenues less reported video entertainment and consumer mobility revenues (AT&T no longer reports both wireline and wireless segment results separately). The total for all publicly traded ISPs uses AT&T's total consolidated revenues.

But as with investment numbers, the industry's aggregate revenue data does not tell the whole story: some companies are generating higher revenue growth than others, and these differences are largely a reflection of each company's overall business strategy, their competitive position and market power, their adjacent-market lines of business (such as cable TV service or switched voice access), and their underlying technology. For example, over the past four years legacy cable company ISPs saw their revenues increase at a CAGR of 5.6 percent, more than three times the revenue growth rate of 1.8 percent for legacy LEC ISPs.

The cable ISPs' inherent business advantages, both in terms of the strength of their legacy businesses and their current broadband platforms, show up in the revenue growth data. While revenue is growing at both cable companies and LECs, that growth is much more pronounced at the former. Cable company revenues were 11.3 percent higher during the two-year post-Open Internet vote period compared to the two years prior to that vote. The LECs' growth rate for those periods was just 3.6 percent. Sequential annual revenue growth for the cable companies we cover was 5.3 percent, 5.3 percent, and 6.3 percent for 2014–2016. At the LECs we cover, the sequential annual revenue growth rates were 1.2 percent, 1.6 percent, and 2.7 percent during those years.

Revenue growth at wireless companies is on the same trajectory, but the growth is less pronounced than it is for cable companies. Post-Open Internet vote revenue growth was 4.6 percent at the five publicly traded wireless carriers, with a four-year CAGR of 2.7 percent during 2013–2016. But revenue growth in the wireless sector is slowing, largely due to the consumer benefits of increased competition from T-Mobile and Sprint. From 2013 to 2014, wireless industry revenues grew by 6.5 percent, declining to 1.1 percent growth the following year, and just 0.6 percent growth from 2015 to 2016.<sup>43</sup>

As one should expect, revenue growth is not uniform from one company to the next within these industry sectors. For example, T-Mobile's pro-competitive moves let it gain market share from all other carriers. As a result, its four-year revenue CAGR was 15.1 percent during 2013–2016, while AT&T's mobility segment revenues declined by a CAGR of -2.9 percent.<sup>44</sup> Cable ONE's strategy of de-emphasizing video resulted in flat revenues during the past four years, an anomaly amongst its MSO peers. And numerous LECs continued to feel the impact of their declining business in legacy residential voice, residential DSL, and enterprise voice.<sup>45</sup> Indeed, the LECs that invested in higher-capacity data services and other growth services are faring far better than those

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<sup>43</sup> We emphasize that these are the publicly reported wireless segment revenues at the four national carriers (AT&T, Verizon, T-Mobile, and Sprint) along with US Cellular (a subsidiary of TDS). These data do not include wireless segment revenues at multi-platform carriers such as Shenandoah Telecom, GCI, or Alaska Communications System.

<sup>44</sup> In AT&T's 2016 10-K SEC report, it described its recent revenue trajectory as a reflection of "declines in postpaid service revenues due to customers migrating to our Business Solutions segment and choosing Mobile Share plans, partially offset by higher prepaid service revenues. Our business wireless offerings allow for individual subscribers to purchase wireless services through employer-sponsored plans for a reduced price. The migration of these subscribers to the Business Solutions segment negatively impacted our consumer postpaid subscriber total and service revenue growth. The shutdown of our 2G network also resulted in higher overall churn as subscribers in our reseller and connected device categories upgraded their devices at lower rates than postpaid and prepaid subscribers." Needless to say, these changes in AT&T service plans and customer behavior are tied to competitive forces in the market, as spurred on by federal regulators' 2011 decision to reject AT&T's bid for T-Mobile. Only a biased analyst would look at this evidence and conclude that T-Mobile's rapid growth or AT&T's slight decline in revenues stems from Title II reclassification.

<sup>45</sup> See, e.g., Consolidated Communications Holdings Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 10-K), for the fiscal year ending Dec. 31, 2016 ("Operating revenues also continue to be impacted by the anticipated industry wide trend of a decline in voice services, access lines and related network access revenue."); CenturyLink Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 10-K), for the fiscal year ending Dec. 31, 2016 ("Our total operating revenues decreased by \$430 million, or 2%, for the year ended December 31, 2016 as compared to the year ended December 31, 2015 and decreased by \$131 million, or 1%, for the year ended December 31, 2015 as compared to the year ended December 31, 2014. The decline in operating revenues for both periods was primarily due to lower legacy services revenues, which decreased by \$666 million, or 8%, and \$695 million, or 8%, for the respective periods. . . . Legacy services [ ] include primarily local and long-distance voice services, including the sale of UNEs, private line (including special access), Integrated Services Digital Network ('ISDN') (which use regular telephone lines to support voice, video and data applications), switched access and other ancillary services.").

that chose to do nothing but squeeze as much as they could out of their legacy copper networks.<sup>46</sup> Verizon's segment results offer an instructive example. Its "premium" wireless network continued to deliver (until very recently) revenue and subscriber growth even in the face of T-Mobile's growth.<sup>47</sup> Verizon's wireline revenues are in a perpetual slow decline, but that situation would be worse if not for the company's growing home internet and pay-TV revenues.<sup>48</sup>

The data in Figure 4 captures all the revenues for the companies shown, including revenues generated from product lines that are perhaps impacted by developments in the consumer broadband market but that are not themselves consumer broadband revenues. To get a better sense of how these companies' broadband businesses are faring in isolation, we examined their reported residential high-speed Internet (or data) revenues during the 2013–2016 period. Not all of the companies we track report data revenues, however, and not all that do report such data revenues then go on to report this information separately for residential and enterprise subscribers. *See* notes to Figure 5. The results presented in the main in Figure 5 indicate that high-speed Internet revenues grew at a CAGR of over 12 percent during 2013–2016, more than two times the rate of overall revenue growth for these companies. The data also reflects the fact that LECs otherwise beleaguered by declines in their legacy businesses can achieve growth from broadband, but only if they invest in competitive technologies such as fiber-to-the-home. For example, compare the explosive data revenue growth of Cincinnati Bell (which invested heavily in fiber-to-the-home broadband) with the slower growth in revenues for CenturyLink (a LEC that only deployed targeted fiber upgrades).

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<sup>46</sup> *See, e.g.*, Windstream Holdings Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 10-K), for the fiscal year ending December 31, 2016 ("Our consolidated operating results during 2016 were favorably impacted by revenue growth in consumer high-speed Internet and enterprise data and integrated services, primarily due to continued migration of customers to higher speeds and increased demand, respectively. Additionally, reductions in interconnect expense, enterprise salaries and other benefits, and depreciation and amortization expense positively contributed to the year ended December 31, 2016. Operating results for 2016 also includes a net gain on the disposal of our investment in CS&L common stock and discrete income tax benefits associated with the disposition of this investment. Conversely, the year ended December 31, 2016 was adversely impacted by reductions in small business, wholesale, and switched access revenues due to customer losses from business closures and competition, declining demand for copper-based circuits to towers and the adverse effects of inter-carrier compensation reform, respectively.").

<sup>47</sup> From 2013–2016, Verizon's wireless segment revenues grew at a CAGR of 3.2 percent, with large gains from 2013 through 2015. The segment's revenues declined during 2016. The trajectory of Verizon's wireless revenues offers evidence of how important T-Mobile and Sprint's competitive pressures have been. For example, Verizon described its 8.2 percent increase in wireless revenues during 2014 as "a result of growth in service revenue and equipment revenue." The company described its 4.6 percent increase in wireless revenues during 2015 as "a result of growth in equipment revenue." And it attributed its 2.7 percent decline in wireless revenues during 2016 to "a decline in service revenue driven by customer migration to plans with unsubsidized service pricing, including our new price plans launched during 2016." *See* Verizon Communications Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 10-K), for the fiscal years ending December 31, 2014, December 31, 2015, and December 31, 2016.

<sup>48</sup> *See id.* (10-Ks for 2014, 2015, and 2016). Verizon's explanations for its recent wireline declines all attribute them to declines in legacy LEC business lines, offset by gains in its Fios unit. Verizon described its 0.5 percent wireline revenue decline during 2014 as "a result of declines in Global Enterprise Core and Global Wholesale, partially offset by higher Mass Markets revenues driven by Fios services and increased Strategic services revenues within Global Enterprise." The company attributed 2015's 1.8 percent decline in wireline revenues to "declines in Global Enterprise, partially offset by higher Mass Markets revenues driven by Fios services." And Verizon blamed 2016's 2.3 percent wireline declines again on "declines in Global Enterprise and Global Wholesale," but also indicated the 6-week work stoppage during Spring 2016 impacted Fios growth.

**Figure 5: Residential High-Speed Internet Access Revenues at Publicly Traded Broadband Providers (2013–2016)**

Data Revenues (\$ thousands; Residential/Consumer unless noted)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)	Compound Annual Growth Rate (2013–2016)
Comcast (cable)	\$10,334,000	\$11,321,000	\$12,471,000	\$13,532,000	\$21,655,000	\$26,003,000	20.1%	9.4%
Charter+TWC+BHN (pro forma)	\$9,124,294	\$10,178,000	\$11,295,000	\$12,688,000	\$19,302,294	\$23,983,000	24.2%	11.6%
Cablevision (cable)	\$1,342,627	\$1,416,328	\$1,478,719	N/A	\$2,758,955	\$3,134,884	13.6%	4.9%
Suddenlink	\$507,336	\$592,130	\$690,279	\$823,057	\$1,099,466	\$1,513,336	37.6%	17.5%
Mediacom	\$451,744	\$483,817	\$535,562	\$603,375	\$935,561	\$1,138,937	21.7%	10.1%
Wide Open West	\$329,100	\$353,400	\$351,900	\$373,100	\$682,500	\$725,000	6.2%	4.3%
Cable ONE	\$252,296	\$265,718	\$294,486	\$344,184	\$518,014	\$638,670	23.3%	10.9%
GCI (wireline)	\$99,740	\$113,306	\$130,213	\$140,196	\$213,046	\$270,409	26.9%	12.0%
<b>TOTAL PUBLICLY TRADED CABLE MSOs</b>	<b>\$22,441,137</b>	<b>\$24,723,699</b>	<b>\$27,247,159</b>	<b>\$30,160,077</b>	<b>\$47,164,836</b>	<b>\$57,407,236</b>	<b>21.7%</b>	<b>10.4%</b>
AT&T (entertainment segment)	\$4,219,000	\$5,522,000	\$6,601,000	\$7,472,000	\$9,741,000	\$14,073,000	44.5%	21.0%
CenturyLink	\$2,358,000	\$2,469,000	\$2,611,000	\$2,689,000	\$4,827,000	\$5,300,000	9.8%	4.5%
Frontier (excluding VZ 2016 acq.)	\$1,866,461	\$1,947,967	\$2,337,000	\$2,327,000	\$3,814,428	\$4,664,000	22.3%	7.6%
Windstream (internet bundles)	N/A	\$1,017,600	\$1,032,800	\$1,049,000	N/A	\$2,081,800	2.3%	1.5%
Fairpoint	\$161,423	\$175,490	\$178,620	\$187,268	\$336,913	\$365,888	8.6%	5.1%
Cincinnati Bell	\$89,600	\$106,900	\$122,200	\$147,200	\$196,500	\$269,400	37.1%	18.0%
Consolidated Communications	\$290,787	\$384,089	\$396,529	\$406,558	\$674,876	\$803,087	19.0%	11.8%
Hawaiian Telecom	\$27,888	\$31,024	\$32,687	\$28,993	\$58,912	\$61,680	4.7%	1.3%
Alaska Communications System	\$22,108	\$24,841	\$25,621	\$24,981	\$46,949	\$50,602	7.8%	4.2%
Otelco	\$14,540	\$14,438	\$14,868	\$15,604	\$28,978	\$30,472	5.2%	2.4%
<b>TOTAL PUBLICLY TRADED LOCAL EXCHANGE CARRIERS</b>	<b>\$9,049,807</b>	<b>\$11,693,349</b>	<b>\$13,352,325</b>	<b>\$14,347,604</b>	<b>\$20,743,156</b>	<b>\$27,699,929</b>	<b>33.5%</b>	<b>16.6%</b>
<b>TOTAL FOR COMPANIES SHOWN</b>	<b>\$31,490,944</b>	<b>\$36,417,048</b>	<b>\$40,599,484</b>	<b>\$44,507,681</b>	<b>\$67,907,992</b>	<b>\$85,107,165</b>	<b>25.3%</b>	<b>12.2%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: Values for Windstream's 2013–2014 total assumes 2013 data revenues were equal to 2014. Cablevision's 2015–2016 aggregate total assumes Cablevision's 2016 value (which Alice did not report) reflected industry average growth. CAGR values shown for these two companies reflect growth over the three-year periods shown. The following companies did not report residential vs. commercial or business internet/data revenues for any or all years above: Wide Open West, Frontier, FairPoint, Consolidated Communications. Companies listed in other tables but not here did not report internet access revenues.

This should come as no surprise. Nothing about the FCC's 2015 *Open Internet Order* altered any of the factors driving ISP revenue growth, which continues unabated as the public's demand for open and nondiscriminatory telecommunications services grows – driven by, and growing in tandem with, the similar growth in demand for all of the services that are reachable via broadband.

The aggregate data revenues summarized in Figure 5 show strong continued revenue growth, but do not speak to whether this growth is due simply to a growing market (*i.e.*, subscriber gains) or primarily to revenue gains from existing subscribers. To get a sense of what is happening at the subscriber-level, we calculated the average monthly high-speed internet revenues per subscriber for these wireline ISPs. These results are summarized in Figure 6.<sup>49</sup>

<sup>49</sup> To calculate these average data revenues per subscriber, we divided the publicly reported data revenues for a given ISP by its number of publicly reported subscribers at year's end. This approach will tend to understate the actual revenues per subscriber, because it uses (in most cases) the highest number of subscribers for a given year's revenues, and not the

This analysis indicates that average data revenues per subscriber grew at a CAGR of 9.4 percent during 2013–2016, slightly below the 12 percent growth rate for total data revenues. This suggests that total revenue growth is primarily due to these higher average subscriber revenues, with only a small portion due to overall broadband market growth. (These companies’ subscribership grew at a CAGR of 3.1 percent during this period; see Figure 8). At a CAGR of 9.4 percent, it would appear that consumer expenditures for wired home internet grew at a rate approximately five times the core inflation rate during the same period.<sup>50</sup>

**Figure 6: Calculated Average Monthly High-Speed Data Revenue per Subscriber at Publicly Traded Wireline Broadband Providers (2013–2016)**

Monthly data revenue per Residential High-Speed Internet subscriber*	2013	2014	2015	2016	Compound Annual Growth Rate (2013–2016)
Comcast (cable)	\$41.63	\$42.96	\$44.55	\$45.65	3.1%
Charter+TWC+BHN (pro forma)	\$41.79	\$46.09	\$47.27	\$49.47	5.8%
Cablevision (cable)	\$40.25	\$42.76	\$43.87	N/A	4.4%
Suddenlink	\$39.90	\$42.94	\$47.03	\$53.25	10.1%
Mediacom	\$39.01	\$39.80	\$41.13	\$43.50	3.7%
Wide Open West	\$37.06	\$40.46	\$41.16	\$41.60	3.9%
Cable ONE	\$47.89	\$49.22	\$53.24	\$61.15	8.5%
GCI (wireline)	\$72.09	\$79.28	\$85.24	\$91.56	8.3%
<b>AVERAGE CABLE MSOs (shown)</b>	<b>\$41.58</b>	<b>\$44.23</b>	<b>\$45.72</b>	<b>\$47.69</b>	<b>4.7%</b>
AT&T (entertainment segment)	\$24.56	\$31.86	\$38.51	\$43.91	21.4%
Frontier	\$35.09	\$35.75	\$43.14	\$45.40	9.0%
Windstream	N/A	\$74.94	\$78.59	\$83.17	5.4%
Fairpoint	\$40.99	\$45.71	\$47.84	\$50.90	7.5%
Cincinnati Bell	\$27.82	\$33.01	\$35.43	\$40.46	13.3%
Alaska Comm. System (wireline)	\$47.63	\$55.33	\$64.16	\$60.16	8.1%
Consolidated Communications	\$56.49	\$72.17	\$72.45	\$71.57	8.2%
Hawaiian Telecom	\$25.42	\$27.84	\$29.29	\$26.52	1.4%
Otelco	\$48.99	\$50.61	\$53.38	\$57.94	5.8%
<b>AVERAGE LECs (shown)</b>	<b>\$27.99</b>	<b>\$36.08</b>	<b>\$42.42</b>	<b>\$52.35</b>	<b>23.2%</b>
<b>AVERAGE ISP (shown)</b>	<b>\$37.40</b>	<b>\$41.67</b>	<b>\$44.74</b>	<b>\$49.01</b>	<b>9.4%</b>

Source: Free Press analysis of company SEC filings (10-Ks; 8-Ks; Financial Supplements). Values are calculated based on year-end reported data revenues and subscriber counts, as shown in Figure 5 (data revenues) and Figure 8 (data subscribers). Windstream’s CAGR is from 2014–2016. Cablevision’s CAGR is from 2013–2015.

actual average number of subscribers during that year. Thus, this data should be considered along with the company-reported average revenues per account/subscriber/user summarized in Figure 7.

<sup>50</sup> The annual non-seasonally adjusted CPI values (less food and energy) for 2013–2016 were 1.8 percent, 1.7 percent, 1.8 percent and 2.2 percent respectively (an average of 1.875 percent). Non-seasonally adjusted CPI for all items (including food and energy) during 2013–2016 were 1.5 percent, 0.8 percent, 0.7 percent, and 2.1 percent (an average of 1.275 percent). See United States Department of Labor, Bureau of Labor Statistics, Consumer Price Index (CPI) News Release, USDL-17-0058 (Jan. 18, 2017); see also past CPI releases numbered USDL-14-0037, USDL-15-0018, and USDL-16-0109.

The data summarized in Figure 6 shows somewhat uneven growth, depending on the company. To the extent that there's any overarching takeaway from this information, it's that LECs that invested in fiber-to-the-home (e.g., Cincinnati Bell) or VDSL (e.g., AT&T) had their investments rewarded with substantial data revenue growth.

We calculated the average monthly high-speed data revenues per subscriber shown in Figure 6 using company-reported annual data revenues and year-end data subscribers. These calculated figures are thus imprecise because they represent total annual revenues divided by year-end subscribers, not by the average number of subscribers for the relevant year. To better understand the data revenue trajectories at U.S. ISPs, in Figure 7 we present the average revenues per user for various customer types and services as reported by publicly traded companies that disclose this type of information.

Unfortunately, very few companies report per-subscriber average high-speed internet revenues. Most only disclose average revenues per customer relationship, which for most companies includes revenues from multiple residential services (internet access, cable TV service, internet and cable TV equipment rental, telephone, alarm, etc.). For the companies that do disclose average internet revenues per internet subscriber, we observe CAGRs of 8 to 12 percent during 2013–2016. The per-subscriber revenue CAGRs for the remaining wired ISPs show low single-digit growth for traditional pay-TV companies and high single-digit growth for LECs. The data reflects the fact that ISPs have ample pricing power in broadband, but face headwinds in their legacy pay-TV and telephone businesses.<sup>51</sup>

The wireless carriers shown in the bottom of Figure 7 universally experienced declining post-paid average revenues per user during 2013–2016. These declines are in part a reflection of price competition created by T-Mobile and Sprint as well as Mobile Virtual Network Operators (“MVNOs”) such as Tracfone. It also reflects the impact of an important industry shift: moving away from more expensive post-paid service plans for which handsets were subsidized; and towards less expensive, pre-paid service plans for which customers purchase their own devices separately.

One consequence of rapidly growing revenues across the board, however, is that it can lead to lower “capital intensity” – which measures capital expenditures expressed as a percentage of revenues. That metric is of particular interest to investors because it offers them a simple way to gauge how a company's investments are changing relative to its overall business. If a company invests heavily in its business, capital intensity will likely increase; but shareholders expect those investments to lead to future revenue growth, and thus to likely lower future capital intensity as well. Investors in the ISP sector generally prefer capital investments to be as low as possible, but not so low that they lead to customer loss.<sup>52</sup>

But even capital intensity can be somewhat misleading, depending upon the rate of growth of each of the metric's components. For example, during 2013, T-Mobile invested \$4 billion in capital equipment and took in \$24.4 billion in revenues. This equated to a capital intensity of 16.5 percent, or \$16.50 of capital invested for every \$100 in revenue. In 2016 T-Mobile's capital expenditures were \$4.7 billion, a 16 percent increase above its 2013 capex level; but its revenues in 2016 were \$37.2 billion, more than 50 percent higher than 2013. Combined, this means that during 2016, T-Mobile invested \$12.60 in capital for every \$100 in revenues – a capital intensity of 12.6 percent. This trajectory mirrors that of the ISP industry overall, with capital expenses rising at a slightly lower rate than revenues are, resulting in a slow decline in capital intensity (see Appendix, Figure A8). The lesson here is a well-worn business truism: you have to spend money to make money. In the ISP industry, with enormous economies of scale and high entry barriers, this return on investment is one of the safest bets possible.

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<sup>51</sup> See, e.g., Tony Lenoir, “Q4'16 cable sector data depicts well-oiled cash flow machine,” *SNL Kagan* (Mar. 28, 2017) (showing average cash flow margins for Comcast and Charter to be 15 percent for pay-TV segments, 18 percent for telephone, and 61 percent for high-speed data – which is an all-time high for data).

<sup>52</sup> See, e.g., Karl Bode, “Even Wall Street Thinks Frontier Should Upgrade its Damn Network,” *DSL Reports* (Mar. 31, 2017).

**Figure 7: Reported Average Monthly Revenues per User  
at Publicly Traded Broadband Providers (2013–2016)**

Average Revenues per User (as reported)	2013	2014	2015	2016	Compound Annual Growth Rate (2013–2016)
Comcast (average revenue per customer relationship)	\$131.22	\$137.04	\$142.89	\$148.26	4.2%
Charter (pro forma) (average revenue per residential customer)	N/A	\$106.33	\$108.22	\$109.77	1.6%
Cablevision (average revenue per cable customer)	\$147.34	\$155.20	\$155.88	N/A	2.9%
Suddenlink (average revenue per residential customer) Cequel-reported	\$109.00	\$108.82	\$111.80	\$117.00	2.4%
Mediacom (average revenue per customer relationship)	\$105.88	\$109.87	\$110.50	\$113.04	2.2%
GCI (average revenue per cable modem subscriber)	\$70.50	\$78.87	\$85.03	\$88.37	7.8%
Cable One (average revenue per residential data subscriber)	N/A	\$49.53	\$53.89	\$61.68	11.6%
Frontier (ARPU per residential customer)	\$59.23	\$61.11	\$69.93	\$77.47	9.4%
Windstream (average revenue per household)	N/A	\$67.44	\$70.36	\$74.45	5.1%
Consolidated Communications (Consumer ARPU)	N/A	\$72.58	\$83.90	\$84.15	7.7%
Alaska Comm. System (average revenue per consumer broadband subscriber)	\$48.27	\$53.17	\$60.75	\$61.26	8.3%
AT&T Wireless Service ARPU	\$47.58	\$42.04	\$38.78	\$36.58	-8.4%
AT&T Wireless Postpaid ARPU	\$66.07	\$58.43	\$55.58	\$53.59	-6.7%
AT&T IP Broadband ARPU	N/A	\$44.13	\$47.22	\$49.69	6.1%
Verizon Wireless Retail postpaid Average Revenue per Account	\$153.93	\$159.86	\$152.63	\$144.32	-2.1%
Sprint Postpaid ARPU	\$63.44	\$58.63	\$52.48	\$49.70	-7.8%
Sprint Prepaid ARPU	\$27.34	\$27.61	\$27.44	\$27.61	0.3%
T-Mobile Postpaid Phone ARPU	\$53.03	\$49.44	\$47.68	\$47.47	-3.6%
T-Mobile Prepaid ARPU	\$34.59	\$37.10	\$37.68	\$37.92	3.1%
US Cellular postpaid ARPU	\$54.23	\$56.51	\$51.46	\$45.19	-5.9%
US Cellular prepaid ARPU	\$31.45	\$35.33	\$35.54	\$33.25	1.9%
GCI (wireless ARPU)	\$48.71	\$49.97	\$45.82	\$38.41	-7.6%

*Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). CAGR values for Charter, Cablevision, Windstream, Consolidated Communications, and AT&T IP Broadband are based on the years shown.*

## Business is Booming: If You Build It They Will Come.

Though several recent surveys suggest that wired home broadband subscriber growth has stalled, this is not reflected in the reported subscriber totals (both as reported by publicly traded ISPs to investors, and as reported in the FCC's Form 477 subscriber totals).<sup>53</sup> From 2013–2016 the number of wired internet subscriptions at publicly traded ISPs increased by 7.5 million, a CAGR of 3.1 percent (*see* Figure 8).

Net growth was only seen in the cable sector, however, as LECs collectively continued to shed customers. Wired broadband subscribers on the whole are dropping slower and less expensive DSL lines in favor of faster and more expensive cable modem service. Publicly traded LECs lost nearly a quarter million high-speed internet subscribers between 2013–2016, a CAGR of -0.2 percent. LECs that invested in next-generation services like VDSL and fiber-to-the-home generally saw better subscriber growth than their ADSL-reliant peers, but not nearly the level enjoyed by most cable company ISPs.

Wireless carriers enjoyed continued healthy subscriber growth, even as the market saturated. The number of wireless subscriptions at publicly traded carriers grew at a CAGR of 5.9 percent during 2013–2016. The bulk of this recent growth, however, was concentrated at just a few carriers. During 2013–2016, T-Mobile added 24.7 million wireless lines, approximately 41 percent of the total industry growth during this period. AT&T captured 33 percent of the net additions, Verizon had 19 percent, and Sprint had 7 percent.

Wireless industry growth was relatively steady during the past four years, with 2015 the peak year of growth during that period. Cable ISP customer growth accelerated following the FCC's 2015 vote, in part reflecting increased customer demand for connections capable of delivering high-quality streaming video content.

But while cable companies and LECs that made next-gen system upgrades continued to enjoy strong high-speed internet revenue and subscriber growth, their pay-TV segments continued to lose customers. The 19 publicly traded pay-TV operators we track collectively have lost nearly two million subscribers since the end of 2013 (*see* Figure 9). This decline started in 2015, as consumers' online TV replacement options expanded dramatically following the FCC's Open Internet vote (*see* Part II). The widespread availability of nondiscriminatory broadband access lines, as ensured by the successful *Open Internet Order* and legal framework, has started to transform the pay-TV market for good. It is moving away from a highly concentrated industry that forced customers into bloated and expensive pay-TV channel bundles, and becoming a market in which user demands finally drive supply.<sup>54</sup> This is a shining example of how critical it would be to our collective well-being to have near ubiquitous availability of affordable, nondiscriminatory telecommunications services. Broadband is basic infrastructure, but its utility is a function of its usability. If it is operated as a private carriage platform, its utility as infrastructure is destroyed. And while nondiscriminatory broadband access alone is not sufficient to ensure greater content diversity or internet affordability, it is a necessary component for both policy goals.

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<sup>53</sup> *See Digital Denied* at 20–21 (describing Pew and U.S. Census Bureau Current Population Survey data suggesting stalled wireline home broadband adoption, even as companies' reported wired subscription growth outpaced household growth). As our report noted: "For example, the Supplement results indicate that the number of households subscribing to (one or more) wired-internet service(s) decreased by 6.75 million from July 2013 to July 2015, a time when the total number of households increased by 2.67 million. This decline in wireline households is very difficult to square with other available data (*e.g.*, FCC data, SEC filings and industry-analyst reports) showing substantial growth in the residential wireline-broadband market during similar time periods, with residential cable-modem lines increasing by approximately 5 million during this two-year period. By all accounts, there is a gap of some 15 to 17 million "missing" wired connections between what the Supplement results indicate and what numerous public and private data sources indicate." *Id.* (internal citations omitted).

<sup>54</sup> For a discussion of the pay-TV market and the potential for "big open pipes" to facilitate consumer choice and competition, *see, e.g.*, S. Derek Turner, Free Press, *Combating the Cable Cabal: How to Fix America's Broken Video Market* (May 2013) ("*Combating the Cable Cabal*").



**Figure 8: High-Speed Internet and Wireless Subscriptions  
at Publicly Traded Broadband Providers (2013–2016)**

Subscribers (HSD or Wireless; Consumer or Residential unless noted)	2013	2014	2015	2016	Compound Annual Growth Rate (2013–2016)
Comcast (cable)	20,685,000	21,962,000	23,329,000	24,701,000	6.1%
Charter+TWC+BHN (pro forma)	18,196,743	18,401,000	19,911,000	21,374,000	5.5%
Cablevision (cable)	2,780,000	2,760,000	2,809,000	2,835,000	0.7%
Suddenlink	1,059,500	1,149,100	1,223,100	1,288,000	6.7%
Mediacom	965,000	1,013,000	1,085,000	1,156,000	6.2%
Wide Open West	740,000	727,800	712,500	747,400	0.3%
Cable ONE	439,032	449,839	460,977	469,053	2.2%
GCI (wireline)	115,300	119,100	127,300	127,600	3.4%
<b>TOTAL PUBLICLY TRADED CABLE MSOs</b>	<b>44,980,575</b>	<b>46,581,839</b>	<b>49,657,877</b>	<b>52,698,053</b>	<b>5.4%</b>
Verizon (wireline, pro forma)	6,930,000	7,024,000	7,085,000	7,038,000	0.5%
AT&T (entertainment segment)	14,313,000	14,444,000	14,286,000	14,179,000	-0.3%
CenturyLink	5,991,000	6,082,000	6,048,000	5,945,000	-0.3%
Frontier (pro forma)	4,432,300	4,541,000	4,514,000	4,271,000	-1.2%
Windstream	1,170,900	1,131,600	1,095,100	1,051,000	-3.5%
TDS Telecom (ex. US Cellular)	288,000	340,100	345,600	363,200	8.0%
Fairpoint	328,183	319,915	311,130	306,624	-2.2%
Cincinnati Bell	268,400	269,900	287,400	303,200	4.1%
Consolidated Comm. (pro forma)	428,955	443,489	456,100	473,403	3.3%
Shenandoah Tel. (excl. wireless)	58,408	63,780	69,021	74,809	8.6%
Hawaiian Telecom	91,437	92,875	93,002	91,089	-0.1%
Alaska Comm. System (wireline)	38,677	37,412	33,275	34,603	-3.6%
Otelco	24,732	23,771	23,211	22,441	-3.2%
<b>TOTAL PUBLICLY TRADED LOCAL EXCHANGE CARRIERS</b>	<b>34,363,992</b>	<b>34,813,842</b>	<b>34,646,839</b>	<b>34,153,369</b>	<b>-0.2%</b>
Verizon (wireless)*	102,799,000	108,211,000	112,108,000	114,243,000	3.6%
AT&T (wireless)**	114,927,484	120,554,000	128,640,000	134,859,000	5.5%
Sprint	55,354,000	55,929,000	58,359,000	59,515,000	2.4%
T-Mobile	46,684,000	55,018,000	63,282,000	71,455,000	15.2%
US Cellular	4,774,000	4,760,000	4,876,000	5,031,000	1.8%
GCI (wireless)	141,500	149,600	227,800	222,500	16.3%
Alaska Comm. System (wireless)	93,127	82,071	N/A	N/A	N/A
Shentel	410,768	433,029	455,352	958,700	32.6%
nTELOS (restated less divestitures)	273,600	282,100	302,000	N/A	N/A
<b>TOTAL PUBLICLY TRADED WIRELESS CARRIERS</b>	<b>325,457,479</b>	<b>345,418,800</b>	<b>368,250,152</b>	<b>386,284,200</b>	<b>5.9%</b>
<b>TOTAL PUBLICLY TRADED WIRED ISP</b>	<b>79,344,567</b>	<b>81,395,681</b>	<b>84,304,716</b>	<b>86,851,422</b>	<b>3.1%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: The following companies did not report residential vs. commercial/business subscriber counts for any or all years above: Mediacom, Wide Open West, Verizon, CenturyLink, Frontier, FairPoint, Consolidated Communications, Shenandoah, Verizon Wireless, AT&T Wireless, Sprint, T-Mobile, U.S. Cellular, ACS, Shentel/nTelos. 2016 Cablevision values are estimated, as Altice now reports subscriber counts excluding business to business connections, but has not revised 2013-2014 counts. \*Verizon wireless subscriber counts represent retail wireless connections, as the company does not report wholesale connections. \*\*AT&T wireless values represent domestic wireless subscribers; 2013 AT&T wireless values include Leap Wireless subscribers.

**Figure 9: Pay-TV Subscribers at Publicly U.S. Companies (2013–2016)**

Video Subscribers	2013	2014	2015	2016	Compound Annual Growth Rate (2013–2016)
AT&T (+DTV)*	25,713,000	26,272,000	25,398,000	25,265,000	-0.6%
Comcast	22,577,000	22,383,000	22,347,000	22,508,000	-0.1%
Charter+TWC+BHN (pro forma)	17,829,813	17,451,000	17,423,000	17,236,000	-1.1%
DISH	14,057,000	13,978,000	13,897,000	13,671,000	-0.9%
Verizon (pro forma less divestitures)	4,147,000	4,453,000	4,635,000	4,694,000	4.2%
Cablevision**	2,813,000	2,681,000	2,594,000	2,529,000	-3.5%
Frontier (pro forma)	1,692,000	1,782,616	1,745,700	1,419,000	-5.7%
Suddenlink	1,177,400	1,138,400	1,092,800	1,041,000	-4.0%
Mediacom	945,000	890,000	855,000	828,000	-4.3%
Wide Open West	694,400	634,700	547,500	501,400	-10.3%
CenturyLink	175,000	242,000	285,000	325,000	22.9%
Cable ONE	538,894	451,217	364,150	320,246	-15.9%
Cincinnati Bell	74,200	91,400	114,400	137,600	22.9%
GCI	136,700	135,400	133,000	125,800	-2.7%
Consolidated Communications	110,621	124,229	117,882	106,343	-1.3%
TDS (cable)	69,200	110,400	106,800	99,000	12.7%
Shenandoah (cable and wireline)	59,418	57,787	55,571	55,918	-2.0%
Otelco	4,164	3,852	3,648	3,350	-7.0%
Hawaiian Telecom	18,393	28,124	35,876	41,557	31.2%
<b>TOTAL REPORTED PAY-TV SUBSCRIBERS</b>	<b>92,832,203</b>	<b>92,908,125</b>	<b>91,751,327</b>	<b>90,907,214</b>	<b>-0.7%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: \*AT&T's values are pro-forma, and exclude DTV's Latin America video subscribers. \*\*Cablevision values for 2016 are estimated to maintain comparability with prior years, as Altice now reports subscribers in a different manner than Cablevision did prior to acquisition.

### **They're In the Money: ISP Profits Continue to Grow After the Open Internet Order.**

All available information demonstrates that the FCC's February 2015 policy and legal interpretation changes did not negatively impact the broadband industry's profitability. Broadband industry profits – as measured by operating cash flows, operating income, and Earnings Before Interest, Taxes, Depreciation and Amortization (“EBITDA”) – were all higher during the two-year period following the FCC's Open Internet vote than in the two-years preceding (see Appendix for data summarizing industry earnings and profit metrics).

Operating cash flow<sup>55</sup> at the publicly traded broadband providers was up 16 percent in the year following the FCC's vote, and the two-year combined value was 5 percent higher than the amount generated during the two years prior to the vote (see Figure A1). Individual company results varied, in some instances due to

<sup>55</sup> Operating cash flow encompasses the cash generated from operating activities. This value is calculated by adding to the firm's net income the cash flow from depreciation and amortization of capital equipment, the value of deferred taxes, joint venture income, and other items. It is a useful measure of a firm's fiscal health, though differences in capital structure could make meaningful comparisons across firms and industries difficult.

acquisitions and divestitures. Standouts, however, included T-Mobile and Sprint, which managed to grow cash flow even with aggressive promotions and investments. GCI's performance was strong, even as the company faced broader economic challenges from Alaska's oil industry decline (*see* discussion of GCI in Part III).

Operating income<sup>56</sup> at the top publicly traded broadband providers increased 56 percent in 2015, and the collective two-year post-vote increase was 18 percent (*see* Figure A2). Verizon and AT&T combined accounted for nearly 70 percent of the industry's income, and for 60 percent of the income gains during 2015–2016.

EBITDA,<sup>57</sup> Wall Street's favorite profit metric, increased 27 percent at the top publicly traded broadband providers in the year following the FCC's Open Internet vote, and increased 16 percent during the two-year period following reclassification (*see* Figure A3). Mergers, acquisitions, divestitures and one-off charges created a wide range of EBITDA performance at individual companies. But the trajectory of profit growth at most publicly traded companies was in line with the trajectory for the broader market sector.

No one should be surprised that the broadband industry's profits continued to soar after Title II restoration and Net Neutrality rule codification. In reality, no informed industry observer is surprised. There was never any reason to expect disruption of this tremendously successful industry, chiefly because the FCC's actions were specifically designed to protect it. The FCC's actions provided certainty to the market, and cemented incentives that reward investment and innovation, while discouraging short-term profit-seeking from harcbrained discriminatory schemes built on ISPs creating and then exploiting artificial scarcity.

The fundamentals of the broadband market remain unchanged: This is a highly concentrated industry, with such large economies of scale and scope that additional entry is not likely regardless of technology progress or changing consumer demand. The industry exhibits natural monopoly economics – particularly the fixed home access segment. Because of the market's fundamental economic structure, we should continue to expect profit growth, precisely because the high demand for this essential service will be met by largely unchallenged incumbents that enjoy the benefits of declining technology costs.<sup>58</sup>

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<sup>56</sup> Operating income is the amount of revenues generated by the business, less operating expenses. It does not include certain expenses such as interest or taxes, but does account for depreciation and amortization. It is therefore a very useful measure of a firm's fiscal health, but does not capture the impact of debt interest or special tax circumstances.

<sup>57</sup> EBITDA represents a firm's profits before the impact of interest payments, taxes, and depreciation or amortization charges. It is therefore a useful proxy for a firm's profitability that enables comparisons across firms in different industries and even between those with unique tax or capital asset structures.

<sup>58</sup> For example, even though Verizon Wireless and AT&T Mobility have faced increased competition in recent years from a revitalized T-Mobile and from Sprint's "half-off" promotions, the biggest two wireless providers have still managed to achieve margin growth. AT&T Mobility's and Verizon Wireless's EBITDA margin, EBITDA service margin and operating margin all achieved historic highs in 2016 (and after declining from 2013 to 2014, these margins have increased since). Verizon's wireless profits grew even as it invested substantially more capital. *See* Appendix, Figure A9.

## PART II

### The FCC's *Open Internet Order* and Title II Restoration Created Marketplace Certainty Followed by Massive Growth in Online Video Investment, Competition and Innovation

The internet is a communications platform. It is an interconnected system of computers that facilitates one-to-one and one-to-many communications. Broadband internet access providers are not “the internet”; they sell, as their name indicates, access to it. There is tremendous value in this service, which is why so many families rank internet access above other goods and services in terms of need and importance. But that valuation depends in large part on the essentially limitless content that a broadband subscription service can deliver. The innovations happening at the edge drive increased demand for these edge services, which in turn drives higher demand for network access. And the reverse is true: increases in broadband access capabilities induce edge innovation to capitalize on those improved capabilities. This is the “virtuous cycle” of innovation and investment that motivated the FCC’s Net Neutrality rules. It is a theory born out by evidence and embraced by the courts.<sup>59</sup>

Evidence of the virtuous cycle already was abundant prior to the FCC’s 2015 vote. Indeed, the need to preserve it motivated the Open Internet rules, and the decision to ground them in Title II. The FCC revisited its prior mistaken decision to classify broadband access as an “information service” and not “telecommunications service” under the Communications Act, rightly deciding that it could not risk this successful framework once more on compromised authority. Yet, the two years following the vote have produced a mountain of new economic evidence conclusively demonstrating the reality and scope of the virtuous cycle.

As we discuss herein, the online video market dramatically expanded during the 24 months following adoption of the *Open Internet Order*. According to SNL Kagan, 25 over-the-top (“OTT”) video services launched in the United States in 2015, and another 17 had launched in 2016 as of November 11th. The numbers of new OTT video launches in those two years were the highest in the company’s database (which counted just 3 such launches in 2013 and 15 in 2014). Put another way, the two years following FCC restoration of Title II for broadband – and with it, the restoration of certainty regarding telecommunications nondiscrimination – saw a 133 percent increase in new OTT services compared to the two years prior to the vote. In fact, more major U.S. OTT video services launched in those two years after the vote than in the seven preceding years combined.<sup>60</sup>

The post-2015 expansion has been driven by the entry of several high-profile “Virtual Service Providers” (“VSPs”), such as Sling TV and DirecTV Now. These VSPs offer OTT pay-TV services that are direct competitors to the traditional linear channel packages offered by incumbent cable and satellite companies. Over the past two years, we’ve also witnessed a proliferation of user-generated live video content, driven by platforms like Facebook Live, Periscope, and YouTube Live. And the ubiquity of LTE services and smartphone adoption, as well as the near universal adoption of Wi-Fi in broadband-adopting homes, have increased general user engagement with data-rich online media content.

While it is wired and wireless broadband internet access networks that transmit this information, the information itself is generated and processed by computers at the edges. These edge systems range from users’ smartphones to the massive cloud-computing and hosting servers owned by huge corporations like Amazon, Google, Apple, and others. And these firms providing these facilities that generate and store internet content all depend on the legal certainty – granted by the Open Internet rules, when grounded on solid authority – that telecommunications carriers will not be able to interfere unreasonably with the transmission of this content.

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<sup>59</sup> *Verizon v. FCC*, 740 F.3d 623, 644–45 (D.C. Cir. 2014) (“The Commission’s finding that Internet openness fosters the edge-provider innovation that drives this ‘virtuous cycle’ was likewise reasonable and grounded in substantial evidence.”).

<sup>60</sup> See “Internet Media & OTT Market Industry Presentation, Q4 2016, *SNL Kagan* (Jan. 17, 2017). This article covers 2016 launches up to mid-November 2016. As we note below, several additional domestic OTT services launched in December 2016 and during the first quarter of 2017.

Title II's restoration and the Open Internet rules brought that degree of certainty to all participants in the broadband market. Carriers have clarity about their legal obligations. The businesses and people using broadband to conduct commerce, to communicate with each other, and to produce and consume media, all can be certain that carriers will transmit their data in a reasonably nondiscriminatory manner. This certainty for all (along with the disincentives the rules created against profiting from artificial broadband scarcity and discrimination) drove the massive investments and expansions at U.S. ISPs described in Part I. But the open internet is a platform for all manner of economic and societal activity, not just a collection of access lines plowed into the ground for ISPs' own sake. The certainty that came from unquestionably preserving that platform's longstanding openness was also followed by massive investments throughout the internet ecosystem.

As Figure 10 shows, capital spending in edge computing industry sectors began to grow dramatically after the election of a President who championed sound legal protection of the open internet. The fulfillment of that promise by the FCC in 2015 was followed by more growth. The "data processing, hosting, and related services" sector (which includes app hosting services like Amazon Web Services ("AWS") and video streaming services like Netflix) saw tremendous growth in capital investment: a \$3.5 billion one-year increase (26 percent) following the FCC's 2015 Open Internet vote.

**Figure 10: Capital Expenditures by Telecom-Adjacent U.S. Firms<sup>61</sup>**  
**(U.S. Census Bureau Annual Capital Expenditures Survey, 2008–2015)**

Industry Sector	Capital Expenditures for Structures and Equipment for Companies with Employees (\$ millions, nominal)									
	2008	2009	2010	2011	2012	2013	2014	2015	Change 2014 to 2015	% Change
Data processing, hosting, and related services	\$4,123	\$4,003	\$7,515	\$7,281	\$6,276	\$12,830	\$13,357	\$16,858	\$3,501	26.2%
Other information services	\$3,065	\$2,917	\$6,382	\$6,199	\$7,527	\$10,197	\$16,608	\$15,979	-\$629	-3.8%
Computer systems design and related services	\$7,442	\$8,420	\$7,450	\$7,915	\$8,574	\$10,429	\$7,569	\$7,886	\$317	4.2%

Source: U.S. Census Bureau Annual Capital Expenditures Survey ("ACES"), Tables 4a (2015) and 4b (revised values for 2008–2014). Note: ACES data prior to 2008 represents different industry sectors and is not comparable to values from subsequent surveys.

<sup>61</sup> See OMB NAICS 2017. These industry sectors are defined as follows:

**Data Processing, Hosting, and Related Services:** "This industry comprises establishments primarily engaged in providing infrastructure for hosting or data processing services. These establishments may provide specialized hosting activities, such as Web hosting, streaming services, or application hosting (except software publishing), or they may provide general time-share mainframe facilities to clients. Data processing establishments provide complete processing and specialized reports from data supplied by clients or provide automated data processing and data entry services. Illustrative Examples: Application hosting, Optical scanning services, Web hosting, Computer data storage services, Video and audio streaming services, Computer input preparation services, Microfilm imaging services, Computer time rental."

**Other Information Services:** "Industries in the Other Information Services subsector group establishments supplying information, storing and providing access to information, searching and retrieving information, operating Web sites that use search engines to allow for searching information on the Internet, or publishing and/or broadcasting content exclusively on the Internet. The main components of the subsector are news syndicates, libraries, archives, exclusive Internet publishing and/or broadcasting, and Web search portals."

**Computer Systems Design Services:** "This U.S. industry comprises establishments primarily engaged in planning and designing computer systems that integrate computer hardware, software, and communication technologies. The hardware and software components of the system may be provided by this establishment or company as part of integrated services or may be provided by third parties or vendors. These establishments often install the system and train and support users of the system. Illustrative Examples: Computer systems integration design consulting services, Local area network (LAN) computer systems integration design services, Information management computer systems integration design services, Office automation computer systems integration design services."

Thus, any analysis of the impact from restoring Title II and protecting the open internet with strong rules must focus on that entire internet ecosystem. Any analysis that looks only at ISP capital expenditures – such as those advanced by the ISPs themselves and by their paid analysts – would tell just a fraction of the whole story, even if it were getting that ISP-centric portion of that story right. (And as Part I above shows, the sky-is-falling crowd is decidedly not getting that broadband investment analysis right.)

Failing to account for the whole ecosystem would ignore the ISP market’s non-capital contributions to economic growth, such as consumer and producer surpluses resulting from user payments for broadband internet access services. It would ignore capital contributions to the economy from edge businesses, such as the purchase of streaming media servers. And it would ignore the internet edge’s non-capital contributions to GDP too, such as investment in programming, salaries for employees of online media firms, and similar expenditures.

### **Subscription Video On Demand (“SVOD”) OTT Services Expanded Dramatically Following the FCC’s *Open Internet Order*.**

Most discussions of the state of the video industry in recent years center around the decline in traditional pay-TV service subscribers, and the role that online video services may play in that. Though figures vary based on source, it is clear that the traditional video market is in decline both in terms of the number of subscribers and the percentage of households adopting. As shown above in Figure 9, publicly traded pay-TV providers lost 2 million subscribers in the past two years. Other estimates for the full market indicate a two-year loss of nearly 3 million subscribers.<sup>62</sup> These declines come as the universe of occupied households grows, which translates into a decline in the percentage of pay-TV adopting households. SNL Kagan’s most recent estimates indicate that the percentage of occupied U.S. households subscribing to traditional pay-TV peaked at 81 percent during the quarter that the FCC reclassified and adopted the Open Internet rules (Q1 2015), but declined thereafter to 77 percent by the end of 2016.<sup>63</sup>

The size of the decline in the total number of pay-TV subscribers doesn’t necessarily match the magnitude of the growth in households relying solely on online video. This is because the subscribers dropping pay-TV service may be relying solely on broadcast television instead rather than online video, meaning that not all of those cutting the cord are subscribing to SVOD services. At the same time, these declines in pay-TV subscriptions might also understate the growth in online video too, because measuring pay-TV subscriber loss does not capture the population of households that never subscribed to pay-TV in the first place (“cord-nevers”).

To arrive at a reasonable estimate of the household population relying on online video only, we utilize estimates of the number of households that subscribe to broadband (necessary to receive online video) but that do not subscribe to traditional multichannel video. These estimates shown in Figure 11 below suggest that there are nearly 16 million broadband-only households, meaning that they take broadband internet access service at home but neither a pay-TV service that is bundled with that internet access by the same provider nor pay-TV from a separate provider. This broadband-only figure represents about 13 percent of all occupied households in the United States. The growth in broadband-only households accelerated following the FCC’s 2015 *Open Internet Order* vote, with 37 percent growth in the two-year period following the vote compared to 19 percent growth in the number of broadband-only households in the two-year period preceding the vote. Most of these broadband-only households either subscribe to a paid-OTT service or watch free online video programming, putting the total proportion of households that rely solely on online video near 11 percent of all occupied U.S. households.<sup>64</sup>

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<sup>62</sup> See, e.g., Alan Breznick, “Cord-Cutting Hits New Heights,” *Light Reading* (Mar. 3, 2017).

<sup>63</sup> See Chris Young, Ian Olgeirson, Tony Lenoir, “Q4’16 video subscriber declines bite into US multichannel,” *SNL Kagan* (Mar. 9, 2017).

<sup>64</sup> See Ian Olgeirson, “OTT, online alternatives have measured impact on US household segmentation,” *SNL Kagan* (Oct. 18, 2016).

Figure 11: Broadband-Only U.S. Households (2013–2016)

Households Subscribing to Wired Broadband But not Traditional Multichannel Video	Mar. 1, 2013	Mar. 1, 2014	Mar. 1, 2015	Mar. 1, 2016	Mar. 1, 2017	Growth 2-Years Pre-FCC Vote	Growth 2-Years Post-FCC Vote
	Housholds (estimated)	9,520,000	10,200,000	11,370,000	13,600,000	15,600,000	
<i>Year-to-Year Change</i>		680,000	1,170,000	2,230,000	2,000,000	1,850,000	4,230,000
<i>Year-to-Year % Change</i>		7.1%	11.5%	19.6%	14.7%	19.4%	37.2%

Source: Free Press projections based on SNL Kagan and Nielsen estimates.<sup>65</sup>

The total number of pay-TV subscriptions has declined in recent years. It is important to note that prior to 2015, however, legacy cable MSOs were losing video customers but telco TV providers were gaining subscribers while satellite stayed flat. After the FCC’s February 2015 vote, MSOs made a concerted effort to change their approach: they now generally focus on marketing a broadband-first offering while also differentiating their video services as complementary to online video services like Netflix. This is producing results for MSOs, particularly Comcast. Meanwhile, AT&T’s planned shift away from U-Verse towards DTV<sup>66</sup> is producing large declines for the number of telco pay-TV subs; but along with the impact of DISH’s Sling TV unit, AT&T’s shift to satellite reversed prior year’s net losses for the U.S. satellite sector.<sup>67</sup>

To be clear, online video providers like Netflix, Amazon Prime Video, and Hulu are a key force driving pay-TV industry subscriber declines. These SVOD services certainly contribute to an ongoing secular change in how people (in particular, younger people) expect to watch video. But observers often overstate the impact of SVOD services on cord-cutting in particular. While SVOD services may be the method of choice for many young adults who were never traditional pay-TV customers,<sup>68</sup> services like Netflix are complementary consumption methods for the vast majority of users.<sup>69</sup> The majority of SVOD customers are paying for multiple SVOD services and for traditional cable or satellite TV. According to a recent survey conducted by Parks Associates, half of the households subscribing to an OTT service subscribe to more than one.<sup>70</sup> This mirrors

<sup>65</sup> See “The Nielsen Total Audience Report Q3 2016” (Jan. 3, 2017); see also “The Nielsen Total Audience Report Q2 2016” (Sept. 26, 2016); “The Nielsen Total Audience Report Q1 2016” (June 27, 2016); “The Nielsen Total Audience Report Q4 2015” (Mar. 24, 2016). We note that Nielsen’s topline estimate for “broadband-only homes” does not include broadband-only homes using TV antennas. See also Tony Lenoir, “Q4’16 broadband-only home penetration shows segment solidifying,” *SNL Kagan* (Mar. 23, 2017) (“We estimate the U.S. counted nearly 15.4 million non-multichannel broadband homes, or ‘broadband-only homes,’ at the end of 2016, implying that 13% of U.S. occupied households and one out of six broadband-subscribing homes make the decision not to take a traditional multichannel package.”); Tony Lenoir, “As broadband-only homes flirt with 14-million mark, stars align for metric to soar,” *SNL Kagan* (May 24, 2016); Tony Lenoir, “SNL Kagan estimates 10.7 million broadband-only homes in the US,” *SNL Kagan* (Dec. 8, 2014).

<sup>66</sup> See Scott Moritz, “AT&T Takes U-Turn on U-Verse as It Pushes Users Toward DirecTV,” *Bloomberg* (Feb. 15, 2016).

<sup>67</sup> See, e.g., Leichtman Research Group, Press Release, “Major Pay-TV Providers Lost About 795,000 Subscribers in 2016” (Mar. 16, 2017) (noting that DirecTV’s and DISH’s traditional satellite businesses gained 191,000 subscribers in 2016, with Sling TV and DirecTV Now contributing an additional 845,000 net additions for those companies).

<sup>68</sup> See, e.g., Steven Perlberg, “TV’s Looming Threat: Cord-Nevers,” *Wall Street Journal* (Oct. 6, 2015) (describing the results of a Forrester Research survey, which found that “cord-nevers” comprise 18 percent of the U.S. population, with half of those being under the age of 33, and that half of cord-nevers “use Netflix and YouTube”).

<sup>69</sup> See, e.g., Brian Bacon, “US consumers look to multiple sources for TV content,” *SNL Kagan* (Feb. 15, 2017) (reporting survey results showing that 59 percent of multichannel subscribers subscribe to one or more online video services).

<sup>70</sup> See Sean Buckley, “About 50% of OTT video subs have multiple subscriptions, Parks says,” *Fierce Cable* (Jan. 4, 2017).

other survey results, one of which indicated that one-third of OTT households subscribe to three or more such services.<sup>71</sup>

SVOD services may not prove quite the disruptor that online pay-TV replacements such as Sling TV may be. Yet SVOD services are an integral part of the online ecosystem. From the last mile, to the interconnection points, to the edge, and beyond to the production studios in Hollywood, SVOD services are a primary driver of internet investment and innovation. And the SVOD market was already a major success story, but it began an even better chapter following the FCC's 2015 vote. The leading SVOD companies massively increased capital and content investments around the time of that vote, with tens of billions of new dollars poured into the U.S. economy and thousands of new jobs created in this fast growing industry. Below we catalog these developments at each leading SVOD company.

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### Netflix

Netflix was one of the first online SVOD providers, offering its DVD rental by mail customers limited streaming content beginning in 2007. In 2011, it launched a standalone streaming service in the U.S. Since then, its business has shifted dramatically into streaming and into original content production too. Netflix ended 2016 with 49.4 million domestic streaming subscribers, up from 21.7 million at the end of 2011. This growth came as Netflix ploughed money into its content portfolio, and into its capital assets and technology support systems too.

These investments all accelerated following the *Open Internet Order*. As Figure 12 shows, during the two years following that February 2015 vote, Netflix spent \$14.4 billion on streaming content, more than double the \$6.8 billion it spent during the 24 months prior. Its reported expenditures for "technology and development"<sup>72</sup> also nearly doubled during those time periods (\$0.85 billion during 2013–2014 vs. \$1.5 billion during 2015–2016). And though not in a traditionally capital-intensive business like broadband, Netflix's capital expenditures also accelerated following the FCC's vote, from \$124 million during 2013–2014 to \$199 million during 2015–2016.

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<sup>71</sup> See, e.g., Keith Nissen, "Surveys indicate OTT video growth due to increased adoption by older adult households," *SNL Kagan* (Sept. 21, 2016) (showing that 54 percent of OTT households subscribed to two or more such services, and 33 percent subscribed to three or more).

<sup>72</sup> In SEC filings, Netflix defines technology and development expenses as "costs incurred in making improvements to our service offerings, including testing, maintaining and modifying our user interface, our recommendation, merchandising and streaming delivery technology and infrastructure" and "costs associated with computer hardware and software."



**Figure 12:  
Netflix Content, Capital and Technology Development Investment; Subscribers (2011–2016)<sup>73</sup>**

Netflix Expenses	2011	2012	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Cash used for addition to streaming content assets (\$000)	\$2,320,732	\$3,515,506	\$3,030,701	\$3,773,019	\$5,771,652	\$8,653,286	\$6,803,720	\$14,424,938	112.0%
<i>Year-to-Year % Change</i>		8.4%	20.5%	24.5%	53.0%	49.9%			
Technology and Development (\$000)	\$259,033	\$329,008	\$378,769	\$472,321	\$650,788	\$852,098	\$851,090	\$1,502,886	76.6%
<i>Year-to-Year % Change</i>		27.0%	15.1%	24.7%	37.8%	30.9%			
Capital Expenditures (\$000)	\$49,682	\$40,278	\$54,143	\$69,726	\$91,248	\$107,653	\$123,869	\$198,901	60.6%
<i>Year-to-Year % Change</i>		-18.9%	34.4%	28.8%	30.9%	18.0%			
Domestic Streaming Subscribers (year-end)	21,671,000	27,146,000	33,420,000	39,114,000	44,738,000	49,431,000	72,534,000	94,169,000	29.8%
<i>Year-to-Year % Change</i>		25.3%	23.1%	17.0%	14.4%	10.5%			

Source: Netflix 10-K SEC filings for 2011–2016.

We've previously documented how Netflix's rising popularity was directly associated with the cable ISP sector's deployment of faster speeds.<sup>74</sup> Despite the real symbiotic nature of this relationship, ISPs historically viewed it as adversarial. While MSOs recognized the substantial majority of Netflix subscribers also subscribe to traditional pay-TV services, these companies were wary of SVOD services as a catalyst for "cord cutting" and thus a threat to pay-TV earnings. Cable also had a bit of "use my pipes for free" worry, contemplating usage-based billing to extract an additional portion of the economic value created on their last mile broadband networks (beyond what they already extract from charging higher monthly fees for higher speeds).<sup>75</sup>

The tense SVOD-ISP relationship boiled over during 2014, with the so-called "peering" disputes (which, as we've also documented, were not peering issues but terminating access monopoly abuse issues).<sup>76</sup> In short, before the FCC's adoption of Open Internet rules and restoration of Title II authority, U.S. streaming video consumers were plagued with poor performance because ISPs refused to make upgrades at interconnection points despite the minuscule cost of doing so. But following the vote, we now see major ISPs like Comcast integrating OTT services like Netflix into their set-top boxes, and even offering free Netflix access promotions.<sup>77</sup>

Finally, we note that the number of Netflix employees also increased dramatically following the FCC's 2015 vote. After ending 2011 with 2,927 employees, the company shed workers in 2012 (down to 2,429) and again in 2013 (down to 2,327), before slightly increasing by the end of 2014 (at 2,450). But at the end of 2015, the

<sup>73</sup> Data in this table begins in 2011, the first full year after Netflix first offered standalone subscription streaming service. Netflix standalone streaming launched in Canada in the fourth quarter of 2010, then expanded into the U.S. in 2011. See Netflix, Letter to Shareholders, at 2 (Jan. 26, 2011) ("In November last year we introduced our \$7.99 per month pure streaming plan."); see also Netflix 2011 10-K, at 1 ("Prior to July 2011, in the United States, our streaming and DVD-by-mail operations were combined and subscribers could receive both streaming content and DVDs under a single 'hybrid' plan.").

<sup>74</sup> See Petition to Deny of Free Press, *In the Matter of Applications of Comcast Corp. and Time Warner Cable Inc. For Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57, at 40–58 (filed Aug. 25, 2014).

<sup>75</sup> See, e.g., Karl Bode, "Sling TV Boss Says Comcast Usage Caps Hurt Competition," *D.S.I. Reports* (Dec. 7, 2015).

<sup>76</sup> See Free Press 2014 Comments at 144–148.

<sup>77</sup> See Bernie Arnason, "Comcast Free Netflix Promotion Underlies Remarkable Co-opetition Evolution," *Telecompetitor* (Mar. 20, 2017).

company tallied 3,700 workers and finished 2016 with 4,700. This means Netflix nearly doubled its workforce in two years, completely reversing its decline during the company's first four years offering standalone streaming.

### Amazon Prime

Amazon's Prime Video launched in 2011 as a free add-on service for its Prime (free shipping service) customers. Based on its success, and the response to its foray into original programming, in April of 2016 the company began marketing the SVOD service on a standalone basis for \$8.99 per month.<sup>78</sup>

Amazon's investment in acquired and original content escalated substantially following the FCC's February 2015 vote (*see* Figure 13). During the two years prior to the vote, Amazon spent an estimated \$1.5 billion on content (and \$86 million of this was on original programming). For the two years following the vote, Amazon's programming spend more than doubled, to \$3.2 billion (with spending on original content quintupling to \$442 million). Those investments came in response to a large uptick in viewership. Though Amazon does not disclose subscription figures (in part because Prime Video is included in the overall Prime membership), on its 4th quarter 2016 investor call it indicated that it "had a doubling of Prime hours for video, music and reading."<sup>79</sup>

Though Amazon's OTT video service is a "free" add-on for customers ostensibly purchasing a free two-day shipping service, it appears to enjoy high-utilization rates. A 2016 SNL Kagan survey indicated that 72 percent of Amazon Prime subscribers used the Prime Video feature.<sup>80</sup> An estimate produced at roughly the same time of the number of Amazon Prime U.S. subscribers (54 million)<sup>81</sup> then would imply that there are 39 million U.S. Prime subscribers (essentially households) using the Prime Video service. This corresponds to other estimates of subscriber overlap between Netflix and Prime Video.<sup>82</sup>

Amazon's 39 million would be nearly 14 million more subscribers than the nation's largest traditional pay-TV provider: AT&T combined with DirecTV. However, while there are some households that substitute SVOD services like Prime Video for pay-TV, the vast majority of Prime Video subscribers use the service in a complementary manner. This means Prime Video, like Netflix, is more comparable to a premium network such as HBO, which ended 2016 with 50 million subscribers.

While Amazon Prime Video's growth (and the success of its original programming) is impressive, Prime Video is not Amazon's primary online content business. AWS is the company's cloud hosting and computing service, and it underpins many online websites and streaming services including some of the web's most-used applications.<sup>83</sup> Amazon's AWS business, like its streaming video business, saw tremendous growth in the two years following the adoption of the *Open Internet Order*. AWS revenues are up nearly 160 percent for the two-year post-vote period compared to the two-year pre-vote period. Amazon's investment in AWS grew markedly too. Capital investments went up 36 percent during the two-year post-vote period. Amazon classifies AWS segment spending as expenses for "Technology and Content," which were \$9.3 billion in 2014, growing to \$16.1 billion in 2017. The total two-year post-vote vs. pre-vote growth for the entire company was 81 percent.

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<sup>78</sup> *See* Brett Molina, "Amazon targets Netflix with standalone video sub," *USA Today* (Apr. 18, 2016).

<sup>79</sup> *See* Comments of Brian Olsavsky, Amazon.com Inc. 4th Quarter 2016 Earnings Call (Feb. 2, 2017).

<sup>80</sup> *See* Brian Bacon, "Amazon Prime Video user profile, U.S.," *SNL Kagan* (Sept. 16, 2016).

<sup>81</sup> *See* Consumer Intelligence Research Partners, LLC, "Amazon Prime Grew 35% in 2015" (Jan. 25, 2016).

<sup>82</sup> *See, e.g.*, Nathan McAlone, "Why Netflix Doesn't Have to Sweat a Challenge From Amazon's Prime Video," *Slate* (Apr. 18, 2016) (showing survey results indicating that 62 percent of Amazon Prime Video users also use Netflix).

<sup>83</sup> Companies large and small rely on AWS for hosting, storage, content delivery and numerous other functions. Notable users include Comcast (to support its Xfinity X1 video services), Verizon's AOL unit (for cloud servers and other purposes), MLB Advanced Media (to power its OTT streaming service, Bam-Tec, which is also the platform ESPN will utilize for its upcoming OTT service), Netflix (for OTT content delivery), PBS (for OTT content delivery), and Sling Media (Dish's place-shifting hardware). *See* Amazon AWS "All Customer Success Stories," <https://aws.amazon.com/solutions/case-studies/all/> (Mar. 25, 2017).

Amazon's entire business is predicated on an open internet. But its high-data volume Prime Video and AWS services require the certainty of consumer access to high-capacity, nondiscriminatory, net neutral fixed and mobile broadband. Any legitimate accounting of the impact from the FCC's Title II restoration and Open Internet rules is incomplete without factoring in the policy's impact on businesses like Amazon's. The data clearly shows accelerated growth in Amazon's online content business following the FCC's vote – growth that demonstrates the validity of the FCC's benefit-cost theory of the “virtuous cycle” of investment.

**Figure 13:**  
**Amazon Programming, Capital and Technology Investment; AWS Revenues (2013–2016)<sup>84</sup>**

Amazon	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Estimated Streaming Programming Costs (\$000)*	\$548,000	\$975,000	\$1,288,000	\$1,940,000	\$1,523,000	\$3,228,000	112.0%
<i>Year-to-Year % Change</i>		77.9%	32.1%	50.6%			
Technology and Content (\$000)	\$6,565,000	\$9,275,000	\$12,540,000	\$16,085,000	\$15,840,000	\$28,625,000	80.7%
<i>Year-to-Year % Change</i>		41.3%	35.2%	28.3%			
Capital Expenditures (\$000)	\$3,444,000	\$4,893,000	\$4,589,000	\$6,737,000	\$8,337,000	\$11,326,000	35.9%
<i>Year-to-Year % Change</i>		42.1%	-6.2%	46.8%			
AWS Net Sales Revenues (\$000)	\$3,108,000	\$4,644,000	\$7,880,000	\$12,219,000	\$7,752,000	\$20,099,000	159.3%
<i>Year-to-Year % Change</i>		49.4%	69.7%	55.1%			

Source: Amazon 10-K SEC filings for 2013–2016; SNL Kagan.<sup>85</sup>

<sup>84</sup> Data presented in this table begins in 2013, the first year Amazon publicly reported AWS segment results. In its 10-K, Amazon describes technology and content expenditures as “costs consist[ing] principally of research and development activities including payroll and related expenses for employees involved in application, production, maintenance, operation, and platform development for new and existing products and services, as well as AWS and other technology infrastructure expenses. Content costs consist principally of payroll and related expenses for employees involved in category expansion, editorial content, buying, and merchandising selection. Digital media content costs related to revenue recorded gross, including Prime Video, are included in cost of sales.” Thus these amounts include the capital expenditure amounts shown in the above table, in addition to the other non-capital expenditures described. As Amazon reported capital investments in its 2016 10-K: “Cash capital expenditures were \$4.9 billion, \$4.6 billion, and \$6.7 billion in 2014, 2015, and 2016, which primarily reflect additional capacity to support our fulfillment operations and additional investments in support of continued business growth due to investments in technology infrastructure (the majority of which is to support AWS), during all three periods.” See Amazon.com Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 10-K), for the fiscal year ending December 31, 2016.

<sup>85</sup> See Deana Myers, “Amazon Prime video spend to hit \$2.67B in 2019,” *SNL Kagan* (Oct. 22, 2015). SNL Kagan later revised this predicted 2019 Amazon spend, increasing its projection to \$4 billion some 14 months after publishing the initial article. See Deana Myers, “Amazon Prime video expansion necessitates big content spend,” *SNL Kagan* (Dec. 28, 2016).

## Hulu

Launched in 2007, Hulu was one of the internet's original sources for on-demand video content authorized by big studio content producers, with an emphasis on broadcast TV programming libraries. Hulu's current ownership group consists of Comcast/NBCU, Fox, and Disney (each with a 30 percent) and Time Warner/Turner Broadcasting (10 percent).

For its first few years, Hulu solely relied on advertising revenues. The company launched a paid subscription service dubbed "Hulu Plus" at the end of 2010, offering paying customers a larger content library and earlier access to just-aired programming. It experienced moderate paid-subscriber growth during Hulu Plus's first few years, but that growth accelerated appreciably in 2015. Hulu's largest year of subscriber growth came in that year of the FCC's Open Internet vote, when it added 3.8 million accounts, finishing with 10.7 million paying subscribers. The company ended 2016 with 11.7 million subscribers.<sup>86</sup>

In 2016, Hulu brought in \$2.1 billion in revenues, with \$1.1 billion of this from its subscription service. This single year revenue total was almost identical to the total that Hulu brought in for the 24 months combined prior to the FCC's February 2015 vote (\$2.2 billion for 2013–2014). Similarly, Hulu's paid subscription revenue in 2016 alone (\$1.1 billion) was higher than the paid revenues it earned during the 24 months preceding the FCC's vote (\$1 billion for 2013–2014).

As it did for Netflix and Amazon, Hulu's investment in acquired and original content also rose substantially following the FCC's February 2015 vote. In 2014, Hulu spent an estimated \$896 million on programming (only \$19 million on original content, \$877 on acquired content). In 2015, this rose 43 percent to \$1.28 billion (with \$44 million original). It rose again in 2016 by another 35 percent, to a total of \$1.73 billion (\$1.65 billion on acquired, and nearly double 2015's spending on original content with \$86 million).<sup>87</sup>

**Figure 14:**  
**Hulu Programming Costs, Revenues, and Paid-Subscribers (2013–2016)**

Hulu	2013	2014	2015	2016
Estimated Streaming Programming Costs (\$000)	N/A	\$896,000	\$1,280,000	\$1,730,000
<i>Year-to-Year % Change</i>			42.9%	35.2%
Revenues (\$000)	\$955,000	\$1,229,000	\$1,696,000	\$2,068,000
<i>Year-to-Year % Change</i>		28.7%	38.0%	21.9%
Paid Subscribers (year-end)	5,100,000	6,900,000	10,700,000	11,700,000
<i>Year-to-Year % Change</i>		35.3%	55.1%	9.3%

Source: SNL Kagan

<sup>86</sup> See, e.g., Ali Choukeir, "Profile: Hulu," *SNL Kagan* (Feb. 22, 2017). Other reports cite less specific figures at different time periods. See Jacob Kastrenakes, "Hulu now has 12 million subscribers, but growth is slowing," *The Verge* (May 4, 2016); Brian Stelter, "Hulu Says Number of Paid Subscribers Has Doubled," *New York Times* (Apr. 30, 2013).

<sup>87</sup> See Deana Myers, "Hulu content spend ramping up" *SNL Kagan* (Oct. 13, 2016). This article presents SNL Kagan's estimation of Hulu's programming costs for 2015 and 2016, with a growth figure for 2015 that enables calculation of its 2014 expenditures. We do not have directly comparable information regarding Hulu's 2013 programming costs.

We cannot know whether Hulu's annual content expenditures, in the absence of the FCC's 2015 vote, would have nearly doubled (as the did by the second year after that vote, when compared to Hulu's outlay in the year before the vote). But what's clear is that the FCC's action provided substantial market certainty, which gave OTT operators like Hulu the confidence that they could expand their businesses without fear of ISP discrimination.

Indeed, Hulu is not just expanding its content spending: in May 2017, the company launched a direct competitor to the ISPs' pay-TV services (see discussion of VSPs below).<sup>88</sup> Originally announced just over 14 months after the FCC's vote,<sup>89</sup> "Hulu With Live TV" is a live, linear channel bundle similar to Sling TV and DirecTV Now.

#### Acorn TV

Acorn TV is an SVOD service that carries content geared towards fans of British television series. Its \$5 monthly offering had 430,000 subscribers by the end of 2016, up from 190,000 the year prior.<sup>90</sup> Acorn's parent company, RLJ Entertainment, was founded by Robert L. Johnson, who founded the cable channel BET in 1980.

#### Urban Movie Channel

Just days after the FCC adopted the *Open Internet Order*, Johnson's RLJ Entertainment's Urban Movie Channel ("UMC") started serving subscribers.<sup>91</sup> This service was, according to Johnson, "designed so that the African-American and urban creative community could directly reach consumers in a way that removes many of the restrictions associated with the legacy content development and distribution models."<sup>92</sup> Priced at \$5 per month, the service had nearly 25,000 subscribers at the end of 2016.<sup>93</sup>

#### Qello Concerts

Gary Winnick, the founder of Global Crossing and one of the personalities at the center of the internet's original "gold rush," recently acquired a majority stake in the live concert streaming service Qello.<sup>94</sup> Winnick's strategy for Qello involves developing the company's underlying technology for use by other content providers to enable their own streaming video apps.

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<sup>88</sup> See Todd Spangler, "Hulu Live TV Service Launches With 50 Channels for \$40 Monthly," *Variety* (May 3, 2017).

<sup>89</sup> See Jacob Kastrenakes, "Hulu confirms plan to stream live TV next year," *The Verge* (May 4, 2016).

<sup>90</sup> See Todd Spangler, "British TV Streaming Service Acorn TV Tops 430,000 Subscribers," *Variety* (Jan. 17, 2017).

<sup>91</sup> See RLJ Entertainment Inc., 2016 Form 10-K, at 5.

<sup>92</sup> See Todd Spangler, "Bob Johnson's RLJ Entertainment Launches 'Urban Movie Channel' Over-the-Top Video Service," *Variety* (Nov. 5, 2014).

<sup>93</sup> See RLJ Entertainment Inc., 2016 Form 10-K, at 5; see also Todd Spangler, "Apple TV Adds Urban Movie Channel Subscription Service," *Variety* (Nov. 5, 2014).

<sup>94</sup> See Jessica Toonkel, "Exclusive: Ex-Global Crossing CEO bets on over the top streaming video," *Reuters* (Mar. 9, 2017).

## In the Wake of the *Open Internet Order*, Online Pay-TV Replacement Services Are Thriving.

Internet apps are often hyped as “disruptors” of existing, stale industries. When it comes to online video, this disruption of traditional and stale pay-TV has been real, but piecemeal. Netflix’s ease of use made binge-watching easy and popular, but cable companies had offered on-demand services years before Netflix launched a streaming service. The incumbent pay-TV providers’ response to the rise of Netflix was to beef up their on-demand catalogs, improve their badly outdated set-top box user interfaces, and facilitate subscriber access to linear channels online through the “TV Everywhere” consortium. These responses, while welcomed by most consumers, were more evolution than revolution. Pay-TV prices continue to rise faster than the rate of inflation. And until 2015, pay-TV choice in terms of traditional packaged channel offerings was no different than it was two decades prior.

But after the FCC restored the certainty of nondiscriminatory telecom access with the *Open Internet Order* and its solid legal framework, truly productive disruption began. The biggest development in the online video market is the availability of VSPs, which offer subscription access to linear cable channels. In contrast to OTT on-demand services like Netflix and Hulu – which are marketed and purchased as complementary to pay-TV services, VSP services are marketed as a replacement for traditional cable or satellite TV.

The U.S. VSP market did not even exist prior to the FCC’s February 2015 vote, but it exploded in the months that followed that vote. Sling TV, the early pioneer, launched the same month as the FCC’s vote. PlayStation Vue followed in March 2015, and YipTV in May 2015. And perhaps the biggest potential disruptor of them all, DirecTV Now, began offering services in November 2016. LeEco followed that same month, and FuboTV’s 70+ channel service entered beta in December 2016. Premium VSP Layer3 TV is now selling service in three markets, with more to follow. And more VSPs are coming. Hulu’s pending VSP offering – which, like Sling TV, Sony Vue, and DirecTV Now, includes live local broadcast channels in numerous markets – is set to launch this year at a \$40 per month price point. Google’s YouTube TV joined the fray in April 2017. And media reports suggest legacy pay-TV providers and incumbents like Comcast and Verizon are considering doing what was once unthinkable: selling channel packages online, and outside of their existing physical network footprints.

Beyond possibly jumping into the VSP game themselves in this way soon, traditional cable pay-TV companies have responded to the proliferation of lower-cost VSPs in dual fashion. They are chasing the high-revenue end of the market with investments in services and devices that combine linear pay-TV and online capabilities. Offerings such as Comcast’s X1 set-top box, Charter’s Spectrum TV service, and Verizon’s Quantum DVR all use the set-top box as a media hub. They enable these cable company subscribers to access third-party streaming content more easily, and they also serve these incumbent cable companies’ linear TV and cloud DVR content to their customers’ tablets and smartphones. At the same time, cable MSOs are also chasing value-conscious and younger demographics by offering their own, managed streaming video services and “skinny” channel packages. For example, in late 2015, Charter launched “Spectrum TV Stream.” It offers an exceptionally whittled-down basic cable lineup for \$13 per month, with additional channels available to add on for extra prices. The service requires no set-top-box. Comcast is trialing a similar offering with a similar name (“Stream”). Both Comcast’s and Charter’s skinny-bundle services are only available to their own broadband subscribers, meaning that they are managed cable TV services, not pure online and over-the-top VSP offerings.<sup>95</sup>

These actions and reactions are exactly the kind of competition and innovation the market needs. They are also exactly what Congress envisioned happening when it wrote and passed the 1996 Act. That law sought a future of “big, open pipes”: high capacity, competitive, and nondiscriminatory broadband telecommunications services. This encourages facilities-based investment, deployment, and competition; but it also makes over-the-top competition possible too, because that also delivers tremendous opportunities for business and value for users. Ideology-driven politicians and FCC leadership temporarily derailed this bipartisan blueprint during the Bush Administration. It took until the FCC’s 2015 Open Internet vote to restore it. That decision is bearing fruit.

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<sup>95</sup> See, e.g., Tony Lenoir, “Top cable MSOs take cue from Sling TV, hedge video prospects via streaming services,” *SNL Kagan* (Nov. 6, 2015).

Below we discuss each of these VSPs listed above, and we analyze their impact on the internet's virtuous cycle of investment and innovation.

### Sling TV

After years of struggling to maintain its traditional pay-TV customer base, DISH launched its VSP service "Sling TV" in the first quarter of 2015.<sup>96</sup> This is a lower-cost service that lets customers choose their own skinny bundle of linear channels, which are then delivered over-the-top on the internet. It came about in part because DISH recognized the need to respond to the secular challenges facing the pay-TV market and its traditional big channel bundles. DISH also recognized its own specific struggles, as a satellite pay-TV distributor, competing against cable companies that can offer customers bundled broadband/TV/phone packages – and that have the ability to cross-subsidize their declining pay-TV margins with inflated, monopoly broadband earnings.<sup>97</sup>

Though Sling TV's user base is relatively small, it appears to be growing rapidly. DISH does not disclose subscriber counts, but various analyst estimates suggest that the number of Sling TV subscriptions rose from 100,000 in the first few months after launch to a million just two years later. The company credits Sling TV with helping to produce its first increase in pay-TV subscribers in a fourth quarter since the end of 2013.<sup>98</sup>

Sling TV is marketed as a low-cost, less bloated replacement for traditional pay-TV channel packages and equipment packages. But as is the case with traditional pay-TV subscribers, Sling TV adopters are also heavy users of non-linear SVOD services. According to a recent survey, the substantial majority of Sling TV subscribers are also customers of major SVOD providers like Netflix.<sup>99</sup>

Though DISH also does not disclose expenditures specific to its Sling TV business separately from its traditional satellite TV business expenditures, OTT services like Sling TV are always far less capital intensive than their traditional pay-TV counterparts. Instead of needing to launch a satellite into space, VSPs can simply install media servers at data hosting centers around the country (or even rent space on existing media servers). Instead of needing to purchase and then deliver multiple set-top boxes to each of its customers, VSPs have no need to purchase any customer premises equipment. CPE comprises a large portion of any MSO's capital outlay. For example, in 2016, CPE accounted for 48 percent of Comcast's \$7.6 billion in cable segment capex.

These lower producer costs act to boost both producer and consumer surpluses (the former via higher operating profits; the latter via lower monthly service fees). This is a good illustration of why simply focusing on

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<sup>96</sup> See DISH Network, Press Release, "Sling TV to launch live, over-the-top service for \$20 per month," (Jan. 5, 2015).

<sup>97</sup> See, e.g., Joseph Williams, "DISH exec Roger Lynch: How Sling was slung," *SNL Kagan* (Jan. 7, 2015) ("I think it helps us reach a demographic that's not being reached with the traditional pay TV model. Price is certainly one [reason], but that's not the only reason. It's the handcuffs that come with the traditional pay TV model: the contract, the credit check, the two-year commitment, all this special equipment, all these other fees that are never in the marketing material. And all those things combined with the fact that you have alternatives today, legal and illegal, and that's what's causing the decline in penetration among millennials."); see also Tim Stenovec, "One CEO trying to blow up TV isn't afraid of Apple, he's worried about internet companies," *Business Insider* (June 18, 2015) ("Roger Lynch, who has headed up Sling TV since it launched earlier this year, told Business Insider last week that he's 'quite concerned' that cable companies, like Comcast, Time Warner Cable, and Charter, could respond to the growing trend of cord cutting by jacking up the prices of their broadband-only subscriptions. 'They have their dominant – in many cases monopolies – in their market for broadband, especially high-speed broadband,' Lynch told us in an interview, adding that it's actually cheaper sometimes for people to subscribe to TV and broadband from a cable company than just subscribe to broadband. The cable companies, Lynch said, 'concern us because they're using their dominant position to try to thwart over the top services.'").

<sup>98</sup> See Peter Kafka, "Sling TV's Web-TV Service Attracts at Least 100,000 Sign-Ups in Its First Month," *Re/code* (Mar. 5, 2015); Wayne Friedman "OTT Vs. Traditional Pay TV: Digital No Longer A Supplement," *MediaPost* (Feb. 23, 2017).

<sup>99</sup> See Brian Bacon, "Sling TV and PlayStation Vue user profiles," *SNL Kagan* (June 7, 2016) (showing that more than half of Sling TV subscribers also subscribe to Netflix, Amazon Prime, Hulu, and/or HBO Now).

ISP capital expenditures alone is a poor way of measuring the health of the U.S. internet market, and why such a myopic approach is fundamentally useless for gauging the efficacy of FCC policies.

### YouTube TV

YouTube is one of the Internet's earliest and most well-known platforms for online video. Over the past decade, the Google-owned site has matured from one on which most users strictly share personal videos to one that also enables content owners to generate ad revenue. But perhaps sensing the opportunity created by the *Open Internet Order's* certainty, Google is poised to leverage YouTube's popularity and enter the increasingly crowded VSP market. On the last day of February 2017, Google announced that it would offer an online pay-TV service with 40-plus linear for \$35 per month. Dubbed "YouTube TV," the service packages local channels, regional sports networks, a personal cloud DVR. A single subscription can be shared across six accounts.<sup>100</sup> It launched in early April 2017.<sup>101</sup>

Google's parent company, Alphabet Inc., does not report detailed information on its capital and non-capital investments across its myriad businesses. However, it does separately report capital expenditures for its core "Google" and "Other Bets" segments, the latter of which largely consists of its Google Fiber unit. Capex at the core Google segment is by the company's own admission highly variable. For example, for the four years from 2013–2016, Alphabet's Google segment capex went from \$7 billion, up to \$11.2 billion, down to \$8.9 billion, and up again to \$9.4 billion. But capital outlays in the Other Bets segment (mainly Google Fiber) increased steadily (\$187 million, \$496 million, \$850 million, and \$1.39 billion) for those four years.

To the extent there are any lessons to be gleaned from Alphabet's capital investments, they are that (1) its core segment's investments are generally cyclical, as are most other company's, which is to be expected given the very long shelf life of durable goods; and (2) the company accelerated its investments in its ISP business following the FCC's February 2015 *Open Internet Order* vote. (Alphabet's "Other Bets" segment capex was 227 percent higher during 2015–2016 than it was during 2013–2014). Both the accelerated investment in its ISP business and its launch of YouTube TV make clear that the FCC's vote preserved the successful status quo of the virtuous cycle on the open internet. The FCC's decision restored market certainty on the legal status of broadband, which did not hinder Alphabet's investments in either the ISP side or OTT side of that ecosystem. And although late 2016 saw Alphabet shift its ISP strategy towards wireless, it did so not due to Title II, but as a rational response to changing technology and to the massive entry barriers that even a corporate giant cannot overcome, even when it is willing up to a point to cross-subsidize its initial losses.<sup>102</sup>

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<sup>100</sup> See YouTube, Official Blog, "Finally, live TV made for you" (Feb. 28, 2017).

<sup>101</sup> See, e.g., Steve Kovach, "YouTube's \$35-a-month TV streaming service just launched – here's what it's like," *Business Insider* (Apr. 5, 2017).

<sup>102</sup> See, e.g., Dave Smith, "Google has made a big shift in its plan to give everybody faster internet: from wired to wireless," *Business Insider* (Aug. 15, 2016); see also Comments of Ruth Porat, CFO, Alphabet Inc., Q3 2016 Alphabet Inc. Earnings Call (Oct. 27, 2016) ("In terms of Fiber, the impetus for it was really about the opportunities that we see to focus on innovation, and what [ ] does that mean if the objective with Other Bets is really these 10X opportunities. And when you go back to the initial impetus for creating the business, it was the Founders' view that there's a sizable opportunity, given the need for abundant connectivity on networks that are always fast and always open, and we do continue to be committed to that vision. The team had some important breakthroughs in new technologies. You noted the most important in our view, all that we are doing with wireless, but also technologies that are key to implementation. And we believe that both of those, a number of things that [we] are doing to enhance both our effectiveness and efficiency. And so we wanted to focus on the potential with these efforts before we reaccelerate deployment, and it was about being – ensuring that we can take advantage of those, before again pushing forth. We are very active in a lot of cities. In the third quarter alone, we rolled out four new cities, so that brings us to 12 cities across the US, where we are deployed, in construction, or in development. And we're making great progress in those cities. We remain very committed to growth across those cities, and then we also have a presence in six cities with our wireless acquisition, Webpass. So we're pausing for now our work in eight cities, where we've been an exploratory discussions, but very much to your question, it's to better integrate some of the technology work we've been developing, and there's more detail in cities on the Fiber side to the extent you want to go into those.").



## Sony PlayStation Vue

Sony's "PlayStation Vue" is one of the better-reviewed online pay-TV replacements, even though it is priced substantially higher than other packages such as Sling TV.<sup>103</sup> Originally launched in three markets in March 2015, the service went nationwide one year later.<sup>104</sup> Sony, like other VSPs, has yet to disclose its subscriber totals; but media reports suggest that the service attracted 120,000 paying customers just three months after its nationwide rollout.<sup>105</sup> And like Sling TV, even though Vue is marketed as a replacement for traditional linear pay-TV, a majority of its subscribers are also customers of major SVOD providers.<sup>106</sup>

There is no indication from media reports whether or how the FCC's *Open Internet Order* impacted Sony's 2015 launch and 2016 expansion of Vue. Nor is there any way to discern how much the Japanese conglomerate is spending on the project inside the U.S. (though we note that the company's 2016 capital expenditures were the highest in its history). What is clear, however, is that the ISP industry's open hostility to OTT competition dramatically subsided following that FCC 2015 vote; and ISPs changed their approach, as they realized that they too benefit greatly from the added demand for high-capacity broadband created by services like PlayStation Vue.

## DirecTV Now

"DirecTV Now," launched on November 30, 2016, is a full OTT pay-TV service, initially offered at a competitive price point (\$35 per month) on a nationwide basis with local channels in some markets. In just one month, the service gained over 200,000 subscribers.<sup>107</sup> Even before its launch, AT&T's Chief Financial Officer characterized DirecTV Now as "a game changer."<sup>108</sup>

And in terms of AT&T's business, as well as the overall evolution of the video market, that was an accurate statement. Though AT&T's business strategy with DirecTV Now is partially predicated on using it to attract and retain wireless broadband customers, it is marketed universally to all internet users, not just existing subscribers to AT&T's broadband internet access offerings. This makes AT&T the first of the traditional, vertically integrated ISPs to offer multichannel pay-TV service delivered to customers of competing ISPs.

This, more than any other development following the 2015 Open Internet vote, illustrates just how much the attitudes of the market's leading ISPs have changed since the FCC settled the legal issues surrounding Network Neutrality. AT&T kicked off what has now become a decade-plus policy battle back in 2005 when Ed Whitacre, the CEO of AT&T's predecessor company SBC, said "[w]e and the cable companies have made an investment and for a Google or Yahoo! or Vonage or anybody to expect to use these pipes [for] free is nuts!"<sup>109</sup>

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<sup>103</sup> Vue's base package is \$30 per month, while Sling TV's is \$20. See "Playstation Vue: The Current Top Cord Cutting Option," *DSL Reports* (Sept. 27, 2016).

<sup>104</sup> See "PlayStation Vue Internet-Based Live TV Service Expands Nationwide," Sony Computer Entertainment Press Release, Mar. 14, 2016.

<sup>105</sup> See Lucas Shaw, "Sony's Vue Web TV Service Said to Surpass 100,000 Subscribers," *Bloomberg* (June 28, 2016).

<sup>106</sup> See Bacon, "Sling TV and PlayStation Vue user profiles," *supra* note 99.

<sup>107</sup> See Comments of John Stephens, AT&T Inc. Senior Executive Vice President and Chief Financial Officer, Fourth Quarter 2016 Earnings Call (Jan. 25, 2017).

<sup>108</sup> See Comments of John Stephens, AT&T Inc. Senior Executive Vice President and Chief Financial Officer, Second Quarter 2016 Earnings Call (July 21, 2016).

<sup>109</sup> See "At SBC, It's All About 'Scale and Scope,'" *Business Week* (Nov. 7, 2005). Whitacre thus succinctly explained his company's rationale for wanting to violate Net Neutrality, which is particularly ironic in light of AT&T's actions with DirecTV Now today. AT&T was not alone in its resistance a decade ago, however. In 2006, Verizon VP John Thorne said that "[t]he network builders are spending a fortune constructing and maintaining the networks that Google intends to ride on with nothing but cheap servers." See Arshad Mohammed, "Verizon Executive Calls for End to Google's Free Lunch," *Wash. Post* (Feb. 7, 2006). This belief that content and application companies get a "free ride" on the internet is completely wrong, and reflects a serious misunderstanding of what actually gives internet access services their value. Content companies

Well, it is now AT&T taking advantage of the true nature of the broadband market: subscribers purchase access to the internet in order to communicate with the other people and access all of the content choices that are available on it. Broadband subscribers pay handsomely to make those connections, just as edge companies pay their own ISPs (or self-provision facilities) to put content on the internet on their side. No one uses “pipes” for free. ISPs profit from subscriber relationships with their end-users, and the only reason they have so many millions of them is the wealth of information and entertainment their subscribers can get online. Today, AT&T is not entering the content business by simply making a generic website available to subscribers of its ISP competitors: it’s marketing a pay-TV service that directly competes with the pay-TV services of those other ISPs.

AT&T’s entry into the VSP sector with DirecTV Now is a rational business response. The marketplace now offers – thanks to the *Open Internet Order* – widely available, open, and nondiscriminatory high-capacity telecommunications services.<sup>110</sup> AT&T is prevented from extracting a portion of the edge value or otherwise acting out Whitacre’s troll-under-the-bridge toll-taking fantasy. So the company instead captures part of that edge value by offering its own premium content video subscription service, as well as by investing in higher capacity broadband networks for which many of its customers are quite willing to pay. This is the virtuous cycle at work, and its beneficiaries are internet users, as well as both the businesses that sell internet access and online content to them. Anyone who surveys the current landscape truthfully, and concludes that the 2015 vote and policy changes were harmful or a failure, is simply ignoring these successes in favor of their own anti-regulatory ideology.

## Hulu

In May 2017, Hulu launched “Hulu With Live TV,” a live, linear channel bundle similar to Sling TV and DirecTV Now. The \$40 per month service includes 50 live channels from networks such as ESPN, CNN, Fox News, TNT, TBS, and all major broadcast networks in some markets. Facing competition not only from legacy pay-TV but other VSPs too, Hulu differentiates its offerings with its owners’ large broadcast libraries, a cloud DVR, and round-the-clock U.S.-based customer service.<sup>111</sup>

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pay billions of dollars to transmit their content via the Internet; and consumers spend even more for the ability to access that content. In the internet market, unlike the long-distance telephone market, end-users have no direct financial relationship with the party in the middle transporting the “call” – as there are potentially dozens of network owners in the middle routing the data to its final destination. Content companies pay large sums of money to telecommunications companies to serve their content “up to the Internet.” Those telecom companies in turn have financial relationships with other carriers to transport data across the country. So when Verizon receives traffic originating from an edge company, handed off by a long-haul network provider, it also gives the long-haul provider data from Verizon customers to carry back out across the Internet. Sometimes this traffic is unbalanced and fees are paid, while at other times the traffic going back and forth across this interconnection point is roughly equivalent and there is no money exchanged. (In still other instances, large edge companies may rent space inside an ISP’s network in order to get as close to end-users as possible). In other words, ISPs already receive remuneration for traffic traversing their networks; what these decade-old statements reflected was the desire of ISPs to use their position as terminating access monopolies to price discriminate.

<sup>110</sup> These broadband internet access services are, of course, not available to or affordable for every individual subscriber. In fact, as we have shown, broadband remains out of reach for far too many, with low-income people in general and people of color most often kept out of the market by lack of choice, high prices, and other structural barriers. See *Digital Denied* at 3–14. Contrary to Chairman Pai’s completely unsupported assertions of late, this persistent divide is in no way caused or exacerbated by Title II, nor solvable by reversing the classification and repeating the mistakes of Chairman Wheeler’s predecessors. As we showed in Part I above, broadband deployment and investment continue apace, and nothing about restoring the proper legal classification to broadband internet access dictates ISPs’ choices about where to invest. Instead, in the absence of truly effective universal service requirements, buildout obligations at the state or municipal level, or effective anti-redlining provisions, monopolistic wireline ISPs in particular are able to chase high-dollar customers while ignoring whole portions of the demand curve. See, e.g., *Petition to Deny of Free Press, In the Matter of Applications of Charter Communications Inc., Time Warner Cable Inc., and Advance/Newhouse Partnership For Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 15-149, at 37 (filed Oct. 13, 2015).

<sup>111</sup> See “Hulu Prepares to Launch Its Live TV Service,” *Reuters* (Mar. 2, 2017).

## fuboTV

In December 2016, fuboTV (which originally had launched as a soccer streaming network in January 2015) expanded its offerings to include a full suite of linear channels. Its introductory \$35 monthly package mirrors the Vue and DirecTV Now entry-level packages, offering more than 70 broadcast and cable channels.<sup>112</sup>

## LeEco

LeEco launched in the U.S. in November 2016. Known as “the Netflix of China,” LeEco began its online video business in 2004. The company’s strategy is to use the streaming video service as an add-on to its hardware products.<sup>113</sup>

## Layer3 TV

Layer3 TV, which bills itself as a premium OTT provider, began rolling out service across several large markets over the past year, including Washington, DC, Chicago and Los Angeles. Layer3’s CEO recently said that its service is available to 13 million homes.<sup>114</sup> Though it is unclear, it appears that the Layer3 TV service is not delivered over the open internet, but as a managed service delivered over MSOs’ last mile networks.<sup>115</sup>

## Comcast

Recent news reports suggest Comcast is preparing to re-launch its “Stream TV” streaming pay-TV service, which is available solely to Comcast broadband customers.<sup>116</sup> The service is not an OTT service, nor a VSP, because it is delivered over Comcast’s last mile broadband network (with just a subset of its content available to Comcast’s broadband subscribers via the open internet when those broadband subs are outside of their homes). It appears that Comcast continues to believe, for now, that it has no business need to offer a VSP service.<sup>117</sup> Yet it does feel that it needs a skinny pay-TV bundle that appeals to its broadband customers, who may be more likely to drop Comcast’s pay-TV services or never subscribe to them in the first place.

However, even though Comcast is not yet entering the VSP fray, it has left the door open<sup>118</sup> and may be preparing to do so in the near future.<sup>119</sup> A recent Bloomberg report suggests that as Comcast renews its contracts

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<sup>112</sup> See Todd Spangler, “FuboTV to Launch Sports-Focused Skinny Internet TV Bundle, Inks Pacts with Fox Networks, NBCU, A&E, Others,” *Variety* (Dec. 14, 2016).

<sup>113</sup> See Janko Roettgers, “LeEco Launches U.S. Business with Phones, TVs and a Paid Video Streaming Service,” *Variety* (Oct. 19, 2016).

<sup>114</sup> See Jeff Baumgartner, “Layer3 TV Launches in La La Land,” *Multichannel News* (Mar. 14, 2017).

<sup>115</sup> See Ian Olgerison, “Layer3 pushes new model for video delivery,” *SNL Kagan* (Nov. 23, 2016) (“CEO Jeff Binder, speaking at the SNL Kagan Multichannel Summit Nov. 17, said that in addition to building a master headend and 25,000 mile backbone, Layer3 is delivering its service over managed connections with agreements from operators including Comcast Corp., Cox Communications Inc. and Altice NV’s Suddenlink Communications.”).

<sup>116</sup> See “Comcast to expand streaming service amid cord-cutting trend,” *Reuters* (Mar. 28, 2017).

<sup>117</sup> See Comments of Brian Roberts, Comcast Corporation Chairman and CEO, from Q2 2016 Comcast Corp. Earnings Call (July 27, 2016) (“Look, we just fundamentally believe for now that our in-market, in-footprint strategy is where we add the most value to consumers. Right now we’re 40% X1 penetrated. We’re hoping to increase that in a short period next year or two as it continues to scale. Our broadband is great results, business services, it all works well with having a network. OTT economics are unproven to us. And out of footprint, it’s not clear that that’s the right strategy for us.”).

<sup>118</sup> See comments of Matt Strauss, Comcast Corporation, Executive Vice President and GM, Video Services, Comcast Cable, at the Wells Fargo Technology, Media & Telecom Conference (Nov. 10, 2016) (“OTT is not for the faint of heart, especially a video-only OTT service. When you really try to evaluate the business model, we have not seen one that really gives us confidence that this is a real priority for us. . . . So when you look at the opportunity, continuing to go deeper in our footprint where I can bundle-in multiple products is just a much higher return and a bigger opportunity. And it very much

with programmers, the company is securing rights to distribute this content via a nationwide VSP service.<sup>120</sup> Comcast, with its superior broadband network and vertical content holdings, is positioned better than any other traditional pay-TV provider to ward off VSP competition. But as pay-TV profit margins continue to decline, and consumer expectations change, Comcast (like AT&T before it) will likely decide to enter the VSP market too. Indeed, Comcast has already licensed its X1 pay-TV interface technology to other MSOs like Cox<sup>121</sup> and will soon convert its video distribution platform to all-IP.<sup>122</sup> This could pave the way for it to offer a premium, X1-powered VSP service differentiated from other offerings in an increasingly competitive video marketplace. Furthermore, as the owner of major content provider NBCU, Comcast has additional incentives to make sure its programming is on as many paying platforms as possible. This motivation likely drove the company's recent moves to secure OTT rights from its affiliates so that VSPs like Sling and Vue can carry local broadcast channels.<sup>123</sup> It is also a likely motivator for Comcast's rumored NBCU-powered SVOD service.<sup>124</sup>

Without the certainty against unreasonable discrimination offered by Title II and the Open Internet rules, it would be impossible to imagine a world in which an MSO offers its pay-TV services to customers of other MSOs' via those competing MSOs' distribution facilities. But now we have two of the nation's four largest pay-TV providers (AT&T/DTV and DISH) doing just that, and Comcast seemingly preparing to. These positive, pro-competitive marketplace developments are precisely what we'd expect (and what we predicted)<sup>125</sup> when internet users and content producers have access to nondiscriminatory, high-capacity telecom services.

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speaks fundamentally to our overarching strategy, which is in many ways you want to own the home. And to own the home, I think we are in a much better position and there is significantly more upside and profitability in going deeper and deeper into our base first versus following a video-only offering OTT. If it turns out that that is an opportunity for us, OTT, there's nothing that would ever preclude us from doing that. It really just comes down to priority and focus and where we really believe it's going to give our investors the most return and the best products and services for our customers.”)

<sup>119</sup> For instance, it is noteworthy that Comcast just hired a vice president for IP Video whose prior position was Global Head of Video at Amazon. See “Comcast Hires VP of IP Video,” *Light Reading* (Mar. 29, 2017).

<sup>120</sup> See Gerry Smith, “Comcast Said to Gain Rights to Offer Online TV Nationwide,” *Bloomberg* (Mar. 23, 2017) (“Comcast Corp. acquired rights from cable network owners to offer their channels nationwide, according to people familiar with the negotiations, giving the biggest U.S. cable operator a backup plan if rival online-TV services catch on with consumers. The rights allow Comcast to sell video service for the first time outside its regional territories.”). However, other reports suggest that Comcast is weighing its options and simply “passively collecting digital rights.” See Joseph Williams, “Comcast not eyeing national OTT offering,” *SNJ. Kagan* (Mar. 28, 2017).

<sup>121</sup> See Jeff Baumgartner, “Cox Inks National X1 Deal with Comcast,” *Multichannel News* (Nov. 11, 2015).

<sup>122</sup> See comments of Neil Smit, Comcast Corporation, Executive Vice President, President and CEO of Comcast Cable, Q3 2016 Comcast Corp. Earnings Call (Oct. 26, 2016) (“[W]e will be going to an IP-based video solution over the next let's just call it couple of years. We have the product in the lab, it is working well. We will continue to roll out new devices.”); see also Mari Silbey, “Comcast May Go All IP by End of Year – Rumor,” *Light Reading* (Mar. 29, 2017).

<sup>123</sup> See Todd Spangler, “NBC Reaches Deal With TV Affiliates for Opting in to Internet Video Distribution Agreements,” *Variety* (Apr. 13, 2017).

<sup>124</sup> See Lucas Shaw and Alex Sherman, “Comcast Is Planning a Netflix Rival Using NBC Shows,” *Bloomberg* (Apr. 10, 2017).

<sup>125</sup> See, e.g., *Combatting the Cable Cabal* at 43.

The answer to the video market's problems is to throw money at it. If venture capitalists in pursuit of a better video-bundling business model throw money at the programmers, the programmers will play ball. Over time, this investment could produce new video business models where supply more closely matches demand. But this investment and innovation will not happen if there is any uncertainty about the openness of the delivery platform. While American Internet Service Providers [ ] all claim to embrace openness, their actions tell a different story. When ISPs embrace data caps and overage charges that serve no legitimate engineering or economic purpose, they send a signal to the market that scarcity, not abundance, is the business model. Artificial scarcity is a market failure, one that depresses investment and deprives Americans of the benefits of technological progress. So the answer to this complex problem is the one we came up with so long ago. We don't need public policy to dictate how the

## Verizon

Similar to Comcast's reported moves, Verizon too is reportedly securing additional streaming rights from linear channel owners. Unnamed sources say these could be used for a new online service launching later this year.<sup>126</sup> Verizon has not commented on these reports, and it is possible that Verizon is simply securing the rights for an offering exclusive to its wireless service. However, even if Verizon doesn't launch a VSP service, it is clear that the company is responding to the competitive pressures produced by the open internet.

## Viacom/Discovery/AMC

The rise of the SVOD and VSP markets is driven in part by consumers' desire for alternatives to the perpetually increasing price of traditional pay-TV services. Millions of families want the pay-TV experience, but can't justify the escalating monthly fees for mandatory equipment and bloated channel bundles. Some of the biggest contributors to escalating pay-TV bills in recent years are sports networks, which command licensing fees well in excess of other even more popular channels. Perhaps sensing an opportunity, pay-TV channel owners Viacom, Discovery and AMC Networks are reportedly in talks with MSOs about creating a service that includes these and other popular linear channels, but does not include sports networks.<sup>127</sup> This rumored service could cost \$20 per month, a price point lower than other VSP services that include ESPN.

This is exactly the type of efficient market segmentation and servicing that the old, bloated basic cable model does not offer. The open internet has started to let viewers express their precise demands, and suppliers are responding. This efficiency is predicated on the continued existence of a common carrier broadband telecom service market. Killing that market, as Chairman Pai proposes now to do, would return us to the era in which ISPs' every move was designed to "cable-ize" the internet – all in order to ward off this type of over-the-top competition that so clearly benefits the public, including content creators and consumers too.

## Other ISPs and Tech Companies

The coming months could bring news of even more online video choices. While ISPs like AT&T and Verizon (and possibly Comcast) enter the OTT space, others may be close behind. For example, CenturyLink has pulled back on its own traditional pay-TV offering, and has publicly stated that it is exploring OTT alternatives. One analyst thinks it is possible CenturyLink could choose to go it alone and launch its own VSP service. T-Mobile and Sprint are said to be exploring this possibility too. And tech giants Apple and Amazon are also the subject of analyst chatter as possible future VSP entrants.<sup>128</sup>

The VSP sector may look radically different in coming years than it does today, as new companies enter and compete for customers, with the likely outcome a few dominant players pushing out others whose offerings failed to catch on with consumers. But none of this will happen if the FCC returns unfettered gatekeeper powers back to the vertically integrated ISPs, who will return to their preferred path: picking the pockets of online content companies, and shutting out those that refuse to pay.

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industry should behave; that's the consumers' job. We need public policy to allow innovation to happen. If we keep the pipes open, the content will flow and consumers will win.

(Emphasis added).

<sup>126</sup> See Lucas Shaw, Scott Moritz, and Gerry Smith, "Verizon Said to Plan Online TV Package for Summer Launch," *Bloomberg* (Mar. 30, 2017).

<sup>127</sup> See Gerry Smith and Lucas Shaw, "No-Sports TV? Viacom, AMC, Discovery Said Eying Web Bundle," *Bloomberg* (Apr. 13, 2017).

<sup>128</sup> See, e.g., Mike Dano, "Who's next? Apple, Amazon, CenturyLink may join streaming pay-TV fray," *FierceCable* (Apr. 4, 2017).

## Traditional Linear Channels Are Now Directly Serving Subscribers Over the Open Internet.

Prior to the streaming media era, households had very limited options for video. They could put up an antenna and gain free access to broadcast networks, or they could subscribe to a cable or satellite pay-TV package. These pay-TV packages largely failed to offer purchasers an ability to express their precise preferences. Subscribers were – and still are – given a choice of extremely “limited basic” service (essentially just broadcast channels); a more typical basic service (50–100 linear channels); or an expanded basic package (with hundreds of channels), plus options most often to purchase additional premium packages but not simply to purchase additional channels a la carte for set-top delivery. The retail price for these bloated bundles increases annually, going up at a rate much greater than the rate of inflation, leaving subscribers frustrated and looking for options.

Now that we’re in the streaming media era, however, video customers frustrated with those bloated bundles finally have options. And in addition to skinny VSP channel bundles that are more flexible than traditional pay-TV bundles, viewers are increasingly able to subscribe directly to the “channels” of their choice. While not quite the set-top based a la carte service for which many viewers have clamored, the entry of traditional linear channels into the subscription (and/or ad-supported) online video-on-demand market enables consumers to express their demands much more directly and precisely than forced channel bundles allow. Popular linear channels like CBS and HBO now sell online SVOD services directly to viewers, cutting out the MSO middleman. But there are now also numerous less popular and niche channels selling direct access to their viewers, enabled by an open and nondiscriminatory broadband telecom market.<sup>129</sup> In addition to these SVOD services, a number of traditional linear channels also offer free, ad-supported OTT services.<sup>130</sup>

After years of refusing to offer the content aired on its ESPN suite of channels outside of a traditional cable bundle, recent comments by Disney indicate that the cable dial’s most expensive channel will soon be available as a standalone SVOD/live OTT hybrid service. (ESPN and its sister networks are currently available on VSP platforms too.) Though this is notable, Disney seemingly wants to have its cake and eat it too. The forthcoming ESPN OTT service apparently will not be an online version of any linear channel, but one that combines some live sports and sports entertainment programming with on-demand content.<sup>131</sup>

ESPN annually pays the major sports leagues and college conferences billions of dollars for exclusive rights to air live games. But the leagues themselves market their own streaming services, which have become very popular with diehard fans. The early innovator in this space was Major League Baseball. Its “MLB.tv” service was a pioneer in live streaming technology. In fact, the company behind MLB.tv (called MLB Advanced Media) provides the underlying technology that powers other live streaming services such as WWE Network and PGA Tour Live.<sup>132</sup> The National Hockey League (“NHL.TV All Access”) and the National Basketball Association (“NBA League Pass”) are also heavily promoting their live streaming services, and seeing good success.<sup>133</sup>

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<sup>129</sup> Linear channel owners that now market SVOD services to customers over the open internet include: A&E Television Networks (“History Vault,” “Lifetime Movie Club”); AMC (“Shudder,” “Sundance Now”); Bounce TV (“Brown Sugar”); CBS Corporation (“CBS All Access,” “Showtime,” “Smithsonian Earth”); Gala; Hallmark (“Feelz”); Time Warner Entertainment (“HBO Now”); Comcast-NBCU (“Seeso”); Starz; Tennis Channel (“Tennis Channel Plus”); TheBlaze (“TheBlaze TV”); Charter/Time Warner Cable (“FilmStruck”); Univision (“Univision NOW”); and Viacom (“NOGGIN”).

<sup>130</sup> Linear channel that now market ad-supported video on demand services to customers via the open internet include: Comcast-NBCU (“Watchable,” “FandangoNow”); FilmON TV Networks (“CinemaNow”); Sony (“Crackle”); and Viacom (“Paramount Movies”).

<sup>131</sup> See Matt Pressberg, “Disney Finally Announces Over-the-Top Streaming ESPN Service,” *The Wrap* (Aug. 9, 2016).

<sup>132</sup> See John Lombardo & Eric Fisher, “PGA Tour-MLBAM initiative began around Augusta picnic table,” *Sports Business Daily* (May 4, 2015).

<sup>133</sup> See, e.g., NBA, Press Release, “NBA Digital sees record-setting growth during season” (Apr. 14, 2016).

## Internet Platforms are Using Online Video to Increase Customer Engagement and Sell Ads.

### go90

In October 2015, Verizon launched a free, ad-supported online video portal called “go90.” Verizon initially envisioned the service as a way to leverage its AOL assets, capture revenues from advertising to the coveted millennial demographic, and attract and retain customers in Verizon’s maturing wireless business. To date, the service appears to be – as one Verizon content partner put it – “a dud,” largely because it is lost in a sea of online content.<sup>134</sup> Verizon presses on though, and it’s likely that the company’s acquisition of Yahoo! (which has its own disappointing history when attempting to attract online video viewers) will result in additional investment in the platform.<sup>135</sup>

However Verizon’s over-the-top ambitions play out, it is clear the company believes it needs to have an OTT video component to augment its core telecom business and its more traditional pay-TV service delivered to its Fios TV subscribers. This is the outcome the Open Internet decision’s framework helped to create: incentivizing ISPs to innovate and invest in all parts of the internet ecosystem, instead of chasing rents that could in theory be earned from using their gatekeeper power to discriminate against the successful innovations of edge companies and users.

### Facebook Live

Perhaps one of the biggest developments in the online video space in recent years is the rise of live streaming content produced by users who are (as a rule) not content production professionals. Pioneered by start-ups such as Justin.tv, this medium went more mainstream with the 2015 launches of Meerkat and Periscope (the latter of which was acquired by Twitter even before its launch). Both launches happened practically contemporaneously with the FCC’s *Open Internet Order* vote.

Facebook, with its existing size and scope, quickly moved in and dominated this market segment upon its launch of Facebook Live later that same year. The live streaming functionality has had a profound impact on civic life in the U.S. It lets users document all manner of newsworthy events (political rallies, candidate townhalls, protest marches, and police misconduct, to name just a few important examples) as well as their own daily lives and milestones.

Facebook does not disclose any details on how it allocates its capital and non-capital investments across its various endeavors. However, the company’s total capital expenditures have risen sharply in recent years, accelerating after the FCC’s 2015 Open Internet vote. It reported \$1.4 billion, \$1.8 billion, \$2.5 billion and \$4.5 billion, respectively, for the four years from 2013 to 2016, and provided 2017 guidance of \$7 to \$7.5 billion.<sup>136</sup> Facebook’s increased capital outlay is largely due to its investment in “data centers, servers, office buildings, and network infrastructure.” These are all ISP-adjacent activities directly enabled by the continued existence – which the *Open Internet Order* and Title II framework preserves – of nondiscriminatory wired and wireless broadband telecommunications services.

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<sup>134</sup> See Karl Bode, “Verizon go90 Streaming Service a Huge ‘Dud’ Say Partners,” *DSL Reports* (Sept. 9, 2016).

<sup>135</sup> See Lucas Shaw and Scott Moritz, “Verizon’s Foray Into Hollywood Is Already Getting a Reboot,” *Bloomberg* (Jan. 24, 2017).

<sup>136</sup> See Facebook Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016.

## PART III

### Individual ISP Results Demonstrate the FCC's Open Internet Policy is Working

In Part I, we summarized publicly available data demonstrating that ISP industry capital investments increased in the aggregate following the FCC's 2015 *Open Internet Order*. This fact should come as no surprise. It largely reflects the continuation of prior trends not in any way altered by the FCC's actions, which were undertaken to preserve the virtuous cycle by returning to solid legal authority for Net Neutrality rules. In Part II, we discussed the exponential growth in the online video market following the FCC's 2015 vote. This growth also should come as no surprise. Far from causing uncertainty as its critics blithely claim, the FCC's vote and return to Title II reduced market uncertainty. It affirmed that end-users and edge-producers would continue to be able to connect with one another via nondiscriminatory, high-speed broadband telecommunications services.

Despite the existence of these positive and easily verifiable facts, the Trump administration's FCC and hardline ideologues in Congress are pushing to repeal this hugely successful policy – and doing so despite its adherence to the largely deregulatory path laid out for the advanced telecommunications market in the bipartisan 1996 Act. The main, and often only, proffered justification for overturning the will of the people and ignoring the law is the usual trope that the removal of regulation will spur investment. But it is clear from the totality of the evidence that this is merely unsupported ideological nonsense, in no way based on the law or on sound policy analysis. If the new FCC were concerned with law and analysis, then it would recognize that broadband internet access service meets the statutory definition of a Title II telecommunications service; and it would acknowledge that the 2015 order coupled with extensive forbearance did nothing to alter the ISP industry's successful trajectory. The *Open Internet Order* and reclassification merely returned the FCC to its rightful, congressionally mandated authority in its role as the last line of defense against unreasonably discriminatory behavior by telecom providers. That vote rightly and thankfully signaled to the industry that monopoly abuses from artificial scarcity are not an acceptable business model, and are in fact bad for business and the general public too.

Unfortunately, the plethora of facts and reasoned analysis supporting *Open Internet Order* have done nothing to deter the Pai FCC's push. The number of data points illustrating this framework's success have only grown in number since the February 2015 decision. Yet Chairman Pai is moving as fast as he can to give ISPs the legal right to discriminate unreasonably against the traffic they are hired to carry. To justify this radical shift, the Pai regime has repeatedly peddled falsehoods about ISP investment declines since February 2015, and blamed this supposed decline on the mere possibility of future Title II-based interventions. As we detailed in Part I (and in our March 2016 report), Pai's claim of a post-vote ISP investment decline is factually incorrect.

But let's be absolutely clear: even if aggregate ISP capital investment had declined, this would in no way prove that the decline was caused (or even meaningfully impacted) by FCC policy decisions. Aggregate industry capital investments, and any change in them from year-to-year, are at most a starting point for understanding industry trends. These trends depend on numerous factors, many well outside the influence of public policy. Furthermore, there are different types of capital investments, some which are more beneficial to the public than others. The aggregate dollar value of capital investments alone does not determine the change in availability of last mile broadband access services, nor the prices for, capacity of, and consumer and producer surpluses derived from the availability of these services. And as we noted in Part II, any consideration of the efficacy of a policy designed to benefit the entire internet ecosystem must examine the policy's impact on all parts of that ecosystem.

In this report we led with aggregate results, primarily because of the need to rebut the blatant falsehoods peddled by the pro-ISP ideologues. In a more rational world, the head of the nation's communications regulatory agency would not actively peddle falsehoods and illogical analysis. In that more rational world, the FCC Chair would understand that capital investments are cyclical, and that each individual company's investments might go up or down over the short term simply because of its completion of upgrade projects. In that more rational world, the ISP industry's aggregate capital outlay would play second fiddle in the analysis to a comprehensive review of individual broadband service providers' actual investments, deployments, and offerings, as laid out in painstaking detail in those companies' public disclosures and public comments on their motivations and plans.



Unfortunately, it appears we now live in a world in which ideology has replaced rational thought and reasoned analysis in communications policymaking. We're now in a world in which the fate of people's communications rights, and their essential protections against unreasonable discrimination, hinge on how the Chairman of the FCC reads (or intentionally misreads) the state of the broadband market based on one inappropriate measure.

Chairman Pai and others possessed of irrational anti-Title II fervor are supported by ISPs' money, with the resulting corruption used to stoke irrational fears. And these ideologues-for-hire operate in a system in which it is easier to promote simplistic falsehoods than it is to counter them with facts, logic, and reason. Nevertheless, the truth is available for those who care to look. Below, we offer excerpts from each publicly traded ISP's public statements, made prior to the FCC's vote and during the two years after it. There's no mystery as to how or why any individual ISP's capital spending changed: 2015's final results held close to the guidance these companies gave prior to the vote, and 2016's results continued those trends, based on each ISP's deployment schedule.

Judging by the words of the ISPs themselves, as spoken to investors and to the SEC, the broadband market remains very healthy two years after the FCC's Title II and Net Neutrality vote. Indeed, as we document herein, the topic of Title II and the Open Internet rules largely disappeared from every company's communications with investors and investment analysts during the two years following that vote. These companies and the analysts that closely follow their progress clearly viewed the policy change as a non-impactful event, certainly less worthy of attention than other oft-raised issues like broader economic trends and tax policy.

As the statements summarized below show, company-specific changes in capital investments detailed above in Figure 1 are easily explained: increases reflect certain ISPs' higher spending on core network investment and on CPE upgrades; decreases reflect other ISPs' completion of prior network deployments and upgraded CPE rollouts for those companies. Guidance for 2017 indicates that capital expenditures will continue to be elevated for many ISPs as they continue their upgrades, but lower for others as they complete their projects.

We urge policymakers and reporters who cover this sector to resist simplistic narratives pushed by pro-discrimination ideologues. Don't take the words of lobbyists (or lobbyists in regulators' clothing) at face value. Go and read the transcripts of what the companies themselves told their investors; go and study each company's results; and use this evidence when confronting claims about the impact from Title II and forbearance.

The reality is clear for anyone interested in taking the time to see it: the FCC's 2015 vote did nothing to alter the ISP industry's long-term trends. Cable company ISPs continue to leverage their superior last mile platform into near-monopoly dominance; incumbent telephone companies continue to lose share on residential and business services to cable companies, even as these legacy telcos deploy targeted fiber upgrades to stem some of these losses. And the wireless market's dominant "Twin Bells" (AT&T and Verizon) are feeling the impact of effective competition from Sprint and T-Mobile, as rejuvenated by Obama-era FCC policies, all to wireless consumers' benefit. Most cable companies are deploying the latest generation of cable modem technologies throughout their entire footprint as soon as they are commercially available, and they are pushing fiber deeper into their networks. Most ILECs are taking advantage of technology advances (such as IP-DSLAM or G.fast), but continue to be selective in their upgrades due to the cable industry's insurmountable natural monopoly advantages. And even as aggregate wireless industry capital investments cycle down with the completion of 4G LTE deployments, individual companies are poised for future capacity expansion (*e.g.*, Sprint's pending network densification; AT&T's SDN expansion and investments in high-frequency 5G spectrum; T-Mobile's preparations to use its newly acquired 600 MHz spectrum; Comcast's entry utilizing Verizon's network).

In sum, while the word "investment" is used as something of a panacea in politics, it's not as simple as totaling up one sector's aggregate totals. Politicians of all stripes speak of "promoting investment," while the companies that curry their favor make promises and threats about investment based on whether government acts as they desire. But in reality it's a complicated subject, and if investment is going to be a primary driver of policy decisions then lawmakers (and the reporters who supposedly hold them accountable) must focus on the details.

## Cable Company Internet Service Provider Investment Summaries and Disclosures.

### Comcast

Comcast spent \$7.6 billion on its cable segment<sup>137</sup> capital expenditures during 2016, the most the company has ever invested in a single year. Its 2016 outlay broke its previous record high of \$7 billion, set just a year prior. Comcast's cable segment capital investments totaled \$14.6 billion during the two years following the FCC's *Open Internet Order* vote, nearly a 27 percent increase from the \$11.6 billion it invested during 2013–2014. Comcast's capital investments have trended up and down over the past dozen years. They increased through the end of 2007, declined sequentially annually through 2011, then steadily increased thereafter.<sup>138</sup>

Comcast's post-vote increase in capital investment primarily stems from deployment of new lines ("line extensions"), the firm's accelerated rollout of its "X1" IP-video platform, and its network fiber densification along with the associated "scalable infrastructure" capital needed to enable Comcast's DOCSIS 3.x cable modem services.<sup>139</sup> It is important to emphasize that while Comcast's recent capital investment increases contributed to the company's expanded broadband capacity, Comcast was previously able to increase service speeds while decreasing capital investments during its nationwide DOCSIS 3.0 rollout.<sup>140</sup> This may seem counterintuitive, but it simply reflects the reality that for cable companies, the cost of increasing their capacity is primarily a function of the cost of electronics on each end of an already deployed coaxial cable line. That cost continues to decline as technology improves. Thus, if the public policy goal is nearly universal availability of latest-generation telecommunications technology as quickly as possible, capital expenditure is a poor metric for assessing progress.

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<sup>137</sup> Comcast Corporation's segments include cable communications, cable networks, broadcast television, filmed entertainment, theme parks, and internal corporate. Throughout this report we present results for Comcast Corp. that exclude all financials from segments other than cable communications.

<sup>138</sup> For 2005–2016, Comcast's cable segment capital expenditures each year were: \$3.41B; \$4.2B; \$6.0B; \$5.5B; \$5.0B; \$4.9B; \$4.8B; \$4.9B; \$5.4B; \$6.2B; \$7.0B; \$7.6B. See Comcast Corp., Financial and Operational Supplements, 2005–2016.

<sup>139</sup> CPE, such as set-top boxes and Wi-Fi/modem gateways, continues to account for nearly half of Comcast's cable segment capital expenditures, but declined from 55 percent of cable segment capex during 2014 to 48 percent during 2016. 2015 was the peak year for its CPE investments, totaling \$3.7 billion. Comcast's investments in scalable infrastructure and upgrades/rebuilds increased from \$1.375 billion in 2014 to \$1.539 billion in 2015, and rose again to \$1.827 billion during 2016. Comcast's investments in line extensions increased from \$673 million in 2014 to \$886 million in 2015, increasing again to \$1.208 billion during 2016. See Comcast Corp., Financial and Operational Supplements, 2005–2016; see also Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q4 2015 Comcast Corp. Earnings Conference Call (Feb. 3, 2016) ("At Cable Communications, capital expenditures increased 10.2 percent to \$2.1 billion for the fourth quarter and 14.3 percent to \$7 billion for the year. This growth reflects higher spending on our customer premises equipment, including X1 and wireless gateways, increased investment in network infrastructure to increase network capacity, as well as the continued investment to expand Business Services. In 2016, we will continue to invest in each of these areas as they are driving positive results in our business.") (emphasis added); Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q3 2016 Comcast Corp. Earnings Call (Oct. 26, 2016) ("While the largest component of our capital spending continues to be customer premise equipment including X1 and wireless gateways, the largest source of year-over-year growth in spending is our investment in scalable infrastructure to increase network capacity. We believe this investment in scalable infrastructure enhances our competitive position in broadband by staying ahead of rapid growth and bandwidth consumption by our customers. In addition, we have extended our network to more customer addresses primarily business addresses through line extensions. We continue to expect that for the full year of 2016 our cable capital intensity will remain flat to 2015 at approximately 15 percent.") (emphasis added); Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, Q3 2016 Comcast Corp. Earnings Conference Call (Oct. 26, 2016) ("Concerning the network, we have continued to invest over the years in our network capacity and we will continue to do that. Business services has brought fiber deeper into the network. We are going fiber direct to new developments and to some MDUs. So we will continue to invest in the network but it is nothing new to our business. We have increased capacity, doubled capacity every 18 to 24 months and that has been happening for the last 8 to 10 years. So we feel pretty good about our position.") (emphasis added).

<sup>140</sup> See *supra* note 9 and accompanying text; see also Comcast Corp. Financial Supplements for periods ending 12/31/2008, 12/31/2009, 12/31/2010, and 12/31/2011.

In sum, Comcast's elevated capital expenditures in the two years following the FCC's *Open Internet Order* vote were largely due to the company's massive increase in network infrastructure investments. During the two years prior to the FCC's vote, Comcast invested \$3.37 billion in its core network infrastructure (line extensions, upgrade/rebuilds, and scalable infrastructure; see Figure 3 above). In the two years following the FCC's February 2015 vote, Comcast's network investments jumped a whopping 62 percent, with a two-year total of \$5.46 billion. These investments translate into higher-capacity services. For example, the majority of Comcast's footprint will be DOCSIS 3.1 capable by the end of 2017, with multi-gigabit symmetrical services rolled out the following year.<sup>141</sup> In the year following the FCC's 2015 vote, Comcast deployed 2 gigabit symmetrical service to 18 million customer locations.<sup>142</sup> Also during 2015, the proportion of Comcast's ISP customers subscribing to service with 50 megabits per second ("Mbps") or greater downstream speeds increased from 58 percent to 77 percent.<sup>143</sup>

These measurable facts clearly indicate that the *Open Internet Order* had no negative impact on Comcast's network investments, which increased to historic levels following the FCC's vote. Nor did that order impact the quality of services available in Comcast's footprint, as it deploys the latest-generation technology as fast as humanly possible. As the nation's largest home internet service provider, Comcast's candid statements about the impact of regulation are of particular importance. These pronouncements are not as informative as its actions, but the signals sent to shareholders have weight too. Thus it is particularly telling that mentions of Title II and the Open Internet rules were absent from Comcast's public statements during quarterly investor calls<sup>144</sup> and nearly all investor conferences following the February 2015 vote, until after the November 2016 election.<sup>145</sup>

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<sup>141</sup> See, e.g., Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, at Deutsche Bank Media, Internet and Telecom Conference (Mar. 6, 2017) ("[W]e are going to continue to grow out DOCSIS 3.1, it will be at the majority of our households; it will be available by the end of the year. We have already rolled it out in Atlanta, Chicago, Detroit, Nashville. So we are seeing the roll out going very effectively . . . . [O]ver the next 24 months we are going to do DOCSIS symmetrical – DOCSIS Duplex, rather, that will get symmetrical speeds – multi-gigabit speeds out into the network, leveraging our core network, our HFC plant. And we continue to roll fiber deeper into the network both with business services as well as with residential. And so, we feel very confident that our network is extendable and flexible and we can continue to deliver higher speeds.").

<sup>142</sup> See Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, Q1 2015 Comcast Corp. Earnings Conference Call (May 4, 2015) ("We have invested significantly in our capacity and will continue to do so and that includes both the – we launched a 2 gigabit speed, 2 gigabit symmetrical speed recently. We are rolling that out across 18 million homes by the end of the year and we've got the fastest in-home Wi-Fi router.").

<sup>143</sup> See Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q4 2014 Comcast Corp. Earnings Conference Call (Feb. 24, 2015) ("High-speed Internet revenue increased 9.5 percent for the year reflecting continued growth in our customer base, rate adjustments and an increasing number of customers taking higher-speed services. At year-end 58 percent of our residential high-speed Internet customers receive speeds of at least 50 megabits, a meaningful increase compared to 2013."); Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q4 2015 Comcast Corp. Earnings Conference Call (Feb. 3, 2016) ("The strong momentum in our high-speed data business continued. Revenue increased 9.8 percent during the quarter, making it again the leading contributor to overall cable revenue growth, driven by an impressive increase in our customer base, as well as rate adjustments and an increasing number of customers taking higher-speed services. We added 460,000 data customers during the quarter and 1.4 million during the full year with 77 percent of our customers receiving speeds of 50 megabits per second or greater.").

<sup>144</sup> No questions were asked about, nor did Comcast make any comments concerning Title II or the FCC's *Open Internet* rules, on its Q2 2015, Q3 2015, Q4 2015, Q1 2016, Q2 2016, and Q3 2016 investor calls. Title II did come up on Comcast's Q1 2015 investor call (the first one following the FCC's vote). Comcast was asked by an analyst, "now that Title II is the new state of the world, if you can lay out for us how you see that framework affecting broadband pricing going forward or what you can or cannot do with this new framework now?" Comcast Cable CEO Neil Smit responded, "on Title II, it really hasn't affected the way we have been doing our business or will do our business. We believe in *Open Internet* and while we don't necessarily agree with the Title II implementation, we conduct our business the same we always have, transparency and nonpaid peering and things like that." See Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, Q1 2015 Comcast Corp. Earnings Conference Call (May 4, 2015) (emphases added).

<sup>145</sup> The topic of Title II and the FCC's *Open Internet Order* was largely absent from the discussions with Comcast executives at the numerous analyst conferences during the 21-month period following the FCC's February 2015 vote until after the November 2016 election. The exception was the May 2016 MoffettNathanson Media & Communications Summit,

Comcast's first statements on this issue following that 2016 election were quite telling, but not surprising to anyone who has closely followed this company and this sector in recent years. Given the election of a president who had ignorantly assailed the FCC's Net Neutrality policies, investors were clamoring for concrete answers on how the potential reversal of the 2015 decision would impact Comcast's business. At the December 2016 UBS Global Media and Communications Conference, Comcast executive Mike Cavanagh was asked "if you saw Title II go away or the reclassification undone, would that be a meaningful change or meaningful benefit for Comcast?" He answered:

I think in terms of what actually happens – I've been asked this – it's the fear of what Title II could have meant, more than what it actually did mean. And, as you know, we very much believe in the principles behind what policy was trying to get at, but the overhang of where it could go in the future was something that I think had a chilling effect. Hopefully that chilling effect is gone; both from how investors look at the space and businesses look at the space.<sup>146</sup>

During this same talk, along with his admission that Title II had no impact on Comcast's business, Cavanagh also noted Comcast had made considerable progress on its deployment "roadmap" towards DOCSIS 3.1-enabled symmetrical multi-gigabit broadband.<sup>147</sup> He called broadband a "fantastic business,"<sup>148</sup> acknowledged that Comcast has "long-term pricing power in the broadband product," and noted that "regardless of regulatory, [broadband is] a product that has a trajectory where pricing it properly and getting paid well for the investment we're making seems very reasonable to me to be able to be done well over the long term."<sup>149</sup>

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when the topic was in the news due to the pending decision of the appeal by the D.C. Circuit. When asked if he felt that "cable is being unfairly targeted by the FCC right now," Comcast executive Neil Smit said "I think we've operated under the consent decree for six years now in conditions like net neutrality and it hasn't affected the way we run the business." Smit made no other mention of FCC regulations (past or future), Title II, or the specific Open Internet rule prohibitions. Smit did pivot, however, and note the company's myriad network investments: "We are launching DOCSIS 3.1 in Atlanta right now and have announced four other cities, so we can get the gigabits speeds. We have an Internet Pro product where we can offer up to 2 gigs and we are investing a lot in Wi-Fi and we will have multi-gigabit routers coming out in the relatively near future. So if you get a gig coming up to the house, you can actually get a gig going through the house across the Wi-Fi network with all the devices people are hanging over it. So I think it's – and the DOCSIS – our HFC network is very flexible. We can do things beyond DOCSIS. So I think it's continued investment in capacity. We double our capacity every 18 months or so, but we want to have the best product out there both inside and outside the house." See Comments of Neil Smit, Senior EVP and President & CEO, Comcast Cable Communications, at the MoffettNathanson Media & Communications Summit (May 19, 2016).

<sup>146</sup> See Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., at the UBS Global Media and Communications Conference (Dec. 7, 2016).

<sup>147</sup> See *id.* ("In a couple of years' time, we'll have the next-generation DOCSIS, which will allow for a multi-gig symmetrical. So that's our roadmap; nothing changes about that roadmap. And, of course, we preserve the ability to take fiber directly all the way anywhere where it makes sense.").

<sup>148</sup> See *id.* ("The broadband business just is a fantastic business, so it's – we've been investing, again, heavily in making that the best product, the best broadband, best Wi-Fi in home, and making sure that that extends as a value proposition to our customers. You think about – I think last year was the 10th year in a row with more than 1 million high-speed data net adds. Last year, in particular, it was 1.3 million and change. This year we're tracking to be right in that same ZIP Code, so we got a lot of runway ahead of us, both in terms of more volume and ability to monetize that business.") (emphasis added).

<sup>149</sup> See *id.* When asked "what's your view on the pricing power you have in the high-speed data business and does that change? Is it potentially improved if we do get the regulatory changes it seems like we're set to see?" Cavanagh also said, "You know, we feel that we've got long-term pricing power in the broadband product. It's a product that is – the use cases for – the data usage of our networks grow at a ridiculous pace, which reflects people using the product, getting value, whether it's us providing the service that's utilizing the data. Obviously, video is the killer app for why you need such high-speed data, but it's not the only one. And with the plethora of things going on in the digital and internet ecosystem around us, we think that the consumers' experienced value of the product is going to keep growing. And that's a good backdrop for making sure we can monetize it."

So according to Comcast's Chief Financial Officer, Title II had no negative impact on its investments or business in any way. Comcast made and will continue to make substantial profits from its broadband investments. And Comcast's investment decisions depend on market realities, not regulatory authority.

Comcast's most recent comments to investor analysts on the matter of potential Title II repeal continue to reflect this reality, that the legal framework change has not had and will not have an impact on its broadband investments. However, now that Title II repeal is a possibility, Comcast is of course eager to see it go. The company clearly feels that since there's a compliant regulator, it might as well do away with Title II authority just in case Comcast decides in the future to engage in the discriminatory behaviors it swears it will never entertain.<sup>150</sup> But the fact that the topic of Title II and the Open Internet rules disappeared from Comcast's investor calls for nearly two years following the FCC's vote, and that Comcast followed a roadmap for multi-gigabit symmetrical broadband deployment in that time, strongly suggest that the policy is working as intended. Maintaining baseline nondiscrimination obligations on solid legal authority is steering Comcast – a company that once blocked the BitTorrent protocol – away from unreasonably discriminatory practices, and towards investments that benefit its businesses, its customers, and the businesses that reach Comcast's ISP customers via the open internet.

Indeed, it was Comcast's ham-fisted blocking of Bit Torrent that lead the FCC eventually to return to Title II for the Open Internet rules. The trajectory of Comcast's network management and investment practices in the years since it started that chain of events illustrates the importance of policy incentives that discourage unreasonable discrimination and artificial scarcity. Following the Bush FCC's admonishment of Comcast for its unreasonably discriminatory "network management" of peer-to-peer traffic, Comcast retooled its practices and began utilizing a congestion management technique that targeted specific heavy users' consumption during periods of actual congestion. It also dramatically increased its total network capacity and improved end-user speeds, making investments that largely eliminated any congestion the company claimed as the excuse for its decision to block the BitTorrent protocol originally.<sup>151</sup> These investments not only enabled Comcast customers to use online video services that compete with Comcast's pay-TV business: they also enabled Comcast to offer an improved pay-TV experience to its customers, so they won't cut the TV cord as often; while at the same time giving Comcast an immensely profitable broadband revenues hedge against secular changes impacting pay-TV.<sup>152</sup>

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<sup>150</sup> See Comments of Brian Roberts, Chairman & CEO, Comcast Corp., Q4 2016 Comcast Corp. Earnings Call (Jan. 26, 2017) ("I think regulatory certainty for investors is the same as it is for management: it helps you have the confidence to make long-term plans. And the kind of discussion we've been having this morning, whether it's fiber or other investments in in-home equipment and what your business opportunities are, the more uncertainty, the less encouraging it is to want to invest. So we are encouraged by the prospect of rules that we believe will encourage that investment, stimulate investment, whether that's tax decreases or revisiting the authority of the government to go to places that they said they weren't going to but legally they could go to in the Open Internet order with Title II.")

<sup>151</sup> See, e.g., Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q4 2016 Comcast Corp. Earnings Call, (Jan. 26, 2017) ("Through consistent investment in innovation, we offer the best broadband product on the market. We double the capacity of our network every 18 to 24 months, have increased internet speeds 17 times in the past 16 years, and now over 50 percent of our residential customers have speeds of 100 megabits per second or higher."); Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, Q4 2016 Comcast Corp. Earnings Call (Jan. 26, 2017) ("Concerning the usage, our HSD usage went from an average of – a median of 88 gigabits per month in Q4 and that's up 55 percent from 57 gigabits during the same period of 2015.")

<sup>152</sup> See, e.g., Comments of Matt Strauss, Comcast Corp. EVP & GM, Video Services, Comcast Cable, at the Wells Fargo Technology, Media & Telecom Conference (Nov. 11, 2016) ("In many ways, video is foundational but at the same time we are continuing to invest in DOCSIS 3.1, which is allowing us to introduce gigabit speeds. We are continuing to invest in our XB6, which is our next-generation router which is going to have 5 times the Wi-Fi coverage, in addition to investing in Wi-Fi hotspots. We've got over 15 million Wi-Fi hotspots."); Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, Q2 2016 Comcast Corp. Earnings Call (July 27, 2016). Smit was asked "how do you guys think about positioning a single play broadband product and [ ] how much flexibility do you have in pricing that?" He answered, "concerning single play and broadband we do market that. We think there is going to continue to be streaming services and OTT services that come through and broadband will continue to grow as we continue to invest in the network and the Wi-Fi capabilities." *Id.*

The mutually beneficial nature of the incentives put in place by the *Open Internet Order's* legal framework were made clear by Comcast's CEO one year after the FCC vote. When asked by a Morgan Stanley analyst to "help us think about where you are investing and how we might think about the trajectory of capital intensity over time," Brian Roberts said, "not all capital is created equal. Some you have to do and some you want to do. And right now we are in an era of the capital we are spending we want to. Giving you a better Wi-Fi in your house is job one. Giving you faster Internet speeds is job one [and] that is what's powering our success."<sup>153</sup>

Comcast's guidance for 2017 indicates that it could be another record year for its capital investments.<sup>154</sup> And depending on how it markets its upcoming wireless service and utilizes its recently purchased 600 MHz spectrum, these investments could remain high. Of course, they might also decline – not because of regulatory fears, but because of the large amounts of capacity already enabled by Comcast's current DOCSIS 3.1 deployments, and because of CPE spending declines as it shifts pay-TV services towards a cloud-based model.<sup>155</sup>

In sum, Comcast (like most other ISPs) railed against the potential adoption of basic nondiscrimination rules under Title II authority prior to the FCC's 2015 *Open Internet Order* vote to do just that. Comcast predicted an unspecified amount of investment harm due to regulatory uncertainty, even as it claimed to agree with the actual legal duties set out in the actual Net Neutrality rules.<sup>156</sup>

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<sup>153</sup> Comments of Brian Roberts, Chairman, President & CEO, Comcast Corp., at the Morgan Stanley Technology, Media & Telecom Conference (Mar. 1, 2016) (emphasis added). During this same interview, Roberts was asked "what do you tell your shareholders about the regulatory oversight around the business and whether that could impact your earnings power long-term?" He said, "I don't envision any great activity that would require a whole other conversation about us and try to execute this year the momentum that we've got. . . ." *Id.*

<sup>154</sup> See, e.g., Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q4 2016 Comcast Corp. Earnings Call (Jan. 26, 2017) ("The full year was led by customer premise equipment, including X1 and wireless gateways, which remain the largest component of our capital expenditures, though spending declined modestly year over year. We also invested in our network through increased spending in line extensions as we extended our network to more business and residential customers and in scalable infrastructure as we invested to increase our network capacity. These investments enhance our competitive position, allowing us to continue to take advantage of opportunities to grow penetration and market share by delivering the best broadband product to more homes and businesses. For 2017, spending on CPE is expected to continue to decline while we increase our investment in network capacity as well as our investment in line extensions to reach more customers. As a result, our outlook is for 2017 capital intensity to remain flat to 2016 at approximately 15 percent.") (emphasis added).

<sup>155</sup> See *id.* ("Longer term, as spending on CPE continues to decline as X1 scales and shifts to less expensive IP devices, we expect to see a decline in overall capital intensity.") (emphasis added); see also Comments of Neil Smit, Senior EVP & President, CEO, Comcast Cable, Q4 2016 Comcast Corp. Earnings Call (Jan. 26, 2017) ("If you look at cellular data usage, it's about 3 gigabits per month average, so there's a lot of capacity in the wired network.") (emphasis added).

<sup>156</sup> See, e.g., Comments of Brian Roberts, Chairman, President & CEO, Comcast Corp., Q4 2014 Comcast Corp. Earnings Call (Feb. 24, 2015) ("We are absolutely for a free and open Internet. We even agree on what President Obama and Chairman Wheeler say should be in the rules – transparency, nondiscrimination, no blocking, no throttling and no paid prioritization – and we've been consistent in communicating our agreement with those principles. The disagreement boils down to what legal authority the FCC should use to put in place these rules. We think the Title II regulation is antiquated and has real downsides. So our attention, just like everyone else, is on the actual text of the order, the upcoming vote, the strength of forbearance and ultimately the Commission's focus on preservation of incentives for the private sector to continue to invest aggressively in broadband. . . . Obviously, my comments I just made about our view that we don't believe Title II was the right answer, but if that is indeed what happens, we will have to appropriately adjust and reflect on what the words are, what the specific details are. We are heartened that there is at least the desire to forbear from things that would be a disincentive to invest, but until we see the fine print, I think we have to reserve judgment."); see also Comments of Mike Cavanagh, Senior EVP & CFO, Comcast Corp., Q4 2014 Comcast Corp. Earnings Call (Feb. 24, 2015) ("[O]bviously the uncertainty that Title II may provide I think does provide us with the opportunity for a higher degree of scrutiny on capital and broadband. We really, as Brian said, need to look at the details, but there will be some internal scrutiny here in terms of what our investment plans look like with broadband."). Based on Comcast's increased and accelerated investments following this statement, it is clear that Comcast felt completely comfortable with the order's scope of regulatory forbearance.

But following the 2015 vote, Comcast's investments increased dramatically as it accelerated its deployment of gigabit-capable infrastructure and next-generation pay-TV services (the latter in response to increased competition from online video services enabled by the open internet). And the entire issue of Title II essentially disappeared from the conversation. Whatever Comcast's actual concerns (if any) about FCC action were prior to that vote, those concerns apparently melted away once the final text of the order made clear that Title II with heavy forbearance would change nothing actually impacting the fundamentals of the ISP business.

None of this should come as a surprise to an honest and rational observer. The FCC adopted a highly deregulatory, forbearance-heavy policy framework that simply preserved the internet ecosystem's and broadband market's status quo. This deregulatory Title II framework has had a quarter-century of success in the wireless voice market, and a decade-plus record of success spurring investment in the enterprise broadband market. The new FCC would be wise to let these facts guide its future actions, not the anti-regulatory faith-based alternative reality that those opposed to Title II construct in their attempt to tear down this highly successful framework.

### Charter/Time Warner Cable/Bright House Networks

Charter Communications is yet another example of an ISP that dramatically increased its network investments during the two years following the FCC's *Open Internet Order* vote. While Charter's *pro forma* capital expenditures were flat during 2015, investment rose substantially during 2016 following its acquisitions of Time Warner Cable ("TWC") and Bright House Networks ("BHN"). During 2013–2014, these three legacy companies' capital expenditures totaled \$12.6 billion. From 2015–2016 Charter's *pro forma* capital investments topped \$14.5 billion, a 15 percent increase which came despite hundreds of millions of dollars (or more) in synergies that Charter claimed following the May 2016 closing of the deal. Charter's *pro forma* core network investments (*i.e.*, line extensions, upgrades/rebuilds, scalable infrastructure) increased in 2015 and again in 2016. The combined company's network investments were \$5.57 billion during the two years prior to the FCC's February 2015 vote, increasing by 24 percent to a total of \$6.9 billion in the two years after (see Figure 3 above).

Charter's *pro forma* capital expenditures have thus far exceeded guidance it gave investors in an August 2015 proxy statement.<sup>157</sup> It estimated *pro forma* capital expenditures would be \$12.979 billion for 2015–2016. The actual amount proved to be \$14.514 billion, 12 percent higher than anticipated 16 months prior. Spending jumped even as the combined firm brought in almost exactly the proxy statement projection on revenues.<sup>158</sup>

The particulars of the Charter/TWC/BHN capital investment story, both before and after the *Open Internet Order* vote, are somewhat complex. We must account for each company's pre-existing trajectory and also the typical slowdown in spending during a merger review. Standalone Charter had completed its all-digital system upgrades nearly 18 months prior to the acquisition closing,<sup>159</sup> but had not yet finished deployment of its cloud-based X1-style "Spectrum" IP-video platform.<sup>160</sup> As of mid-2016, approximately 40 percent of the Time Warner

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<sup>157</sup> See Charter Communications Inc., Schedule 14A, Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934, at 221 (Aug. 18, 2015) ("August 2015 Proxy Statement").

<sup>158</sup> See *id.* In the August 2015 Proxy Statement, Charter estimated *pro forma* revenues of \$77.01 billion for 2015–2016. The actual amount totaled \$77.417 billion, just 0.5 percent higher than originally estimated.

<sup>159</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2014 Charter Communications Inc. Earnings Call (Feb. 5, 2015) ("With all digital behind us, the capital intensity of our operations and our retained footprint will decline significantly in 2015, driving meaningful free cash flow growth.") (emphasis added).

<sup>160</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2015 Charter Communications Inc. Earnings Call (Feb. 4, 2016) ("Through the course of 2016, we're rolling out our new cloud-based Spectrum Guide. Our initial Spectrum Guide launches are working and scaling well, with positive customer response. Spectrum Guide's more intuitive and feature-rich user interface improves both video search and discovery, fully enables our on-demand offering, and allows us to include internet video in the Guide, which enhances the value of our service. And because the Guide is cloud-based, and will work across nearly all of our 10 million set top boxes, we can launch and refresh the Guide without purchasing or installing new set top boxes. By avoiding deployment of new boxes, Spectrum Guide minimizes customer disruption, and accelerates the time to put a modern UI on every outlet.")

Cable footprint and 60 percent of the BHN footprint had not yet converted to all-digital,<sup>161</sup> but TWC had heavily promoted its higher-capacity “Maxx” services in the markets where its upgrades were complete.<sup>162</sup> According to Charter, the substantial increase in its *pro forma* capital investments during 2016 were largely due to increases in core network equipment (e.g., CMTS units).<sup>163</sup> These increases more than offset savings from other IT-related synergies<sup>164</sup> and from the company’s later “pause” of all-digital upgrades in the legacy TWC markets.<sup>165</sup> Charter has since restarted those all-digital upgrades, and the company expects capital expenses will remain elevated for the next couple of years<sup>166</sup> before efficiency gains translate into a return to “normal” levels.<sup>167</sup>

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<sup>161</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017) (“In the second quarter, we’ll restart our all-digital deployment, featuring fully two-way advanced set top boxes to video customers in the approximately 40 percent of TWC and 60 percent of Bright House that are not yet all-digital, which allows us to offer more HD, interactivity on every video outlet, faster data speeds, and reduced operating costs. We should be 100 percent all-digital in less than two years.”).

<sup>162</sup> See, e.g., Comments of Rob Marcus, Chairman & CEO, Time Warner Cable Inc., Q1 2016 TWC Earnings Call (Apr. 28, 2016) (“TWC Maxx is proceeding apace. At quarter end that all digital conversion and broadband speed increases were complete in around half our footprint, with another quarter of our footprint in process. . . . Customer satisfaction and churn improvements in Maxx markets continued to outpace those in non-Maxx markets.”).

<sup>163</sup> A cable modem termination system (“CMTS”) is a piece of equipment at the cable headend used to provide high speed data services. See Comments of Chris Winfrey, EVP & CFO, Charter Communications Inc., Q2 2016 Charter Communications Inc. Earnings Call (Aug. 9, 2016) (“There was also some what I believe is pull-forward of good capital, but a significant pull-forward of capital around CMTS and routers and some of that type of activity. That should slow down a little bit as well. But the danger in providing capex guidance or even expectations is, frankly, if we see the opportunity to go make an investment that’s going to put the Company in a position to grow faster, then we’re going to do that inside of a particular quarter or inside of a particular last 12 months or fiscal year. And our view on the trends of capex is that capital intensity will go down significantly once we get through the all-digital program.”).

<sup>164</sup> See *id.* (“In Q2, excluding transition capital, TWC spend [on] capital [was] approximately 21 percent, Charter 18 percent, and Bright House 15 percent of revenue, respectively. Going forward, obvious we’ll reduce the spend on IT, product development, and other areas which were by definition duplicative, and we should see a short-term benefit from the regrouping on the remaining all-digital projects . . . . Even though capex was being spent at a more elevated level, and it included the duplicative portion of capex which is three different companies spending on IT and different types of product development . . . at least [ ] 2 if not 3 times over. So that’s another area that it should automatically get more efficient.”).

<sup>165</sup> See Comments of Chris Winfrey, EVP & CFO, Charter Communications Inc., Q2 2016 Charter Communications Inc. Earnings Call (Aug. 9, 2016) (“We’re not going to be providing capex guidance. But I think the thing that is clear is that one of the big drivers for spend in the first half of the year on a *pro forma* basis – again, it wasn’t us managing the combined capex . . . . But there was obviously the significant amount of all-digital activity that was continuing at TWC, and that will be largely put on hold as we put it in the Charter all-digital strategy beginning at the beginning of next year.”).

<sup>166</sup> See Comments of Chris Winfrey, EVP & CFO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017) (“The all-digital will restart in Q2, and it will go probably for around two years. But the bulk of the activity [ ] is going to be taking place next year, so we’ll be doing all-digital from Q2 to the end of this year, but the bulk of it’s going to be in 2018. There will be some CapEx associated with that rollout. The bigger portion of CapEx this year is going to be driven by a higher amount of CPE and placement costs for Spectrum pricing and packaging connects, because A, we expect sales in connects to be higher, as we’ve already seen in the markets where we’ve gone. But, when we do an install under Spectrum pricing and packaging, there’s a higher number of devices that we’re placing in the home because of our two-way set top box strategy, as well as our strategy not to charge for modem rental, and to have reasonable router fees, which means that you’re going to put more capital into the home on an average transaction, and we expect to have higher transactions. So that’s going to be a bigger driver in 2017, offset by some transaction synergies. . . .”).

<sup>167</sup> See *id.* (“On capex, we’re not providing capex guidance, just because we approved a budget internally which is what we want to operationally deploy this year. It could be less than that, just because of what practically can be done, or it can be in a position to accelerate. But from our perspective, it doesn’t make sense to really set an artificial target, try to wag the dog for what’s ultimately right. But if you think back to what I said, in 2017, we will be spending more on Spectrum pricing and packaging through that higher CP placement for connect. We will restart all-digital. We will be insourcing. But offsetting some of that increase will be the benefit of synergies. So without giving specific guidance, 2017 is probably a bit higher in terms of absolute dollars than what we were *pro forma* in 2016, but it shouldn’t be a dramatic change in terms of capital intensity or capex as a percentage of revenue.”).



So, we know that Charter's *pro forma* capital expenditures and core network investments increased following the restoration of Title II, even as the company paused TWC's all-digital upgrades and even with merger synergy-related savings. But how does this increased spending translate into what's available and what will shortly be available to internet users living in Charter's expanded footprint? Charter's legacy footprint was already all-digital and DOCSIS 3.0-enabled prior to the FCC's Open Internet vote. During the year following it, the percentage of Charter customers on a 60 Mbps downstream tier increased from 80 percent to 90 percent.<sup>168</sup> Prior to the November 2016 election, Charter made clear its plans to complete the all-digital upgrades of TWC and BHN systems by the end of 2018.<sup>169</sup> Charter is preparing to roll out DOCSIS 3.1,<sup>170</sup> and expects to have all of its 50 million-plus customer locations multi-gigabit enabled by the end of 2021.<sup>171</sup> Charter also told investors that it will begin offering symmetrical 10 gigabit services over coaxial infrastructure before the end of 2020,<sup>172</sup> and because most of the network is already in place, and because of coaxial cable's large room for increased capacity too, Charter is going to deploy these future-proofed capacities even as its capital investments decline.<sup>173</sup>

Thus, it is clear that Charter planned for (and began upgrading) its systems to be multi-gigabit capable during the months following the FCC's vote to restore Title II and adopt the Open Internet rules. Charter repeatedly told investors to expect higher capital investments in the period following the FCC's February 2015 vote, and emphasized that network investment was its top priority, even ahead of returning capital to

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<sup>168</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2014 Charter Communications Inc. Earnings Call (Feb. 5, 2015) ("And at year end, over 80 percent of our internet customer base subscribed to tiers that provided 60 megabits or more."); Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2015 Charter Communications Inc. Earnings Call (Feb. 4, 2016) ("As of the end of the fourth quarter, nearly 90 percent of our residential internet customers subscribed to internet service that provided speeds of 60 megabits or more.").

<sup>169</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q2 2016 Charter Communications Inc. Earnings Call (Aug. 9, 2016) ("In 2017, the all-digital project at Time Warner Cable and Bright House markets will use the Charter all-digital strategy, which uses fully functioning two-way set-top boxes with video-on-demand and advanced guide functionality on every TV outlet. We expect the project to be completed by 2018.").

<sup>170</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2015 Charter Communications Inc. Earnings Call (Feb. 4, 2016) ("[W]ith regard to 3.1, we didn't specifically plan for it in Legacy Charter in this fiscal year. But the modems will become available commercially later this year, and we think that it's possible that we'll start to deploy those modems, in lieu of 3.0 modems. But we don't have a specific plan to do that yet. But over the next 18 months, this platform is going to become available to the industry, at commercially deployable pricing. And we expect that we will begin the transition in the new Company over that timeframe.").

<sup>171</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q3 2016 Charter Communications Inc. Earnings Call (Nov. 3, 2016) ("Over the next five years or so, with relatively small infrastructure investments, our network will be able to deliver symmetrical multi-gigabit speeds with high compute and low latency capabilities to all 50 million homes and businesses in our footprint.").

<sup>172</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., at the Deutsche Bank Media, Internet and Telecom Conference (Mar. 6, 2017). When asked "what do you think the timing is on [10-gig symmetrical] commercial availability," Rutledge answered, "probably three years from now." See *id.*

<sup>173</sup> See, e.g., August 2015 Proxy Statement at 221 (showing Charter's projection that *pro forma* capital expenditures would peak in 2017, decline by 6 percent during 2018, and decline by another 10 percent during 2019); see also Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017) ("So we're very comfortable with the extensibility of our network, and the ability to put high capacity anywhere in our network. We have a cable labs project, which is an industry association organization, that has developed 10-gig symmetrical products in the lab that are capable of running on our nodal architecture. To get to those speeds, we may need to go deeper with our fiber, but we can go to 5G symmetrical with less deep fiber penetration. So we think we have a very flexible architecture that allows us to grow significant capacity, without a lot of capital investment.") (emphasis added); Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q1 2016 Charter Communications Inc. Earnings Call (Apr. 28, 2016) (noting the coming savings from cloud-based IP-TV services, and explaining that "[e]lectronic disconnects and self installs will provide significant benefits to Charter systems in the coming years. It will also reduce operating costs and capital expenditures.").

shareholders.<sup>174</sup> Charter followed through, and it continues to follow through on its investment and upgrade promises made when the company believed that Title II would likely remain in place for the foreseeable future. In many markets, Charter's entry-level service is 100 megabits per second – a capacity four-times the level the FCC considers to be “advanced,” and that Chairman Pai has previously said most ISP customers do not want even if it is available.<sup>175</sup> After Title II's restoration but before the 2016 election, Charter outlined plans to spend heavily to complete all-digital upgrades of the legacy TWC and BHN systems, and made clear that it would offer multi-gigabit services as quickly as DOCSIS 3.1 modems were available on a mass-market basis.<sup>176</sup> And it undertook these activities in part as a response to the growing online video competition that takes place over its broadband network<sup>177</sup> – competition that the FCC's Open Internet rules promote and protect.

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<sup>174</sup> See Comments of Chris Winfrey, EVP & CFO, Charter Communications Inc, Q2 2016 Charter Communications Inc. Earnings Call (Aug. 9, 2016) (“But in order of priority, we'll invest in our business, including areas that provide faster and more sustainable growth; pursue accretive M&A when available and ready; return capital to shareholders in the form of share repurchases; and if we had no better use of cash or determined it prudent to reduce our target leverage, we'll pay down debt.”).

<sup>175</sup> See *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, 30 FC Rcd 1375, 1485 (2015) (Dissenting Statement of Commissioner Ajit Pai) (“For today's report declares that 10 Mbps Internet access service is no longer broadband. Only 25 Mbps or more counts. This decision should surprise American consumers. 71 percent of consumers who can purchase fixed 25 Mbps service – over 70 million households – choose not to.”).

<sup>176</sup> See Alan Breznick, “Charter Issues RFP for D3.1 Modems,” *Light Reading* (Mar. 7, 2017) (“Charter Communications has put out an RFP on DOCSIS 3.1 cable modems to equipment suppliers as it gets ready to try out the new cable broadband spec.”).

<sup>177</sup> See, e.g., Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2015 Charter Communications Inc. Earnings Call (Feb. 4, 2016) (“And because the [Spectrum Guide] is cloud-based, and will work across nearly all of our 10 million set top boxes, we can launch and refresh the Guide without purchasing or installing new set top boxes. By avoiding deployment of new boxes, Spectrum Guide minimizes customer disruption, and accelerates the time to put a modern UI on every outlet. It turns every TV into a connected smart TV, and allows us to integrate third party video services, including over the top providers like YouTube, Netflix, Hulu, and Amazon Prime, giving customers the ability to search and view all the content they're interested in, without changing consumer owned hardware or devices. . . . And so we think that we have a tremendous upside to grow our own business, with the quality of video services that we can build and provide, and with the service infrastructure we've built around that, I do think – we've talked about the macro issues previously, and the pressures on video, most of which I think are economic. The costs have been high. It does look like costs have moderated a little bit on the margin. And that's partially because over the top is affecting the value of content, in a good way, from our perspective.”); see also Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q1 2016 Charter Communications Inc. Earnings Call (Apr. 28, 2016) (“Our go-to-market strategy and our programming relationships are designed to encourage the sale of our existing products and the development of over-the-top products. Our broadband package and the capabilities of our broadband service are realized when customers use it. They use it when they subscribe to over-the-top services. Video is the most bandwidth-intensive product there is. We have superior network, which we have invested to make superior. We cleared it to create more spectrum available for broadband. We've taken broadband speeds up and capabilities. The way that our drive into the marketplace is accelerated is by people's perceiving the value of our broadband and the way they perceive that value is through over-the-top . . . . I don't know how high broadband penetration can go. I think it continues to rise. I think there are other – there are substitution possibilities on the margins that are already occurring, but I think that we have a better infrastructure and we've invested in a better infrastructure and I think we have an opportunity to take significant share.”) (emphasis added); Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q2 2016 Charter Communications Inc. Earnings Call (Aug. 9, 2016) (“And by going all-digital and using your two-way interactive platform, you can build a better video product than your competitors, in my opinion; which is why I think Charter is growing its video business year-over-year. It's a slow process. The inertia is real in the marketplace. But I think Charter has turned the video business positively, and I think the same is possible in Time Warner and Bright House. But it requires the proper investment in a video product, which means you need a two-way product with an excellent user interface and all the functionality and features that you get from an Internet-type-like service with live, fully featured content. So I think there's still lots of upside selling traditional MVPD products, that cable service, to customers who have broadband only.”).

These are not the actions of a company that is retreating in fear of regulation. They are the actions of a company that is deploying new services as fast as possible. These are the actions of a company that is smartly leveraging its natural monopoly position with relatively modest investments in order to grow its business and network capacity,<sup>178</sup> just as it did before the FCC's vote too.

And while its actions speak louder than its words, Charter also has made clear its thoughts on Title II's ultimate impact. Even though the topic largely disappeared from its investor calls during 2015–2016, when the subject did arise Charter executives repeatedly stated that Title II had no and would have no negative impact on its investments or overall business. For example, Charter was asked about Title II on its May 1, 2015 investor call (for Q1 2015 results), which followed the FCC's vote. Charter CEO Tom Rutledge told analysts that "Title II was a – it's actually a longstanding issue. . . . Although I wish it were structured differently and I thought that the outcome was less than ideal, I don't think that is particularly related to being friendly or not friendly to cable in general."<sup>179</sup> One month later Rutledge recounted a conversation he had with then-FCC Chairman Tom Wheeler, who asked him directly "are you not going to invest?" with Rutledge responding, "obviously I'm investing."<sup>180</sup>

Other than these two mentions, and one further comment in May 2015 when Charter volunteered that it has "no plans to block, throttle or engage in paid prioritization of internet traffic,"<sup>181</sup> the issue of Title II was not raised at any of Charter's investor calls or conference appearances until after the November 2016 election. At the

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<sup>178</sup> See, e.g., Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017) ("There are a bunch of ways you can manage capacity on our network. We can do what are called virtual node splits. So what that means is if you clear spectrum electronic – take off analog spectrum and go all-digital, and you have excess capacity in your network, and you have demand that would say, I need to put more capacity in a node, there's two ways of doing it. One way is to physically split the node into a smaller node, which requires the placing of an electronic device in the field, and maybe the expansion of some fiber, depends on how the architecture of that is structured, but it's a relatively – it's inexpensive on a grand scale capital perspective, but a lot more expensive than a digital or virtual node split. You can do those if you have channel capacity, by just recreating additional DOCSIS paths, you can create a virtual node, essentially. We manage our network for the future based on the actual load on the network, as opposed to some theoretical issue, and there are other ways of getting capacity out of all-digital networks. Like for instance, most of our set top boxes now are capable of IP delivery. They're also capable of MPEG4 delivery, which means that we can squeeze the capacity out of our video business, and get more DOCSIS capability in our network, which means we can do more virtual or electronic node splitting than we might have done a couple of years ago. And that's a function of our CPE strategy. So we're managing all of those things together to get capacity. But in any model we get to, some future state, where there's a whole new product set that requires massive capacity that currently isn't required, we would take our fiber deeper and go to a passive network, and go to the symmetrical 5 or 10 gig that I talked about earlier.") (emphases added).

<sup>179</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q1 2015 Charter Communications Inc. Earnings Call (May 1, 2015) ("Title II was a – it's actually a longstanding issue. The issue of net neutrality has been around for a long time and companies have been agitating. It's been part of the President's agenda all along, and he campaigned on it initially. So it's not surprising that the forces that prevailed there did. Although I wish it were structured differently and I thought that the outcome was less than ideal, I don't think that is particularly related to being friendly or not friendly to cable in general.").

<sup>180</sup> On June 17, 2015, at the Guggenheim TMT Conference, Rutledge was asked about Title II authority versus the failed effort of the Genachowski FCC to adopt rules under a 706 theory. The questioner recounting his recent conversation with the former Chairman stated, "[Genachowski] said that he doesn't see any signs that capital spending – you look at the auctions or spectrum, and you look at the spending – that the uncertainty of regulatory is not inhibiting the deployment. And [Charter is] talking about deploying capital." Rutledge responded, "Well I had to file an ex parte statement after I saw the FCC. And they asked me that question, so why are you here? Are you not going to invest? I said, no; I'm sort of – obviously I'm investing." (Emphasis added).

<sup>181</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Charter Communications Inc. Conference Call Announcing Transactions with Time Warner Cable and Bright House Networks, M&A Call (May 26, 2015) ("Charter invests significantly in interconnection. And in capacity before ports get congested, so customers will have a quality experience when watching on-line video or gaming. And regardless of Title II litigation, we have no plans to block, throttle or engage in paid prioritization of internet traffic.").

December 2016 UBS Global Media and Communications Conference, Rutledge was asked about what the new administration “means for Charter and the cable industry.” He responded, “I mean, Title II, it didn't really hurt us; it hasn't hurt us.”<sup>182</sup> A similar question was asked on Charter’s February 2017 investor call, and Rutledge again noted, “look, we had a lot of headwinds in the previous administration, from a regulatory point of view, we got Title II. It didn't really affect us but had the potential of affecting us.”<sup>183</sup>

In sum, Charter’s network investments increased following the FCC’s Title II reclassification. Charter’s post-vote investments exceeded its own predictions. Charter is deploying the latest generation of cable modem technology in rapid fashion, and is following through on its post-vote commitment to upgrade all of its lines with multi-gigabit symmetrical capabilities well ahead of any market demand for this level of service. Charter repeatedly told its investors that Title II did not and would not impact its investments or business, and it voluntarily committed to the FCC’s Open Internet rules even before they were codified. There’s simply no logical reason to believe that the continued application of the FCC’s deregulatory Title II framework has caused, or would cause, a negative impact on Charter’s highly successful enterprise.

#### Altice/Cablevision/Suddenlink Communications

Netherlands-based Altice N.V. acquired mid-sized MSO Suddenlink Communications in December 2015, and closed on its acquisition of Cablevision Systems Corporation in June of 2016. Shortly thereafter, just about a year after the Open Internet vote, Altice announced a five-year plan to upgrade its entire footprint of 8.4 million locations with fiber-to-the-home technology capable of delivering 10 gigabits per second symmetrical.<sup>184</sup> Analysts estimate Altice will spend up to \$9.6 billion to do so, meaning an average cost of \$1,100 per passing.<sup>185</sup>

Yet despite this ambitious plan, Altice estimates that its total U.S. capital expenditures will decline from the company’s 2013 *pro forma* peak. This is another example of why absolute change in all ISPs’ total capital investments – or even in a signal ISP’s total outlay – is an exceedingly poor metric for measuring infrastructure availability. Altice claims to have a proprietary method for fiber deployment that leads to substantial cost savings. It is aided by the fact that much of its service area has aerial rather than buried lines.<sup>186</sup> It also benefits from legacy Cablevision’s and legacy Suddenlink’s prior investments pushing fiber deeper into their networks.

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<sup>182</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., at the UBS Global Media and Communications Conference (Dec. 6, 2016) (“I mean, Title II, it didn't really hurt us; it hasn't hurt us. But it has the potential of hurting us. And even the privacy regulations, which have the potential of hurting us relatively – speaking to the edge companies, the Googles of the world and so forth – in terms of what kind of advertising products we have and what they’re allowed to do and what we’re not allowed to do. Those authorities come out of Title II.”) (emphasis added).

<sup>183</sup> See Comments of Tom Rutledge, Chairman & CEO, Charter Communications Inc., Q4 2016 Charter Communications Inc. Earnings Call (Feb. 16, 2017).

<sup>184</sup> See, e.g., Anita Balakrishnan, “Speedy new rival for Verizon Fios and Google Fiber headed to 20 states,” *CNBC* (Nov. 30, 2017).

<sup>185</sup> See Alan Breznick, “Altice USA Sticks to High-Fiber Diet,” *Light Reading* (Mar. 9, 2017) (“Despite cutting back on its overall capital expenditures, Altice is still going full speed ahead with its plans to go all-fiber throughout its US territories. With the integration of its two new US cable properties (Cablevision Systems and Suddenlink Communications) continuing to proceed as planned, Altice is now building FTTH networks in the regions of both acquired cablecos. Plans call for blanketing nearly the entire Cablevision and Suddenlink footprints, encompassing a total of 8 million homes passed, with fiber by the end of 2022, at an estimated cost of up to \$9.6 billion.”).

<sup>186</sup> See Comments of Dexter Goei, President, Altice N.V., Q4 2016 Altice N.V. Earnings Call (Mar. 9, 2017) (“We clearly are focused on driving to our fiber-to-the-home rollout over the next five years. We’re going to maintain the same capex budget envelope that we’re spending today. We don’t think we need to increase that. You have to remember that we are doing last-mile upgrade as opposed to end-to-end fiber-to-the-home build-out. And secondly that our network, even in the Optimum footprint, overall across our Altice USA footprint is 80 percent aerial, right. So we clearly believe that our capex needs are covered by our existing budget and spend that we’re seeing in 2016 and we don’t expect that to materially increase at all going forward.”) (emphasis added).

Though total capex at Cablevision and Suddenlink combined declined from a 2013 peak, Altice's *pro forma* U.S. core network investments actually increased after the FCC's vote, peaking in 2015 (see Figure 3). This was due in part to large decreases in spending on CPE (such as set-top boxes) and support capital during 2015–2016, offset by increases in line extensions, upgrades/rebuilds and scalable infrastructure during 2015.

But even with its 2016 net capex declines, Altice managed to greatly increase the speeds offered to its newly-acquired Cablevision and Suddenlink customers. At the end of March 2016, Cablevision's peak consumer downstream speed offering was 101 megabits per second. With minor additional investments, Altice took this to 300 Mbps by the end of 2016.<sup>187</sup> When it acquired Suddenlink, 50 percent of that predecessor's footprint was capable of delivering maximum downstream speeds of 150 Mbps. By the end of 2016, Altice's investments helped bring 58 percent of Suddenlink's lines up to gigabit speed capability.<sup>188</sup> What's more, Altice's speed upgrades (and those made by Suddenlink<sup>189</sup> and Cablevision prior to acquisition) are helping it to stay ahead of customer demand and helping it to grow bottom line profits.<sup>190</sup>

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<sup>187</sup> See Altice N.V., 2016 Results Investor Presentation at 9 (Mar. 9, 2017) ("Altice 2016 Results"); see also Comments of Dexter Goei, President, Altice N.V., Q3 2016 Altice N.V. Earnings Call (Nov. 10, 2016) ("Altice Q3 2016 Call") ("Optimum has already made a lot of investments in its network, . . . It's 100 percent digital, almost wholly encrypted with an average of 300 homes per node. The maximum download speed previously being offered to customers, though, were only 101 megabits, so we have directed a lot of investment over this in the last few months in taking this to 300 megabits across the whole footprint for residential customers and 350 megabits for commercial B2B customers, which meets our public interest commitments more than one year ahead of schedule and allows us to upsell more customers now for higher speeds. This included head-end equipment upgrades which are scalable for DOCSIS 3.1.") (emphases added).

<sup>188</sup> See Altice 2016 Results at 9; see also Altice Q3 2016 Call ("For Suddenlink, on the right-hand side, the cable network that we bought was less invested than Optimum's, but we have continued with Project GigaSpeed to deliver next-generation one gig broadband services, reaching 46 percent of Suddenlink's footprint by the end of September 2016. This is being achieved with the utilization of the network as more capacity is being freed up for broadband services, as well as encrypting the network for security and similar head-end equipment upgrades that we've done at Optimum.") (emphasis added).

<sup>189</sup> In 2014, Suddenlink started its upgrade project dubbed "Operation GigaSpeed," which pushed fiber deeper into its networks and replaced headend and customer equipment in order to facilitate higher capacity ISP services. During 2014, Suddenlink upgraded half of its customers to this new capability. The bulk of the capital cost of this upgrade project came during 2015, with Altice reducing the pace of this DOCSIS-based project during 2016 as it changed to an all-fiber strategy. See Cequel Communications Holdings I, LLC, Annual Report for the Year Ended December 31, 2014 ("In 2014, we completed the initial phases of Operation GigaSpeed in 26 markets, which serve approximately 49 percent of our residential high-speed Internet customers. Those investments allowed us to increase the flagship Internet speed from 15 Mbps to 50 Mbps and to increase our top Internet speed to up to 150 Mbps to 300 Mbps in those markets. We spent approximately \$35.2 million of the total capital expenditures related to Operation GigaSpeed in the second half of 2014, and expect to spend \$85 million in 2015, with the remainder expected to be invested during 2016 and 2017."); Cequel Communications Holdings I, LLC, Annual Report for the Year Ended December 31, 2015 ("We completed the initial phases of Operation GigaSpeed in 112 markets, which serve over 90 percent of our residential high-speed Internet customers. Those investments allowed us to increase the flagship Internet speed from 15 Mbps to 50 Mbps and to increase our top Internet speed to up to 150 Mbps in those markets, with top speeds in 28 markets increasing to 1 Gbps, which serve approximately 50 percent of our residential high-speed Internet customers. For the year ended December 31, 2015, we spent approximately \$81.3 million of capital expenditures related to Operation GigaSpeed. Since the inception of Operation GigaSpeed, we have incurred \$116.5 million in capital expenditures related to this initiative."); Cequel Communications Holdings I, LLC, Annual Report for the Year Ended December 31, 2016 ("For the year ended December 31, 2016, we incurred approximately \$31.5 million of capital expenditures related to Operation GigaSpeed. Since the inception of Operation GigaSpeed, we have incurred \$148 million of capital expenditures related to this initiative. In November 2016, we announced we would build a fiber-to-the-home network capable of delivering speeds of up to 10 Gbps across most of our footprint by the end of 2021.").

<sup>190</sup> See Altice Q3 2016 Call ("And to give you a sense of the impact on ARPUs as a customer, if you take 200 megabits for an extra EUR20 you get 3 to 3.5 times the speeds you were getting previously at the 60 megabits level. This is not a high incremental cost to the customer for a lot more value but it does have a meaningful impact on our cash flow growth. You can see particularly for Suddenlink this migration of customers to higher broadband speeds has increased the average broadband speeds delivered to customers from 19 megabits when Project GigaSpeed started to 82 megabits at the end of Q3. This is almost double the average speeds delivered at Optimum at 44 megabits. But we should now have a catch up that is really going to drive much better service for our customers now." (emphasis added).

Altice describes its strategy as “upgrade networks, simplify and harmonize bundle offers, and then drive the penetration of higher broadband speeds and higher cash flows, which we can then reinvest to support further growth.”<sup>191</sup> Altice’s adoption and revenue metrics indicate it is working as planned. For example, at the end of 2014, only 47 percent of Suddenlink ISP customers subscribed to service of 50 Mbps or faster downstream.<sup>192</sup> This increased to 87 percent at the end of 2015, and 90 percent at the end of 2016.<sup>193</sup> At the end of 2014, just 2 percent of Suddenlink’s gross customer adds subscribed to 100 Mbps or faster service. That was 34 percent by the end of 2015, and 59 percent by the end of 2016. Only 1 percent of Cablevision’s new ISP customers subscribed to its top-tier 101 Mbps service at the end of 2014. That went up to 12 percent by mid-2016. Less than a year later, 62 percent of Cablevision’s gross customer adds subscribe above the 100 Mbps threshold.<sup>194</sup>

These real-world metrics demonstrate that Cablevision and Suddenlink customers were offered substantially higher capacity broadband services following the FCC’s February 2015 vote. Both Cablevision and Suddenlink increased network investments during 2015, even as their attention turned to their pending sale to Altice. Altice also planned for and announced a full fiber upgrade during the fourth quarter of 2016, the only U.S. cable operator to make such a commitment (as most will utilize DOCSIS 3.1 to offer symmetrical multi-gigabit services). That means Altice is poised to invest more per-passing than any other U.S. ISP in coming years.

These are not the actions of a company afraid of Title II. Indeed, there were no questions about and no mentions of Title II, Network Neutrality, the Open Internet Order or any FCC broadband regulation on Altice’s investor calls preceding or following its acquisitions. This leads to the question: what “problem” is Chairman Pai proposing to solve with his efforts to kill Net Neutrality rules and Title II authority? What benefits will this bring to Cablevision and Suddenlink customers, who currently have access to transmission capacities well in excess of demand, and who will shortly have access to services with speeds exceeding what any other global ISP offers? Chairman Pai bears the burden of providing an answer for why ISPs like Altice should be free from baseline nondiscrimination laws. And phony claims of “investment harms” simply won’t do.

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<sup>191</sup> See Altice Q3 2016 Call (“As has been with every asset Altice has acquired, we are focused on upgrading our broadband networks to drive increases in broadband speeds and better customer experience. And if you’re driving higher broadband speeds and higher ARPU’s you’re driving very high incremental cash flow growth. This is a common approach across the entire Altice Group[.] Altice USA is now the prime example of this approach . . . [I]mmediately after the closing of Optimum we focused on upgrading the Optimum network and selling higher than 100 megabits speeds. Following this upgrade you can see the spike in the number of new customers taking higher speeds since we made these early network upgrades from just 12 percent previously to about 40 percent by the end of Q3. And at just 8 percent of the total base taking higher speeds over 100 megabits, we think there’s a lot of further growth to come from this.”).

<sup>192</sup> See Cequel Communications Holdings I, LLC, Annual Report for the Year Ended December 31, 2014. According to Cequel, 87 percent of Suddenlink’s ISP customers subscribed to 15 Mbps or faster downstream services.

<sup>193</sup> See Cequel Communications Holdings I, LLC, Annual Report for the Year Ended December 31, 2015; *see also* Cequel Communications Holdings I, LLC, Annual Report for the Year Ended December 31, 2016. According to Cequel, 92 percent of Suddenlink’s ISP customers subscribed to 15 Mbps or faster downstream services at the end of 2015, increasing to 95 percent at the end of 2016.

<sup>194</sup> See Altice 2016 Results at 26; *see also* Comments of Dexter Goei, President, Altice N.V., Q4 2016 Altice N.V. Earnings Call (Mar. 9, 2017) (“Altice USA continues to be a prime example of our approach across the Group to upgrade our networks, simplify and harmonize bundle offers and then drive the penetration of higher broadband speeds, resulting in higher cash flows, which we can then reinvest to support further growth. . . . [O]ur initial upgrade to Optimum’s network has led to a significantly higher number of customers taking higher speeds, from just 12 percent before Altice’s control to about 60 percent today, matching Suddenlink by the end of Q4 2016. The proportion of the total base taking higher speeds has now increased to 13 percent, but we know we have a lot further to go with this. . . . [A]bout 60 percent of Suddenlink’s new customers tak[c] higher broadband speeds, almost 40 percent of the customer base are now taking speeds of 100 megabits or higher, from a similar starting point at Optimum just over a year ago. As a result, Optimum average broadband speeds delivered to our customers has now started to accelerate at 51 megabits in Q4 2016, from 40 megabits last year. And eventually we expect to catch up, narrow the gap with Suddenlink’s average broadband speeds of 90 megabits and growing. And we have now taken our network upgrade to the next level with our new project Generation GigaSpeed to deliver [ ]100 gig broadband speed services to our customers and drive structural cost efficiencies in our network.”).

## Mediacom

Mediacom does not hold investor calls, but its SEC filings and press releases reflect a medium-sized MSO committed to network upgrades in order to capture share and grow earnings. After a 3 percent decline in capex in 2014 (attributed to “reduced outlays on the company’s all-digital video platform, HSD bandwidth expansion, and cell tower backhaul, among other factors”),<sup>195</sup> Mediacom dramatically increased its capital outlay directly after the FCC’s vote in 2015, continuing throughout 2016.

In March 2016, a year after the FCC vote, Mediacom announced it would invest an additional billion dollars over a three year period to bring gigabit broadband to its entire 3 million home footprint.<sup>196</sup> Though this was slated as a 3-year project, a mere 9 months later Mediacom announced that it’s “entire broadband network will be gigabit-capable by the end of 2016” and that it would become “the first major U.S. cable company to fully transition to the DOCSIS 3.1” technology.<sup>197</sup> According to its CEO Rocco Commisso, the company was able to accelerate its plan due to earlier than expected commercial availability of compatible modems. In a comical attempt to express his continued displeasure with the FCC’s *Open Internet Order*, he made it clear that Title II had no negative impact on Mediacom’s investments while stating that the company’s “substantial investments in our rural markets were made despite the heavy-handed and unfair regulatory burdens recently imposed on our company by the FCC and without depending on government subsidies.”<sup>198</sup> Some burden that was.

Mediacom’s story is instructive on how the market fundamentals of technology, competitive advantage, cost structure, and consumer demand drive cyclical upgrades, and how little an impact regulation has. Mediacom’s leadership team, like many ISP executives, clearly loathes the FCC for reestablishing baseline consumer protections for two-way telecommunications services. But this loathing is not enough to overcome their desire to make money. Mediacom recognized after the FCC’s vote that it could cement its monopoly, grow earnings, and future-proof its network at a relatively small cost. Anti-Title II zealots will of course ignore Mediacom’s real story. They’ll suggest that, if not for the restoration of backstop legal authority, Mediacom might have perhaps taken even less time than the record-breaking 9 months it took to deploy gigabit service across its entire footprint. Such absurdity reveals the factual bankruptcy of the anti-Title II ideology.

## Wide Open West

Wide Open West (branded as “WOW!”) is a cable overbuilder, meaning it competes with not only a telephone company ISP in all of its markets but also an incumbent cable company ISP. Wide Open West’s business model traditionally involved growth not through acquisitions, but by building out its existing systems. Thus, if any company should be worried about any impact of regulation on investment, it is WOW! As an overbuilder, it always has one additional company vying for market share against it. Wide Open West’s overall capital investments in 2015 were \$231.9 million, down from \$251.9 million in 2014 (though still exceeding the company’s prior guidance).<sup>199</sup> As in every other case analyzed above though, this was not due to Title II.

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<sup>195</sup> See Kamran Asaf and Tony Lenoir, “Comcast, TWC drive spending as Q2 cable CapEx spike 27.7 percent YoY,” *SNL Kagan* (Aug. 19, 2014).

<sup>196</sup> See Mediacom Communications, Press Release, “Mediacom Communications Marks 20th Anniversary by Announcing \$1 Billion Capital Investment (Mar. 14, 2016).

<sup>197</sup> See Mediacom Communications, Press Release, “Entire Mediacom Communications Broadband Network to be Gigabit-Ready by Year End” (Dec. 7, 2016).

<sup>198</sup> See *id.*

<sup>199</sup> See Comments of Rick Fish, Chief Financial Officer, WOW! Internet, Cable & Phone 2014 Earnings Release Conference Call (Mar. 31, 2015) (“And finally, we put out guidance for 2015 last month. So to reiterate, we’re anticipating total revenue for 2015 to be between \$1.255 billion and \$1.275 billion, which is the midpoint growth percentage of about 4.6 percent and adjusted EBITDA to be between \$440 and \$450 million with a midpoint growth percentage of 7.9 percent. Capex is estimated to be between \$205 and \$215 million.”).

The 2014 results do not account for the company's divestiture late that year of its South Dakota systems. On a *pro forma* basis, Wide Open West's 2014 capex was \$238.8 million.<sup>200</sup> Furthermore, it announced this one-year decrease in 2015 ahead of the FCC's vote. The company's 2014 expenditures were temporarily elevated due to upgrades to Knology systems it acquired in 2012, and those upgrades were completed during 2014.<sup>201</sup> But now that all of its systems are all-digital, WOW! is once again returning to its strategy of growth through building. Its 2016 capital investments were \$287.5 million, the highest total in the company's history.<sup>202</sup> That means its total capital investments were nearly 10 percent higher during the two years following the FCC's vote than in the two years prior, and an estimated 16 percent higher on a *pro forma* basis (excluding the capital spent on systems divested in 2014). The company has indicated that 2017 capital expenditures will remain at an elevated level while it finishes the current upgrade cycle,<sup>203</sup> and will likely decline during 2018.<sup>204</sup>

These temporary swings in total company capital expenditures don't reflect the improvements in the quality of services available to customers living in Wide Open West's service area. The company reported in its 10-K filings that its most popular tier was 15 Mbps at the end of 2014, increasing to 30 Mbps at the end of 2015. During 2015, WOW! rolled out 300 Mbps services across its entire footprint.<sup>205</sup> During 2016 WOW! continued this process: it made its entire footprint DOCSIS 3.1 capable, brought 600 Mbps speeds to 93 percent of its lines and started offering gigabit residential services in 2016, with additional markets coming online during 2017.<sup>206</sup>

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<sup>200</sup> See *id.* ("So our statement of cash flows for the year shows total cash outflow related to capex for the year totaling \$251.9 million. On a pro forma basis, however, stripping out South Dakota, capex for the year totaled \$238.8 million.')

<sup>201</sup> See, e.g., WOW! Investor Presentation at the J.P. Morgan 2016 Global High Yield & Leverage Finance Conference (Feb. 29, 2016) ("Between 2008–2012, the Company invested over \$100 million in edge-out projects [. . .] Elevated levels of capital expenditures, however, following the Knology acquisition in 2012 to integrate the Knology network & back-office infrastructure have prevented investment in edge-out growth opportunities since 2012. New primary equity investment from Crestview, however, will enable WOW! to pursue these opportunities going-forward. In excess of \$200 million of such edge-out opportunities have been identified with similarly favorable return characteristics providing a relatively low-risk growth opportunity.") (emphasis added).

<sup>202</sup> See WideOpenWest Finance, LLC, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016 ("Capital expenditures were \$287.5 million and \$231.9 million for the years ended December 31, 2016 and 2015, respectively. The increase in capital expenditures is primarily due to our build out of our fiber network in our Midwest region.") (emphasis added).

<sup>203</sup> See Comments of Rick Fish, Chief Financial Officer, WOW! Internet, Cable & Phone 3Q 2016 Earnings Release Conference Call (Nov. 14, 2016) ("2017 in total, will probably be, directionally in the same amount of the similar size as, you know, 2016. When you add in, you know, the two buckets, baseline capex plus the incremental growth initiatives, so baseline will, probably slide up a bit just, given activity volume, you know, a bigger base to take care of, etc. We will have most likely an uptick in our edge out opportunity for next year from where we are this year. I would anticipate that we would try and move that number up to, kind of in \$50 million range.')

<sup>204</sup> See Comments of Steve Cochran, CEO, WOW! Internet, Cable & Phone 2Q 2016 Earnings Release Conference Call (Aug. 16, 2016) ("I think this year will be \$50 to \$60 million related to this and next year we'll have another \$20 plus. So we'll see a nice step-down related to this project year-over-year and then as we move into 2018 it goes away.')

<sup>205</sup> See Comments of Steve Cochran, Chief Executive Officer, WOW! Internet, Cable & Phone 2015 Earnings Release Conference Call (Mar. 18, 2016) ("Significant investments have been made over the last year as it relates to our HSD offerings, whereby, we now have 30, 60 and 110 meg offers in every market; 300 meg offers in 75 percent of our footprint. That 300 will be rolled out to 100 percent of the footprint by the end of the year, and we're also rolling out 600 meg in numerous markets as well as introducing one gig in three markets throughout the year.") (emphasis added).

<sup>206</sup> See Comments of Steve Cochran, Chief Executive Officer, WOW!, Internet, Cable & Phone 3Q 2016 Earnings Release Conference Call (Nov. 14, 2016) ("We now have 600 meg offers in over 90 percent of our footprint and we've launched one gig in five of our markets and connected our first customers to 1 gig in the month of October.');

WOW! Investor Presentation, at the J.P. Morgan Global High Yield & Leverage Finance Conference (Nov. 9, 2016) ("Fully upgraded systems with DOCSIS 3.0 and 3.1 capabilities in all markets providing 750+ MHz capacity in 100 percent of the combined markets. 95 percent of network footprint is on an all-digital platform. 300Mbps and 600Mbps data offering available in 93 percent of footprint. . . . 1Gbps data offering in Q416/Q117 in ~13 percent of footprint with additional markets planned for 2017.')



Finally, the topic of Title II and the FCC's Open Internet rules did not come up on any of WOW!'s investor calls following the FCC's February 2015 vote. This fact, and the company's real-world investments, certainly indicate that the people running Wide Open West and its new investors at Crestview have ample confidence about the future of the broadband market. If it were actually worried about the potential impact of Title II on future earnings, the company would not have started the process to spend hundreds of millions of dollars more to keep overbuilding existing cable and phone company ISP networks. The logical explanation for the data is that WOW! and its investors are not concerned about Title II whatsoever.

### Cable One

Arizona-based MSO Cable One Inc. is unique among its traditional cable company peers. The company has pursued a strategy that promotes its broadband product ahead of double- and triple-play offerings.<sup>207</sup> While other MSOs are content to pass along ever-escalating broadcast and cable channel licensing fees, Cable One has shown it's not afraid to tell rights-holders "no thanks" and drop their channels.<sup>208</sup> Thus far, it appears that Cable One's decision to turn away from a video-centric or bundle-centric business model is working.<sup>209</sup>

To implement this broadband-first strategy, Cable One increased its capital investments during 2014–2015. Specifically, Cable One increased capital spending to convert its systems to all-digital, increase the spectral capacity of its physical plant, upgrade headend equipment to 24-channel bonding DOCSIS 3.x-capability, and push fiber deeper into its network.<sup>210</sup> With these upgrades completed during 2015, Cable One's 2016 capex declined to pre-IPO levels, making for an overall decline at Cable One in the two-year period after the FCC's February 2015 vote compared to the two years before it. Was this decline due to Title II? Certainly not, if you believe the company's logical explanations for spending less after completing that 2015 push.

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<sup>207</sup> See Comments of Tom Might, CEO, Cable One Inc., Q2 2015 Cable One Inc. Earnings Call (Aug. 6, 2015) ("Q2 2015 Cable One Earnings Call") ("Three years ago this summer we turned our attention away from video and the triple-play as centerpieces of our long-term strategy based on several trends that we started seeing back then, and even though video was over half our revenues and units back then. We saw then that cable TV started losing video subs in 2007 . . . . The total pay-TV industry started losing household penetration in 2010 . . . . Cable ONE video gross margins [ ] dropped 13 percent [from] just two prior years and Netflix, Hulu, and YouTube had started the OTT evolution a few years earlier that may now be a revolution. On the phone side of triple-play, total landline[s] were dropping at about 10 percent per year across the US, despite cable phone's temporary success, and phone ARPUs were falling even faster than that. So we decided that what would eventually be left of the triple-play was HSD only and our cost analysis with virtually all of the triple-play profit had already shifted to HSD thanks to forces like programmers, cell phones, Vonage-like companies, the FCC, and many other forces. Cable ONE's strategic decision . . . was to confront these brutal facts, not pretend we had the wherewithal to repeal them. Since then, we have been optimizing the inevitable transition to an HSD home-dominated residential business.").

<sup>208</sup> David Liberman, "Cable One Says It's Doing Just Fine After Dropping Viacom Channels," *Deadline* (Oct. 31, 2014).

<sup>209</sup> See, e.g., Comments of Tom Might, Q2 2015 Cable One Earnings Call ("But contrary to popular myth: one, we have not abandoned video. In fact, we have been growing video operating cash flow since 2012. We call it harvesting. Two, dropping Viacom was not our strategy. It was a small tactic that fit our strategy very well. It cost us about 2 percent of our video subs, not 20 percent. And, three, HSD can survive without the triple-play just fine. Since 2011, before this strategy change, video subs are down about 35 percent. Phone subs are down about 13 percent, but HSD subs and cash flow are up about 10 percent. HSD is the primary source of today's approximately \$300 million of operating cash flow. However, business services or commercial sales is the primary growth engine for new cash flow. Both of these products have much higher margins than residential video or phone and their volumes are growing, not shrinking.") (emphasis added).

<sup>210</sup> See, e.g., Cable One Inc., Quarterly Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Quarterly Period Ended June 30, 2015 ("Because of the levels of competition we face, we believe it is important to make investments in our infrastructure. We are investing at an aggressive pace by increasing cable plant capacities and reliability, launching all-digital video services and increasing data capacity by moving from four-channel bonding to 24-channel bonding, a 600 percent increase. We believe these investments are necessary to remain competitive. However, we anticipate that a significant amount of these capital projects will be completed in the near-term, freeing up sources of cash that would otherwise have been used on such investments.") (emphases added).

As Cable One made clear repeatedly during 2015<sup>211</sup> and 2016,<sup>212</sup> its capex would decline in 2016 and beyond due to completion of these upgrades that put it “ahead of the curve.”<sup>213</sup> And in November 2015 – a mere nine months after the FCC reclassified broadband internet access as a Title II service – Cable One announced its “GigaONE” initiative to deploy gigabit-capable service across its entire footprint.<sup>214</sup> Just another 13 months after announcing that initiative, Cable One reported that 70 percent of its passings were gigabit-enabled.<sup>215</sup>

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<sup>211</sup> See, e.g., Comments of Kevin Coyle, SVP & CFO, Cable One Inc., Q2 2015 Cable One Earnings Call (“Turning to capital expenditures, property, plant, and equipment totaled \$32.8 million in the second quarter, compared to \$44.2 million during the second quarter of 2014. The decrease was primarily due to the decline in spending for customer premise equipment and it was offset by spending on four major initiatives: our all-digital conversion; remaining plant upgrades to 750 megahertz; 4- to 24-channel bonding; and increases in fiber deployment. We expect significant expenditures for the remainder of 2015 due to the completion of these capital projects, and we are still forecasting that capital expenditures for 2015 will be approximately 20 percent of revenues.”); Comments of Kevin Coyle, SVP & CFO, Cable One Inc., Q3 2015 Cable One Inc. Earnings Call (Nov. 5, 2015) (“[O]ur capital expenditures totaled \$31.4 million in the third quarter compared to \$52.3 million during the third quarter of 2014. This decrease was primarily due to the decline in spending for customer premise equipment and offset by four major initiatives . . . – our all-digital conversion, remaining plant upgrades to 750 MHz, increased channel bonding and increased node splitting and fiber deployment. We expect significant expenditures for the remainder of 2015 due to the completion of most of these projects and we are still forecasting that capital expenditures for 2015 will be approximately 20 percent of revenues in the \$155 million to \$165 million range. As we mentioned in our second-quarter investor call, with the completion of most of these capital initiatives by the end of this year, we expect capital expenditures to return to historical levels in the mid to high teens after 2015.”) (emphasis added).

<sup>212</sup> See, e.g., Comments of Tom Might, CEO, Cable One Inc., Q4 2015 Cable One Inc. Earnings Call (Mar. 3, 2016) (“Our CapEx as a percentage of total revenues has been running high over the last few years due to various plant investments. As we have previously said, we expect that CapEx spending should return to a more historical range of mid to high teens in 2016, which should have a large positive impact on free cash flow.”) (emphasis added); Comments of Tom Might, CEO, Cable One Inc., Q1 2016 Cable One Inc. Earnings Call (May 5, 2016) (“Well, we’ve outlined in our Form 10 a year ago and several times since the four major unusual capital investments we were making in things like all digital, CMPS replacements, bandwidth expansion, etcw. And we’ve put years on all of those as well in the Form 10 so you could see they were largely expiring last year or a few all digital for example ends at the end of this year. We have three systems left to do. So it’s really the expiration of all those one-time unusual plant enhancements . . . .”) (emphasis added); Comments of Kevin Coyle, SVP & CFO, Cable One Inc., Q3 2016 Cable One Inc. Earnings Call (Aug. 4, 2016) (“[[J]ust year we had a lot of higher expenses and CapEx to a lot of projects like own digital going on . . . and now the launching of one GIG. But there was temporarily an extra expense in capex which we talked about in press quarters. A lot of that is behind us for right now so . . . can look at the long-term trends and draw your own conclusions.”) (emphasis added).

<sup>213</sup> See, e.g., Comments of Kevin Coyle, Q2 2015 Cable One Earnings Call (“We mentioned that this year will be the finish of the large capital expenditures, that capital will be in the \$155 million to \$165 million range, which is 20 percent of revenues. We are forecasting that going forward, with the completion of most of these major capital initiatives, we should return to historical levels which are in the mid to high teens . . . somewhere in that range so we are forecasting that they will go down. Again, we are fully cognizant of the fact that we want to stay ahead of the curve from a technology standpoint on HSD. So they’re not going to go away but they are going to go down.”) (emphasis added).

<sup>214</sup> See Cable One Inc., Press Release, “GigaONE Gives Cable ONE Markets Next Gen Speeds” (Nov. 5, 2015) (“More than 200 cities and towns across the United States will be able to lay claim to the title “Gig city” with the 2016 launch of GigaONE, the company’s new Gigabit service . . . . [GigaONE] will be available to the majority of Cable ONE customers by the end of 2016 . . . . Cable ONE has invested more than a half billion dollars over the past five years on network upgrades and enhancements in order to bring the latest technology and fastest speeds to its customers. . . . Unlike many of our competitors, Gigabit service will be available to all of our customers – not just a select few in certain areas. We’ve been committed for decades to serving smaller cities and towns, and we are delighted to provide them with the latest technology to make them Gig cities in 2016 . . . . ‘Our extensive fiber network deployment and continued investment in improving and expanding our network enables us to offer the fastest, most reliable Internet connections at the best value, while contributing to the economic development of the communities we serve,’ Joe Felbab, Vice President of Marketing for Cable ONE said. ‘The company recently doubled speeds on virtually all of its plans for new and existing residential and business customers. . . . [W]e’re committed to offering our customers a variety of powerful Internet speeds to choose from in order to meet their family’s tech needs,’ Felbab said.”) (emphasis added).

<sup>215</sup> Comments of Julie Laulis, President & CEO, Cable One Inc., Q4 2016 Cable One Inc. Earnings Call (Feb. 28, 2017) (“At the end of 2016, approximately 70 percent of our homes passed had access to GigaONE, our 1 gigabit service.”).

Let's pause to review the facts once again, this time using Cable One as the example. Its capex and network investments increased following the FCC's vote. It announced and nearly completed a system-wide gigabit upgrade shortly after that vote too. And Cable One did not mention – and was not asked about – the impact of Title II and Net Neutrality on its investment on any investor calls or at any conferences following the FCC's vote, until after the November 2016 election.

Despite these facts, in the wake of the election, Cable One's executives are only now saying Title II will harm investment. When asked at the December 2016 UBS conference if “a change [ ] or a rollback” would meaningfully impact its business, Tom Might, Cable One's now-former Chairman and CEO answered, “[i]n the long run, yes. Because in the long run there's a serious overhang and risk of Title II rate regulation. So that would, at least for now, eliminate that long-term risk. Short term, the issues are nuisance – minor regulatory compliance issues more than economic issues. But, long term, there's a very serious rate regulation overhang.”<sup>216</sup>

This statement confirms only that the election reinvigorated irrational anti-Title II fervor, emboldening ISPs to once again resort to scare tactics with no basis in reality. As we've previously noted, in its February 2015 order the FCC explicitly ruled that it was not going to regulate rates, and it forbore from the statutory and rule sections that would require it to regulate them. There's no plausible reason to think the FCC would set rates somewhere down the line either, if for no other reason than the agency's 25-plus years of experience applying Title II to ILEC services. The FCC also has applied a “light” Title II approach to cellular voice services since 1993, without ever regulating rates. It never regulated the rates for DSL services prior to 2005, when those were classified as Title II services. It never even dictated the rates for rural ILECs' monopoly DSL services, which many rural ISPs voluntarily kept under Title II from 2005 to 2015. And the FCC does not regulate rates for the Baby Bell's Title II enterprise broadband services, to which it gave the same “Title II light” status a decade ago.

These irrefutable facts strongly indicate that the “overhang” Cable One now pretends to fear is not real. Its post-hoc comments, made after the company completed a major upgrade following the FCC's 2015 return to Title II, are the kind of tired scare tactics that ISPs use to push for deregulation enhancing their market power.

But for the moment let's set this FCC history of deregulation and rate non-regulation aside, and name what Cable One is worried about: its customers having potential legal protections against monopolistic pricing. Cable One certainly understands that the FCC simply doesn't regulate rates outside of a complete monopoly market, and even in those has done little there to respond to monopoly pricing (*e.g.*, Prison Phones and Special Access). So to the extent Cable One has anything to fear, it is regulatory intervention against monopoly, and even then, possibly only for the most egregious monopolistic practices. This raises the question: what sort of practices does Cable One have in mind that it thinks would be prohibited under Title II?<sup>217</sup>

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<sup>216</sup> See Comments of Tom Might, CEO, at the UBS Global Media and Communications Conference (Dec. 7, 2016).

<sup>217</sup> Based on the totality of the FCC's history of enforcing Title II, it is clear that ISPs like Cable One have an extremely wide berth when it comes to exercising pricing power. If a modicum of competition exists in a market, the FCC will not intervene in pricing. Perhaps Cable One's former CEO was concerned given his company's questionable actions and his own questionable statements. In May 2016, Might indicated Cable One uses FICO scores as a screening tool not just to determine which prospective customers should pay a deposit, but to determine what level of customer service a customer receives. See Daniel Frankel, “Cable One using FICO scores to qualify video customers, Might says,” *FierceCable* (May 23, 2016) (“According to company CEO Thomas Might, . . . ‘We don't turn people away,’ . . . but the cable company's technicians aren't going to ‘spend 15 minutes setting up an iPhone app’ for a customer who has a low FICO score.”). Might also made statements indicating his desire to avoid serving low-income customers, not simply to decrease churn but so that the company could keep prices high. In August 2015, when asked about the large low-income population in Cable One's territory and how that impacts penetration, Might said, “we are not chasing volume there either. Even though we are HSD-centric in our residential thinking, we're still going for the more profitable part of the market rather than just trying to build up our volume of HSD. So if we can grow just 2 percent or 3 percent in units, but do it persistently for a long period time, we are thrilled. Rather than having 5 percent to 7 percent growth in one year, but a lot of that coming in at ARPU's down in the \$30s\* or something of that sort.” See Comments of Tom Might, Q2 2015 Cable One Earnings Call (emphasis added).

And it also raises another question: shouldn't people have a potential defense against egregiously discriminatory monopolistic abuses when purchasing an essential telecommunications service? Congress certainly thought so, which is why nondiscrimination protections remain at the core of Title II. They exist to provide relief if needed. No telecom carrier, in order to justify investing, needs the "certainty" that it can reek monopolistic havoc. The history of investment following adoption of the 1993 and 1996 Amendments to the Communications Act demonstrates this, as does the market's recent evolution discussed herein. So do Cable One's actions after the FCC's 2015 Open Internet vote. Talk of a long-term fear of "overhang" is just another tenet of an anti-regulatory ideology that is unmoored from evidence and reality.

### General Communications Inc.

Alaska-based cable and wireless company GCI increased its capital investments during 2015–2016. Its two-year post-vote combined capex was 4 percent higher than the company's combined 2013–2014 investment total. These results were largely in line with GCI's investor guidance,<sup>218</sup> and reflected increases in certain company segments with decreases in others.<sup>219</sup> GCI's \$194.5 million total in capital investments during 2016 was the highest in the company's history, as it reinvested proceeds of tower sales into its fiber network.<sup>220</sup>

Historically, GCI's capital expenditure as a percentage of revenue is higher than most other MSOs,<sup>221</sup> primarily due to the unique challenges of operating systems in Alaska – though its data ARPUs are also higher than most other ISPs (see Figure 6). GCI's total capital expenditures historically have cycled up and down,<sup>222</sup> unsurprisingly, and according to the company's most recent forecasts they will cycle down again during 2017.<sup>223</sup>

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<sup>218</sup> See, e.g., General Communications Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2012 (“[W]e expect our 2013 expenditures from unrestricted cash for property and equipment, including construction in progress, for our core and non-core operations, to total approximately \$150.0 million and \$15.0 million, respectively.”); Comments of Peter Pounds, CFO, General Communications Inc., Q4 2013 General Communications Inc. Earnings Call (Mar. 6, 2014) (“For the year as a whole, we invested \$181 million in capital expenditures. Of this, \$16 million was funded by grants for a net of \$165 million of cash capex. . . . For capital expenditures, our base investment program will be lower than 2013. It should be \$140 million to \$150 million, down from the \$165 million net of grants in 2013.”). Comments of Peter Pounds, CFO, General Communications Inc., Q4 2014 General Communications Inc. Earnings Call (Mar. 5, 2015) (“For the year, our core cash capital expenditures totaled \$164 million, slightly under our guidance of approximately \$170 million. . . . We have the following guidance for 2015[?] Forecast capital expenditures will be approximately \$170 million.”); Comments of Peter Pounds, CFO, General Communications Inc., Q4 2015 General Communications Inc. Earnings Call (Mar. 3, 2016) (“[C]apital expenditures for the year totaled \$176 million, or approximately guidance of \$170 million. . . . [They] are expected to be approximately \$210 million in 2016.”).

<sup>219</sup> For example, GCI's wireless segment capital expenditures for 2014–2016 were \$30.2M, \$47.9M, and \$34.6M respectively. Its wireline segment capital expenditures for 2014–2016 were \$145.9M, \$128.3M, and \$159.9M respectively. See General Communications Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016, at 113–114.

<sup>220</sup> See Comments of Peter Pounds, CFO, General Communications Inc., Q4 2015 General Communications Inc. Earnings Call (Mar. 3, 2016) (“We will be reinvesting the proceeds of our tower sale transaction back into the business. The two main projects that these proceeds will fund are a diverse fiber to the North Slope of Alaska, and a completion of the ring for our TERRA network. These projects represent approximately \$60 million of our spending in 2016.”).

<sup>221</sup> See Comments of Peter Pounds, CFO, General Communications Inc., Q4 2016 General Communications Inc. Earnings Call (Mar. 2, 2017) (“And just note that we got where we are today because we have been aggressively growing the business. We have spent 20 percent to 22 percent of our revenues historically on CapEx and the focus was on building a great network just as quickly as we could.”) (emphasis added).

<sup>222</sup> For 2005–2016, GCI's annual capital expenditures were (in millions): \$79.8, \$96, \$153, \$221.5, \$121, \$96.2, \$177.1, \$146, \$180.6, \$176.1, \$176.2, \$194.5.

<sup>223</sup> See GCI, 2016 Earnings Release (Mar. 1, 2017) (“Capital expenditures are expected to be approximately \$165 million in 2017, a reduction of 21 percent from our 2016 expenditures. This reduction represents our commitment to growing free cash flows in the face of continuing signs of economic challenges for Alaska.”) (emphasis added).

This pending downturn has nothing to do with the FCC's regulatory framework. GCI is reducing investments due to completion of prior deployments,<sup>224</sup> and due to its concern over Alaska's growing fiscal crisis<sup>225</sup> and declining population.<sup>226</sup> Indeed, just as for all other ISPs, there were no mentions of Title II or the FCC's Net Neutrality rules on any of GCI's investor calls following the agency's February 2015 vote. GCI's pending capex declines likely won't impact the overall quality of wired or wireless services GCI offers. This is because the company's elevated capex during 2015–2016 helped bring 4G LTE to most of GCI's footprint,<sup>227</sup> and its aggressive fiber deployments have the company on track to meet its gigabit deployment goals.<sup>228</sup>

In sum, the evidence demonstrates that even for a small ISP like GCI, and one that faces particular geographic and topographic challenges in covering a rugged and sparsely populated service territory, the FCC's Net Neutrality rules and reclassification vote did not negatively impact broadband deployment. The company's investments are not determined by FCC authority, but by economic reality.

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<sup>224</sup> See Comments of Peter Pounds, CFO, General Communications Inc., Q3 2016 General Communications Inc. Earnings Call (Nov. 3, 2016) (“Yes, the two primary areas where we’ll be reducing capital expenditures next year is number one, on the fiber going to the North Slope where we are forward funding. It’s a two year project, but more than half of that is being spent this year, so year-over-year, we should experience a decline. And number two, the spending on the TERRA project will decline next year, with some of the significant spending that we’ve had this year. . . . And then, otherwise it’s just smaller percentages of multiple areas of capital spend in the Company, kind of some belt-tightening there.”).

<sup>225</sup> See GCI, 2016 Earnings Release (Aug. 2, 2016) (“The state government has not been able to adopt a workable long term fiscal plan in 2016. As a result, we have announced that we will be reducing 2017 capital expenditures by 20 to 25 percent from our 2016 forecast of \$210 million. This implies 2017 capital expenditures of \$158 to \$168 million.”); Comments of Peter Pounds, CFO, General Communications Inc., Q2 2016 General Communications Inc. Earnings Call (Aug. 3, 2016) (“I think the message is that without long-term stability on the state fiscal front, we are going to be reducing our capex and that’s really what we felt comfortable releasing, is that next year’s capex is going to be 20 percent to 25 percent below the current year. And I did note that if we continue to have problems with the state’s fiscal situation, if there is not action to handle that, . . . there is the likelihood of additional cuts in capex in out years.”) (emphasis added).

<sup>226</sup> See, e.g., Comments of Ron Duncan, President, CEO & Co-Founder, General Communications Inc., Q2 2016 General Communications Inc. Earnings Call (Aug. 3, 2016) (“We’re expecting the size of the market to compress rather than continue growing. Depending on how bad the state economy gets in reaction to the fiscal situation, we’re going to see some loss of population over the next several years up here. We’re already seeing it with the compression in the oil industry. We’re going to compound it with the compression of investment spending by not just us, by others in the economy. So we won’t have a need for as much growth in the network. We won’t be doing as much densification. We won’t be building as much new bandwidth capacity, because when the size of the market shrinks, you don’t need that and we’ll be slowing down the deployment of the new products. So there would be slower advances beyond the gigabit speeds. There’ll be fewer locations to get upgraded to gigabit, there will be less network to expand. And we’re slowing down our infrastructure investments in [the] rest of the state. And as Pete said, they will slow down more if the state can’t figure a path to some sort of long-term stability. We will also be prioritizing our investments, so that they’re directed away from things that rely on the consumer economy and more into core assets where we know there is a return from either government entities that are in place or our roaming partners or that sort of thing. . . . If some economic surprise happens and the state goes from a situation where the economy is gradually declining to where it’s robustly growing again and we feel confident in making investments would have a good return, in subsequent years we would look at stepping back our capital.”) (emphases added).

<sup>227</sup> See, e.g., Comments of Peter Pounds, CFO, General Communications Inc., Q4 2015 General Communications Inc. Earnings Call (Mar. 3, 2016) (“On the network side, we continued our wireless build-out and now cover over 80 percent of the state’s population with LTE. Additionally, we continue to make progress on expanding our 1 gigabit consumer cable modem product, and our TERRA network.”).

<sup>228</sup> See, e.g., Comments of Peter Pounds, CFO, General Communications Inc., Q1 2016 General Communications Inc. Earnings Call (May 5, 2016) (“Progress on our 1-gigabit red consumer data rollout has continued, with Juneau coming online in early April and Fairbanks later.”); Comments of Ron Duncan, President, CEO & Co-Founder, General Communications Inc., General Communications Inc., QVC Group, Liberty Interactive Corporation, Liberty Ventures, M&A Call (Apr. 4, 2017) (“[W]e’ve been focused on aggressively growing our company through a series of technology transitions from analog to digital, from dial-up to gigabit cable modems, from briefcase cell phones to pocket computers, and along the way, we’ve turned the company that started out with a lot of debt and no revenues into almost \$1 billion in revenue. And today, the largest telecommunication provider in Alaska. We’re not done.”).

## Local Exchange Carrier Internet Service Provider Investment Summaries and Disclosures.

### AT&T

AT&T (along with Sprint) serves as the main source for Hal Singer's and USTA's false claim of a post-reclassification capital decline. We explained above how both Singer and USTA incorrectly manipulated AT&T's capital spending to produce their desired result. We also explained how illogical it is for them to suggest a systemic negative impact from Title II reclassification, based solely on a (manipulated) aggregate capex decline, when the bulk of the market's participants increased capex and all ISPs are increasing broadband capacities.<sup>229</sup>

But focusing on AT&T's individual outlays once again, we can see that its historical investments belie the anti-Title II ideologues' faulty premise: it's simply not true that capital spending must always go up, both at the aggregate industry level and also at the company level, or else the mere existence of regulatory authority is to blame. In fact, that ridiculous notion that lies at the heart of Singer's and USTA's – and thus, Chairman Pai's – Title II critique is absurd on its face. Yet here we are still debating it despite the reams of real-world data and actual explanations for AT&T's changes in capital spending over time.

Unfortunately, AT&T changed its segment reporting in 2013. Prior to that date, we see that AT&T's wireline segment capital investments decreased every year after peaking in 2008, with decreases that occurred even as the company made massive investments deploying fiber-fed VDSL and IPTV services to millions of its customers. There's no mystery then as to why AT&T's capital investments were temporarily down more recently, in the first year after the FCC's 2015 reclassification vote. AT&T told investors that its capex would increase then subsequently decline, and it told them so more than two years prior to that vote – and long before Title II was even on the table. AT&T's 2013–2014 capex increases were due to its “Project VIP,”<sup>230</sup> and its declines thereafter were due to completion of this LTE expansion/wireline IP-DSLAM deployment effort.<sup>231</sup>

Even before the FCC's February 2015 vote, AT&T's Project VIP spending surge was winding down. VIP's peak quarter for capex was Q2 2014, and it declined after that until increasing for the final push under the VIP project in the first quarter after that vote (which, coincidentally, was also the last quarter prior to the DirecTV merger closing). During the first two years of VIP (Q1 2013 to Q4 2014), AT&T's average quarterly wireless segment capital expenditures were about 10 percent higher than its average for 2011–2012 (\$2.82B vs. \$2.57B). These dropped sharply starting in the 3rd quarter of 2014 (\$2.6B, from highs such as \$3.5B in Q2 2014 and \$3.1B in Q3 2013). Capital intensity during this period fell from 18.4 percent in Q2 2014 to 12.2 percent in Q1 2015. And even in that second quarter of 2015, after the FCC's vote but before the DTV deal closed in late July 2015, AT&T's overall capital intensity rose again to 14.2 percent with total a outlay for that quarter of \$4.7B.

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<sup>229</sup> AT&T's size means that the company's completion of an upgrade cycle could be enough to produce an aggregate market capex decline even if all other firms were in the midst of a cycle of elevated investment. Note in Figure 1 that from 2014 to 2015, AT&T accounted by itself for 28 percent of all publicly traded ISPs' total capital expenditures. It accounted for a whopping 80 percent of the aggregate capex decline for the seven ISPs that saw a drop during that one-year period.

<sup>230</sup> See Comments of John Stankey, Group President and Chief Strategy Officer, AT&T Inc., 2012 Analyst Conference (Nov. 7, 2012) (“AT&T Project VIP Announcement”) (AT&T's Project VIP upgrade plans were “to deliver IP broadband to 57 million customer locations. We'll reach 33 million total U-verse customer locations by year-end 2015, 24 million U-verse IPDSLAM customer locations by the end of next year, though we're nearly complete today. We'll expand 4G LTE to reach 300 million POPs by year-end 2014. . . . Our plan is to increase our U-verse footprint by a third to 43 percent, meaning 75 percent of our customer locations will have access to either U-verse or IPDSLAM. We'll be essentially complete with this IP broadband build by the end of 2015.”) (emphasis added).

<sup>231</sup> See *id.* (Comments of John Stephens, Senior EVP & CFO, AT&T Inc.) (“In terms of overall capital, we expect wireless spending to continue to outpace wireline, with wireline remaining stable during the investment period, with the increased investment offsetting lower baseline spending. This will move capex to the upper end of our current capital intensity range, which is mid-teens as a percent of our revenues. So, we're looking at annual capex in the \$22 billion range over the next three years, then returning to normal levels.”) AT&T's actual capex for 2010–2016 was \$20.3B in 2010, \$20.3B in 2011, and \$19.7B in 2012; then \$21.2B in 2013 and \$21.4B in 2014, but \$20.0B in 2015; finishing at \$22.4B in 2016.

In other words, as we have explained on numerous occasions before, AT&T told investors in late 2012 that the higher than normal capital investments associated with the Project VIP upgrade would come to an end by year-end 2015. AT&T then finished that project ahead of schedule, contributing to its decreased capex during 2015.<sup>232</sup> This had nothing to do with Title II. And as we explained above, it is not analytically possible to somehow exclude the impact of the DirecTV acquisition on AT&T's capex either, because the reduction in capex from the combination stemmed in part from synergies and savings that AT&T realized<sup>233</sup> (and in fact, used to justify) this horizontal merger. Yet even if that were analytically possible, we would still see that AT&T's capital investments did appear to return to "normal" levels for the company<sup>234</sup> because of its (earlier than planned) completion of Project VIP and other savings. AT&T's CEO made this all quite clear when he told investors that 2014 had been "the monster of all years" because the company had "finished off our VIP project . . . All of that stuff tailed off in 2014 and so our CapEx has come down rather dramatically."<sup>235</sup>

Ultimately, this all shows the absurdity of this exercise, trying to determine what AT&T's "real" capex spend was for a particular year or span of years. The absolute dollar amount spent on capital equipment from quarter to quarter or from year to year is impacted by a number of factors, and thus not a reliable metric for judging the impact of regulations or supposed regulatory uncertainty. But just as importantly, the notion that AT&T's investments would have somehow been higher is belied by the company's business fundamentals too. There's simply no plausible scenario in which AT&T could have earned enough marginal profit from Net Neutrality violations to then justify increased network spending based on the discriminatory tolls it could levy.<sup>236</sup>

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<sup>232</sup> See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., Q2 2015 AT&T Inc. Earnings Call (July 23, 2015). An analyst noted that the spending projection at the midpoint of year "implies a nice downtick in the U.S. spending. What's driving that? Are you finding that you just don't need to spend it or are you sort of pushing that out to next year?" Stephens explained that the spending ramp-down in mid 2015 came from simply finishing the job ahead of schedule. "Once again the network has done a great job in getting the Project VIP initiatives completed and when they're done the additional spend isn't necessary because the project's been completed. And not for lack of anything but success. That's what's driving our changes." *Id.* (emphasis added).

<sup>233</sup> See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., AT&T Inc. Analyst Conference (Aug. 12, 2015) ("Other synergies include capital spending savings. Just one example. Today we have about 70 million set-top boxes in the market between our two platforms. That creates a need for two sets of engineering standards, two roadmaps for planning and two refurbishment groups to support customer needs. As we move to a single set-top box environment we can be much more efficient in these areas. Our new scale will also provide us the capital efficiency opportunity. On average we purchase about 25 percent of that embedded base for replacements in new sale [additions.]").

<sup>234</sup> AT&T's 2012 wireline plus wireless segment capex was \$19.7B. A portion of this for was U-Verse video delivery capital now spent on DirecTV video delivery. Therefore AT&T's capital spending may even be higher than what it would have considered "normal" in the fall of 2012. In its Project VIP announcement press conference, AT&T said that over a three-year period the project's wireless investments would amount to an additional \$8 billion, and that wireline investments would be an additional \$6 billion. AT&T executed the project at a lower cost. It projected annual capex of \$22 billion total each year during the three-year period, but actual outlays were closer to \$21 billion. This implies that without Project VIP, AT&T's baseline capex was less than \$16 billion per year, well below the current level even assuming no DTV acquisition. AT&T's capital expenditures were 15.5 percent of revenues at the start of Project VIP, and stood at 14.6 percent during its most recent reporting quarter (Q1 2017), in line with the company's general expectation. See *for* note 40.

<sup>235</sup> See Comments of Randall Stephenson, *supra* note 38. Stephenson also proudly proclaimed to the same audience that day that "[w]e are going to deploy more fiber next year than we did this year, but the capital requirements are going down" because "[o]ur capital requirements are getting more and more efficient all the time." *Id.* (emphases added).

<sup>236</sup> According to information publicly disclosed by AT&T, its U-Verse homes-passed cost was approximately \$240 during the early years of deployment, and approximately \$350 during later years and during the Project VIP expansions. See, e.g., AT&T Inc. 2006 10-K, at 2; see also AT&T Project VIP Announcement. This indicates that while Verizon was willing to risk between \$1500-\$2000 of capital per passing initially (and \$800-\$1000 in later stages), AT&T's willingness was always much lower. (And notably, it was lower even in 2006, just a year after the FCC removed DSL from Title II and at a time when AT&T was obtaining favorable changes to video franchising regulations in the states). Yet nothing about the 2015 reclassification and rule adoption changed AT&T's calculus in terms of inhibiting, even marginally, its willingness to spend on wireline upgrades. In other words, long before the FCC's 2015 vote, AT&T maxed out its willingness to deploy FTTN in its footprint, at a final average cost of \$350 per passing. The gap between FTTN and FTTH is another \$500 per passing.

What matters more than baseless speculation about what an ISP might've spent is what it actually spent and got for it. It's not just the sheer dollar amounts, but the capacity increases achieved – potentially at a lower cost, as AT&T executives' statements and Comcast's deployment history demonstrate – because of efficiency gains from new technology. We must understand not just what a particular company deployed, but also why it did or didn't, as spurred on by competitors' upgrades (or deterred by their fundamental advantages).

In AT&T's case, the company is progressing just as it projected in November 2012. AT&T fully deployed 4G LTE, banking on wireless as its future. On the wireline side, as for all other ILECs, AT&T's capex is in secular decline<sup>237</sup> due to the natural advantages that cable MSOs have with their superior physical plant and cheaper upgrade path. Yet AT&T made IP-DSLAM upgrades as planned, and went beyond its 2012 fiber plans. It is exploring both 5G mobile and fixed projects, with project "AirGig" an example of potential innovation.<sup>238</sup> The company is increasing its wireless capacity even ahead of full 5G deployment, with SDN and network densification projects far less capital intensive than Project VIP's wireless efforts were. And it's investing in video delivery innovation after the DTV acquisition, to retain high value customers and stay ahead of the market's transition away from bloated pay-TV bundles.

Adhering to its long-stated guidance, AT&T will maintain its historically high level of capital investments during 2017,<sup>239</sup> even as innovations like SDN and its large spectrum portfolio reduce its overall capital requirements.<sup>240</sup> This elevated capex will be driven in part by the positive response to its fiber deployments.<sup>241</sup>

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Assuming AT&T would want to recover its capital within 3 years (and assuming a generous average of 35 percent penetration over that period), this implies AT&T would need to earn an additional marginal net income per FTTH customer of \$40 per month in a world without Net Neutrality rules. Even if the company were more patient than the investor class (targeting a 7 year recovery, with 40 percent average penetration), the marginal net income from whatever priority or blocking scheme it might cook up would need to be more than \$15 per customer per month. These estimates illustrate the folly of the notion that "uncertainty" from Title II might have dampened deployment, especially when all evidence demonstrates healthy continued investment and no evidence suggest that the rules themselves cost ISPs enough in "lost" profits to justify spending more.

<sup>237</sup> AT&T Wireline segment capital expenditures from 2007–2012 were \$14B, \$14.3B, \$11.2B, \$11B, \$10.4B, and \$8.9B, before ramping up under Project VIP to \$10B in 2013 and 2014, the last year in which AT&T reported wireline capex.

<sup>238</sup> See, e.g., AT&T, Press Release, "AT&T in Advanced Discussions with Power Companies and Others to Trial Project AirGig" (Jan. 31, 2017).

<sup>239</sup> See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., Q4 2016 AT&T Inc. Earnings Call (Jan. 25, 2017) ("Our teams executed well in 2016. We grew revenues, and on an adjusted basis, we expanded our operating margins and increased earnings, as we had projected. And free cash flow came in at the high end of expectations even with strong capital investment . . . Moving to cash flows, we had more than \$39 billion in cash from operations for the full year. That's a record for us. This allowed us to return substantial value to the shareholders through dividends while also investing more in capital than we ever have before. Capital investment was at \$22.9 billion for the year; that includes taking advantage of pricing and financing terms from our vendors that made good business sense for us, particularly with bonus depreciation still intact. Our investments are growth focused. For example, we're ahead of plan with our fiber-to-the-home build. Today, we market to nearly 4 million consumer customer locations . . . Let's now take a look at our operations where you see a consistent story of investment and the subscriber growth it generated . . . "Fourth-quarter margins were down year-over-year because we didn't hesitate to invest in growth opportunities . . . "Customer growth was strong. We added 1.3 million new wireless subscribers in the fourth quarter and over 3 million customers for the full year. This strong investment obviously pressures margins, but, as you can see in several parts of our business, we are clearly willing to invest in growth. . . "Capital investment was at the high end of what we expected. CapEx is expected in the \$22 billion range, similar to last year.") (emphases added).

<sup>240</sup> See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., Q2 2016 AT&T Inc. Earnings Call (July 21, 2016) ("On the capex budget, we've done well of in all aspects of it. . . [B]ecause of our software-defined network we're starting to see a little bit of those savings. If you think about our buying capacity and the overall economic conditions, we've been able to get some volume pricing and some purchasing power benefits. Certainly, we're getting more efficient with what we do. I will tell you, though, that one of the things I think people miss out on is that, because of the spectrum that we've invested in over the last, say, five years or so, we've got a lot of effective capital deployment that doesn't involve a lot of



The evidence is clear: AT&T is a diversified company for which investments come in cycles<sup>242</sup> against a backdrop of secular changes in telecom. AT&T had elevated spending during the two years preceding the FCC's vote, and will now increase investments again in certain segments as it pushes FTTH services and prepares for 5G.

And in AT&T's case, the subject of the *Open Internet Order* and Title II was not mentioned on any of the company's quarterly investor calls from April 2015 until July 2016, when it was asked about the impact of the DC Circuit upholding the FCC's ruling. (On that same call, AT&T affirmed that its wireless segment capital spending was trending lower due to the company's completion of its nationwide 4G LTE deployment). Even as it sidestepped the question,<sup>243</sup> AT&T expressed confidence in its FTTH deployment plans and the potential to expand them without once mentioning supposed uncertainty from Title II.<sup>244</sup> When the subject was brought up on AT&T's third quarter 2016 investor call in the context of the government's review of the Time Warner merger, AT&T again indicated that so long as there were no price regulation there would be no impact on this massive acquisition.<sup>245</sup> In fact, both AT&T's and Time Warner's CEOs made statements indicating they

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dollars. It involves deploying spectrum, and that's a really efficient way to deploy capacity. So on a per unit of capacity, our dollars can be really efficient because of the spectrum portfolio that we have that we're putting in use.") (emphasis added).

<sup>241</sup> See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., Q4 2015 AT&T Inc. Earnings Call (Jan. 26, 2016) ("In broadband, overall subscribers were relatively stable in the quarter while our fiber build out continues to be a great story. Our penetration of broadband is a full 9 percentage points higher in those markets compared with our non-fiber footprint. After we launched our 100 percent fiber network in the new market, we are seeing about half of the new broadband customers buying speeds of 100 megabits per second or higher with 30 percent of the customers taking a gig. And the real kicker is that the vast majority of recent sales in those markets are taking multiple services from us. So as our fiber deployment accelerates, we're excited about this growth opportunity.").

<sup>242</sup> See Comments of John Stephens, Senior EVP & CFO, AT&T Inc., Q2 2016 AT&T Inc. Earnings Call (July 21, 2016) ("Since the introduction of the first smartphone, we've seen unprecedented growth in mobile data traffic. Even more incredibly, we expect that to continue to grow at a very strong pace. To meet this demand, we undertook several strategic initiatives to improve the capacity of our network for today and the years to come. Here is what we've accomplished. First, we ratchet up our investment cycle with Project VIP. This was crucial to getting the high-quality, high-capacity network we have today. Our 4G LTE network deployment was accelerated. Fiber backhaul was deployed and cell sites built. We now have almost 70,000 cell sites, thousands more than our largest competitor, and our move into the Mexico wireless market further expands our LTE reach. We also drove fiber deeper in our wireline network. We added more than 1 million business locations to our fiber network, and we expanded our IP broadband footprint to more than 60 million customer locations. The next phase of driving fiber into our network is our GigaPower deployment. Over the next few years we expect to reach at least 12.5 million customer locations with our gigabit broadband service. We now have more than 2.2 million fiber-to-the-home customer locations, and we expect to reach 2.6 million or more by the end of the year. Our already dense wireless network and expanding fiber footprint puts us in an excellent position as we move to more small-cells and 5G. We have already filed patents, trials are already underway, and testing is ongoing. When 5G is ready to roll, we will be ready as well. At the same time we launched VIP we moved to expand our spectrum portfolio. We have about 150 megahertz of spectrum in our portfolio today, including 40 megahertz of relatively untapped AWS and WCS spectrum. We have the best, most balanced spectrum portfolio in the industry."). We note too that AT&T also has agreed to acquire FiberTower and its extensive physical assets, which will reduce capex and opex for all of these expansions.

<sup>243</sup> See *id.* ("On Title II, we always expected the final resolution to be in the hands of the Supreme Court, and we'll work through the process and follow the Supreme Court process closely, and then make our decisions going from then on.").

<sup>244</sup> See *id.* ("When you're done with that, you may still have some profitable builds that are at or above the 12.5 million commitment, and you may go ahead and build those. . . . But the ability or the schedule to build is an economics activity, a business case activity with, of course, the opportunity to overbuild in some areas being probably more timely and less expensive.") (emphasis added).

<sup>245</sup> See Comments of Randall Stephenson, Chairman, President & CEO, AT&T Inc., AT&T Inc. Acquisition of Time Warner Inc and 3Q 2016 Results Conference Call (Oct. 24, 2016). When asked "if the FCC does decide to look at things like rate regulation for broadband, how does that impact your view on the deal and the optionality that it gives you?" Stephenson answered, "I don't think it has any bearing as you think about this deal," because "we're hopeful the Chairman of the FCC as well as the President, when Title II was discussed, both said that they had no intention to regulate prices of broadband. So hopefully that will be the case as we move forward with this transaction." *Id.* (emphasis added).

understand quite well the importance of video to AT&T's business with Net Neutrality upheld and the openness of the internet preserved.<sup>246</sup> In other words, the virtuous cycle is still working, just as the FCC intended.

Title II and the *Open Internet Order* were not raised again until the January 2017 investor call, after the election. AT&T's CEO only then dusted off his old rhetoric about Title II suppressing investment.<sup>247</sup> But nowhere did he suggest that it had impacted AT&T's own investment in any specific way. In fact, the company's CFO noted on that call that during 2016 AT&T had accelerated its previously planned FTTH builds.<sup>248</sup>

It comes as no surprise that AT&T has not once told investors that Title II impacted its own investments, or issued even a loose dollar estimate (much less a firm one) on the magnitude of this supposed regulatory harm. The fact is that Title II had no negative impact, as AT&T's numerous prior statements and its own investments reveal. And again illustrating how the total dollar amount a company spends on capital is a poor indicator of progress, AT&T's own statements reveal it is deploying next-generation capacities at a far lower per-unit cost.<sup>249</sup> AT&T's fiber-to-the-home service deployments are up sharply following the *Open Internet Order*, with even more deployment in 2016 than prior years.<sup>250</sup>

In sum, AT&T's capital and deployment plans for 2015 and afterwards were driven by its business plans, which have not been impacted one iota by Title II. In fact, the certainty from the FCC's Open Internet framework, derived from the Congressional blueprint for telecommunications services, helped AT&T's business by making online video a stable growth area during a time when the home and wireless broadband markets

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<sup>246</sup> See *id.* Time Warner CEO Jeff Bewkes was asked, in light of the Time Warner Cable spinoff in 2009, whether "content and distribution together [are] synergistic" -- and if so, what had changed in the seven years after that spinoff. Bewkes said, "[T]he world's much different now. You now have net neutrality in place, you've got broadband distribution, you have mobile as an ever-bigger part of the distribution package. And you have a lot of incoming new distributor or competition coming from Facebook, Netflix, Google, Amazon." AT&T's CEO agreed: "[A]s we begin to stimulate even more and more demand of video over-the-top on our mobile networks, the desire and the incentive to go faster on 5G deployment is heightened. . . . Our expectation is, as we began to innovate with content, delivering content over these mobile networks, it's going to give us a lot more enthusiasm to go faster with 5G and not slower." *Id.* (emphases added).

<sup>247</sup> See Comments of Randall Stephenson, Chairman, President & CEO, AT&T Inc., Q4 2016 AT&T Inc. Earnings Call (Jan. 25, 2017) ("We happen to be advocates of net neutrality, just the concept of net neutrality, but placing utility style regulation on our mobility and Internet businesses. There's no way anybody could argue that that is not suppressive to investment. And so, we're hopeful that Chairman Pai will come in and begin to address some of these issues that are suppressing capital investment.").

<sup>248</sup> See *id.* (Comments of Comments of John Stephens, Senior EVP & CFO) ("We've spent the last few years in a very heavy investment cycle; it's no secret. We've been getting ready for a world where mobile technology and premium video content would intersect. And, we've been convinced for a long time that this intersection was inevitable. And when it happened, we wanted to have the foundation laid to make the intersection a very different experience for our customers. And that foundation, in our mind, begins with a network that's engineered and designed for the special requirements of video. It has to have deep capacity; it has to have broad distribution. . . . [T]his is exactly the foundation we've built. Our high-speed network is engineered and it's built for video. It's an LTE network that covers nearly 400 million people in the US and Mexico. There's nobody else that's even close. We're building out fiber to 12.5 million locations. This network is software defined and that gives us unique scalability at the lowest cost per megabyte around. It's a network with an elegant path to gigabit speeds and 5G. And in terms of capacity, we are really in a unique position here. We've invested \$27 billion in spectrum over the past five years and, as a result, we have the premier spectrum position in the industry; 40 megahertz of fallow spectrum. And, as John referenced, if we're successful with our FirstNet bid, we get access to another 20 megahertz of prime nationwide spectrum for public safety and secondary use.") (emphases added).

<sup>249</sup> See Comments of Randall Stephenson, *supra* note 38.

<sup>250</sup> See *id.* AT&T's FTTH network reached approximately 1.5 million locations at the time of the DirecTV merger closing (late July 2015). This increased to 3.8 million locations by the end of 2016, and reached 4.6 million locations by May 2017. AT&T says it will reach 5.8 million locations by the end of 2017, and that it is accelerating the pace of deployment thereafter to reach 12.5 million locations by mid-2019. See AT&T Inc., Press Release, "AT&T Invests Nearly \$6.8 Billion Over 3-Year Period to Enhance Local Networks in Texas" (May 9, 2017); see also AT&T Investor Day Presentation (Aug. 12, 2014).

reached saturation. AT&T's recently renewed but unsupported protests about Title II harms do not square with the reality of AT&T's own investments or those of its peers.

#### Verizon Communications Inc.

Verizon's capital investment total increased during the year following the FCC's adoption of the *Open Internet Order*<sup>251</sup> (just as the company said it would, a month before the February 2015 vote).<sup>252</sup> And Verizon's total two-year post-vote capital expenditures were 3.1 percent higher than they were in the two years preceding the vote, even as the company divested its Florida, Texas and California systems to Frontier Communications.

There's no mystery about Verizon's capital spending. The company's wireline network spending peaked at \$11 billion during 2007, and it has declined sequentially every year since – even as Verizon continued to deploy its Fios FTTH internet and pay-TV services, including a recent “refresh” of its CPE as a part of Verizon's “Quantum” project. Meanwhile, the company's wireless segment capital investments increased annually from 2008–2015, as it took the lead rolling out 4G LTE and LTE-Advanced services. More recently, Verizon rolled out gigabit services at half the price it previously charged for much slower speeds.<sup>253</sup> And it is on a fiber and millimeter spectrum buying spree as it prepares for the 5G wireless era.<sup>254</sup>

Investors understand this history well. Verizon's made a point of emphasizing exactly why it believes it can grow earnings through reduced wireline capex<sup>255</sup> and sustained wireless capex.<sup>256</sup> Though 2016's total

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<sup>251</sup> See Comments of Fran Shammo, EVP & CFO, Verizon Communications Inc., Q4 2015 Verizon Communications Inc. Earnings Call (Jan. 21, 2016) (“Verizon Q4 2015 Earnings Call”) (“Our capital spending was consistent with our guidance of around \$17.5 billion to \$18 billion for the year. In total, capital expenditures were \$5.2 billion in the fourth quarter and \$17.8 billion for the full year, up 3.4 percent from 2014.”).

<sup>252</sup> See Comments of Fran Shammo, EVP & CFO, Verizon Communications Inc., Q4 2014 Verizon Communications Inc. Earnings Call (Jan. 22, 2015) (“On capex, Mike, it goes directly to what you said. I have been pretty consistent with this in the fact that we will spend more capex in the Wireless side and we will continue to curtail capex on the Wireline side. Some of that is because we are getting to the end of our committed build around FiOS, penetration is getting higher. We are reconnecting homes that we've already connected, so it's not additional capital that we have to outlay and we are very focused on those, what we call connected homes, that are not our customers to go back after them. That is a very good return for us because we already spent the capital to connect that home. So it's a lot of combination around that, but yes, this is around densification. This is around our projection of growth for the wireless industry and staying ahead of that. Again, it's all that encompassing so we're looking at a slight increase from where we ended 2014.”) (emphases added).

<sup>253</sup> See Verizon Communications Inc., Press Release, “Verizon launches Fios Gigabit Connection service delivering millions of customers the speeds they deserve” (Apr. 24, 2017).

<sup>254</sup> See, e.g., Lauren Thomas, “Verizon agrees to \$1.05 billion fiber-optic cable deal to grow its wireless platform,” *CNBC* (Apr. 18, 2017); see also Prysmian Group, Press Release, “Prysmian awarded a \$300 million optical cable supply agreement from Verizon Communications” (May 8, 2017); “Straight Path stock surges after Verizon raises its takeover offer,” *Reuters* (May 8, 2017).

<sup>255</sup> See Verizon Q4 2015 Earnings Call (“Capital spending in Wireline was \$1.6 billion in the fourth quarter and totaled \$5 billion for the year, down 12.2 percent, which is consistent with our strategy to reduce our capital spending in the Wireline segment.”).

<sup>256</sup> See *id.* (“We remain committed to consistently investing in our networks for the future. Our 2015 investments have positioned us for growth and allow us to maintain our network leadership position, as consistently acknowledged by third parties. Wireless densification enables us to add capacity to manage the growing trends of video consumption and the demand required for the Internet of Things, as well as prepositioning us for the future 5G technology. We invested in AWS-3 spectrum during the year, acquiring spectrum covering 480 markets for a total value of \$10.4 billion. We continued to execute a disciplined capital allocation model with the priority to invest for the future.”) (emphases added).

company spend was down slightly, Verizon expects 2017 capital expenditures to rise again,<sup>257</sup> as it continues to invest in wireless densification and fiber deployment<sup>258</sup> ahead of a commercial launch of 5G technology.<sup>259</sup>

After the FCC's February 2015 vote and before the November 2016 election, there was only one question on the company's quarterly calls about the impact of Title II on Verizon's investment. On its April 2016 investor call, when asked about the pending court case, CFO Fran Shammo said: "The thing that we disagreed with and opposed was applying Title II [to] broadband services and particularly wireless broadband. . . . This will, obviously, have some negative consequences on innovation as a whole. But, look, we are a company that has operated under regulation for 100 years and has been very successful, so we will wait and see what the FCC concludes and then we will operate accordingly. But it's too early to say what exactly is going to happen here."<sup>260</sup>

This tone was much more measured than the one Shammo took on the company's investor call two months ahead of the vote, when he claimed that reclassification "will absolutely affect us and the industry on long-term investment in our networks. That can be seen factually as to what happened in the rest of the world, where you have high regulation, the networks are not invested in, they are not good quality of service networks. And that's where this will put us."<sup>261</sup> Yet it is abundantly clear from Verizon's continued wireless segment investment and its fiber deployments – along with those made by its wired and wireless competitors – that Verizon's pre-vote rhetoric was nothing more than bluster. Its more sober post-vote comments reflect the reality that the FCC's policy had zero negative impact on its own investment and the industry's pro-growth status quo.

### CenturyLink

Unlike AT&T and Verizon, CenturyLink's business is strictly wireline. Thus it acutely feels the impacts of the cable industry's continued dominance of the fixed broadband market, driven by the much lower-cost upgrade path for cable modem service compared to DSL. And like many other wireline-only telephone companies, CenturyLink's capital spending has been flat in recent years. Despite these existential challenges, CenturyLink has committed to upgrading a portion of its first-generation DSL networks to next-gen VDSL and

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<sup>257</sup> See, e.g., Comments of Matt Ellis, EVP & CFO, Verizon Communications Inc., Q4 2016 Verizon Communication Inc. Earnings Call (Jan. 24, 2017) ("[W]e are targeting the following for 2017: consolidated capital spending between \$16.8 billion and \$17.5 billion").

<sup>258</sup> See *id.* ("As you think about the capex, as you say, the number is reasonably consistent year after year and that's something you've seen from us for a number of years. But, as you say, within that it changes over time. So within LTE our spending continues to transition from coverage to densifying the network. And that continues to evolve as we leverage new technologies around radio and hardware and software and then refarming our spectrum within 4G and densifying with small cell. So you will continue to see that densification of the 4G network. And that includes how we put fiber out there, which obviously is needed for the 4G network, but also is something that we think about for prepositioning for 5G. So you will continue to see that. You will continue to see us launch additional parts of LTE Advanced as we go through that. We had the initial launch of that last year. We expect additional features to come during the course of this year and we will continue to expand our C-RAN architecture. So within Wireless you should expect to see the spending continue to move to make the network more efficient on a cost-per-gig basis going forward. Then, as we've mentioned, fiber is a consistent part of our business so that is something you should expect to see us continue in. We've talked about what we're doing in Boston; you should continue to see us do that. Some of the other businesses aren't – as we've said previously, they are not as capital intensive as our network business, so you should expect to see that capex will continue to be focused on the network side of the business as we go into 2017.") (emphases added).

<sup>259</sup> See *id.* ("5G wireless technology is a focus for us. We are now launching about 10 pre-commercial pilots across the country with multiple use cases, including dense urban and suburban neighborhoods. Our goal is to test the 5G fixed wireless technology in different environments in order to successfully operationalize 5G products for a commercial launch.").

<sup>260</sup> See Comments of Fran Shammo, EVP & CFO, Verizon Communications Inc., Q1 2016 Verizon Communications Inc. Earnings Call (Apr. 21, 2016).

<sup>261</sup> See Comments of Fran Shammo, EVP & CFO, Verizon Communications Inc., Q4 2014 Verizon Communications Inc. Earnings Call (Jan. 22, 2015).

full fiber. For example, during 2016 CenturyLink “increased addressable units receiving 100 megabits and 1 gigabit-plus speeds by 31 percent and 53 percent respectively.”<sup>262</sup>

However despite its next-gen DSL deployment efforts, CenturyLink’s 2015 capital spending was down slightly from 2014. Even with an increase in 2016, its total two-year post-vote capex declined by 4 percent. Nevertheless, this downturn had nothing to do with the FCC’s vote, nor the company’s spending on its core ISP business. In fact, its consumer broadband network investments are up following the FCC’s vote.<sup>263</sup> CenturyLink’s total capex is slightly down because the growth in consumer broadband capital spending was offset by declines in data center investment<sup>264</sup> and pay-TV segment capex.<sup>265</sup>

After reviewing its capital plan in early 2016,<sup>266</sup> CenturyLink made it clear to investors that it would pursue a strategy of growth through network upgrades that enable downstream speeds of 40 to 200 Mbps.<sup>267</sup> The

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<sup>262</sup> See, e.g., Comments of Glen Post, CEO, CenturyLink Inc., Q4 2016 CenturyLink Inc. Earnings Call (Feb. 8, 2017) (“Moving to the second initiative, we believe the greatest potential for us to drive returns on our capital investment lies in enabling and delivering broadband services. . . . During the year we increased addressable units received 100 megabits and 1 gigabit-plus speeds by 31 percent and 53 percent respectively.”) (emphasis added).

<sup>263</sup> See, e.g., Comments of Glen Post, CEO, CenturyLink Inc., Q4 2015 CenturyLink Inc. Earnings Call (Feb. 10, 2016) (“Finally, we deploy a disciplined approach to our operating capital investments to deliver profitable growth, first by investing more capital to enable high bandwidth network connectivity, and pursuing capital light investment approaches for our complementary adjacent services. Allocating capital based on the best returns on investment and opportunities and key strategic objectives will be key.”) (emphasis added); Comments of Glen Post, CEO, CenturyLink Inc., Q4 2016 CenturyLink Inc. Earnings Call (Feb. 8, 2017) (“Also in the capital side, you will notice that we reduced our expected 2017 capital spend to \$2.6 billion. I want to say a word about that. First, I want to point out that we don’t believe this reduction will materially affect our revenue trajectory in 2017 or 2018. We have a significant amount of embedded capacity in our existing network. Our broadband investments for 2017 are expected to actually be a little higher than 2016 levels.”) (emphasis added).

<sup>264</sup> See Comments of Glen Post, CEO, CenturyLink Inc., Q2 2015 CenturyLink Inc. Earnings Call (Aug. 5, 2015) (“We believe we have a number of opportunities to manage our business in a way that supports the dividends, as we work to capitalize on our growth prospects. First, we have made significant investments in our network and data center infrastructure over the last several years and believe we have the flexibility to lower our planned capital budget by about \$200 million to approximately \$2.8 billion in full year 2015, without significantly affecting our path to growth.”); See also *id.* (Comments of Stewart Ewing, CFO) (“[S]ome of the projects that we’re looking at that we’ve actually cut really relate to what we – that falls in the revenue enablement bucket. . . . And then another one-third of the \$200 million really comes from furniture equipment, vehicles, and things like that that we just think we can not have to do.”).

<sup>265</sup> See, e.g., Comments of Glen Post, CEO, CenturyLink Inc., Q4 2016 CenturyLink Inc. Earnings Call (Feb. 8, 2017) (“On the video side, we are trialing an over-the-top product, but more generally we’re monitoring the rapidly evolving video market closely. . . . If we can get a better deal or we can get some of our content cost down and get the same type of service with the DirecTV Now, we will certainly take a look at that. We are talking to all the service providers looking at every possibility there . . . if you look at our Prism product, as you know, we’ve talked about content costs have really gone out of sight the last couple of years. If you look at the margins, sometimes actually negative margins. But we certainly – we have to make a truck roll and the cost of provisioning really makes it difficult from a returns standpoint for really driving the kind of returns we expect. With the over-the-top product, we don’t have to make a truck roll. We have much wider availability due to the lower bandwidth requirements for over-the-top. We have network-based storage for DVR, we’ll have local channels to help distinguish that product. And our trial is getting really strong reviews right now. But we have really deemphasized the Prism product because of the margin issue. Now, the value there is the pull-through. We get a strong pull-through, 90 percent pull-through of additional services, and 50 percent of those customers are new customers to CenturyLink. So that’s the real value here of the Prism product. But we have deemphasized that in moving more toward the over-the-top product and also focusing more on the broadband offerings we have versus the video.”) (emphasis added).

<sup>266</sup> See Comments of Glen Post, CEO, CenturyLink Inc., Q1 2016 CenturyLink Inc. Earnings Call (May 4, 2016) (“[W]e believe our priority for capital investment is in the network to protect and grow our consumer and business network market positions. Therefore, we’ve launched the strategic review process for our data center and colocation business last year.”).

<sup>267</sup> See Comments of Glen Post, CEO, CenturyLink Inc., Q2 2016 CenturyLink Inc. Earnings Call (Aug. 3, 2016) (“As you can see, even this relatively high usage case, which is well beyond the vast majority of users’ activity, can be met with speeds of less than 100 megabits, and that aligns with our own experience, where we see speeds of 40 megabits to 100

company expects capital intensities to remain elevated for the next few years as it makes these broadband upgrades, even as overall capex remains flat.<sup>268</sup> Another recent change for CenturyLink is its decision to deemphasize its pay-TV service in favor of a lower-cost OTT/VSP approach. This is an example of how LEC ISPs are improving their own competitiveness vis-a-vis cable companies by utilizing Open Internet-enabled video competition. Relying on OTT as a video solution benefits consumers while also decreasing capex on the ILEC's balance sheet. This is the sort of benefit versus cost analysis that simply counting capex alone misses.

Finally, we note that there were no mentions of Title II or the Open Internet rules' impact on investment on any of CenturyLink's quarterly investor calls following the FCC's February 2015 vote.

#### Telephone and Data Systems Inc. (TDS Telecom/U.S. Cellular)

Telephone and Data Systems Inc. ("TDS") is the parent company of regional mobile carrier United States Cellular Corporation ("U.S. Cellular") and of ILEC/MSO TDS Telecommunications Corporation ("TDS Telecom"). TDS's wireline and cable capital investments were up more than 6 percent for the two-year period after the FCC's Open Internet vote, while its cellular capex declined by 24 percent. TDS told investors before the FCC's vote to expect these diverging directions in its capex spending across those two ISP business segments, and it explained precisely why: completion of its 4G LTE deployment on the wireless side, but increases in deployment of FTTH, DOCSIS 3.0, and bonded DSL high-speed internet access services.

Long before the FCC's vote in 2015 to restore Title II, TDS's U.S. Cellular unit had completed the bulk of its 4G LTE upgrades to nearly its entire network.<sup>269</sup> U.S. Cellular's capital investments peaked in 2012, and

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megabits as competitive today in virtually all of our markets. We expect that usage curve to continue to increase over time, moving to the 100 megabits or 200 megabits range over the next several years. Certainly, there will be users who will seek the gigabit connection, but for the vast majority of consumers, we see 100 megabits to 200 megabits as being more than sufficient to meet market demand for a number of years. . . . We're confident we can accomplish these broadband speeds within the confines of our existing capital budget levels, and this is based on currently available compression and access technologies, and average cost of deployment, which we hope will improve over time. By year-end 2018, we expect to enable speeds of greater than 40 megabits to 85 percent of our top 25 markets, and to reach more than 55 percent of those markets with more than 100 megabits, with a lot of that improvement coming over the next 12 to 18 months. And . . . across all of our markets, this will represent about 50 percent of addressable units receiving 40 megabits and higher speeds, and more than 30 percent of addressable units receiving 100 megabits and higher speeds by year-end 2018. By the time we get to year-end 2019, we'll have [ ] almost 11 million addressable units, representing 42 percent of total addressable units, across all of our markets, capable of receiving 100 megabits and higher. And in our top 25 markets, over 70 percent of addressable units are expected to have 100 megabits and higher speeds. By this time, we also expect to have approximately 3 million addressable units enabled for 1 gigabit, and higher speeds across all of our markets. Obviously, the changes in technology, cost of deployment, and market factors could cause us to reassess our actual deployments either a little lower or a little higher. While the details may vary, the point is, we believe we can deploy very competitive speeds within our existing capital plans. And while our investment plans assume capital intensity at current levels for the next several years, we do anticipate our capital intensity to return to historical averages over time." (emphases added).

<sup>268</sup> *See id.* ("I was not saying the capital intensity would be up. It just won't come down for a couple of years, two or three years. We've had – our capital intensity has a little been higher than the industry for a couple of years, and we expect that level to continue. We believe we can hit these objectives in terms of broadband speed, improve the network, and enhancing the network with SDN and the other services that we are putting into the network, other technologies, within the current capital budget which is about \$3 billion today. . . . As for the more normal level of capex we can get to, we think there's \$300 million or \$400 million that come out easily out of \$3 billion so we think the \$2.5 billion level is certainly achievable, maybe less. It depends on what the opportunities are in terms of driving or investing in technology to drive revenue and margins. But right now, we think a more normal level being closer to the \$2.5 billion mark.") (emphases added).

<sup>269</sup> *See* Comments of Ken Meyers, President & CFO, U.S. Cellular, Q4 2013 TDS and U.S. Cellular Earnings Call (Feb. 26, 2014) ("[C]apex was down in 2013 over 2012 by about 13 percent, and it's down again this year. Part of that has been the work we've been doing with LTE. This year, while we start the year with about 87 percent of our customers covered, that's only about two-thirds of our cell sites. So, our plan right now is to push that out this year, probably covering about another 1,100 cell sites. Which will get us somewhere – 93 percent or so of our customers, maybe 88 percent of our cell

have declined annually ever since. The company made it clear, well ahead of the FCC's vote, that its 4G project completion would be followed by a decline in capital investment,<sup>270</sup> and that's exactly what happened. This is no surprise. U.S. Cellular's 4G LTE network reached 94 percent of its customers on the eve of the FCC's February 2015 vote,<sup>271</sup> and expanded to reach more than 99 percent of postpaid customers by the end of 2016.<sup>272</sup>

But while TDS's wireless segment was reaching the end of an upgrade cycle, its cable and ILEC segment continued to rollout higher-capacity broadband services. Contrary to the myths surrounding Title II, TDS executives repeatedly expressed strong confidence in their business prospects and their desire to invest – well after the FCC's vote – in higher capacity services in order to drive growth.<sup>273</sup> Just prior to that vote, TDS said it had set aside a third of its capital spend to bring fiber-fed services to 35,000 new locations.<sup>274</sup> This represented an acceleration of its plans for 2015, announced the day before the FCC's vote – which as everyone knew by then, was to adopt strong net Neutrality rules and return to Title II.<sup>275</sup>

In May 2016, TDS announced it would increase DSL speeds at *an additional* one-third of its ILEC passings by deploying line-bonding technology.<sup>276</sup> Six months later it reported completing nearly half of these upgrades.<sup>277</sup> And during 2016, TDS announced deployment of 300 Mbps cable modem services.<sup>278</sup> One year later, this higher-speed DOCSIS 3.0-enabled service is available to more than half of TDS's cable customers.<sup>279</sup>

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sites. . . That will give us a little bit of a job next year to finish the LTE rollouts. We expect to get to all of our cell sites when we are done. . . . Next year's LTE piece isn't as big, so there is a potential there." (emphasis added).

<sup>270</sup> See *id.*

<sup>271</sup> See Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q4 2014 TDS and U.S. Cellular Earnings Call (Feb. 25, 2015) ("[R]esidential broadband customers are increasingly choosing higher speeds in our ILEC market with 41 percent choosing speeds of 10 megabits or greater and 11 percent choosing speeds of 25 megabits or greater, driving increases in our average revenue per connection . . . and we continued to deploy 4G LTE, which now reaches 94 percent of our postpaid customers, providing an excellent network experience in our suburban and rural markets.").

<sup>272</sup> See Comments of Ken Meyers, President & CFO, U.S. Cellular, Q4 2016 TDS and U.S. Cellular Earnings Call (Feb. 24, 2017) ("Our 4G LTE network reaches 99 percent of our postpaid customers . . .")

<sup>273</sup> See, e.g., Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q1 2015 TDS and U.S. Cellular Earnings Call (May 1, 2015) ("We are very pleased with the success of our IPTV deployments and will continue to make fiber investments this year to achieve our goal of approximately 25 percent.") (emphasis added).

<sup>274</sup> See Comments of Dave Wittwer, CEO, TDS Telecom, Q4 2014 TDS and U.S. Cellular Earnings Call (Feb. 25, 2015) ("We are very pleased with the success of our IPTV deployments and will continue to make fiber investments this year . . . . In the wireline we will continue to deploy fiber where it strategically and economically makes sense or our costs and demographic metrics support the business case. In 2015, we have earmarked about a third of our capital spend to enable high speed broadband and video to approximately 35,000 additional service addresses.").

<sup>275</sup> See *id.* (Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom) ("Wireline CapEx, which is about two-thirds of total spend, is expected to increase slightly as we pull forward deployments of additional fiber build[.] the cable capital budget includes funds to increase capacity related to household growth, success based capital and continued network upgrades.") (emphasis added).

<sup>276</sup> See, e.g., Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q1 2016 TDS and U.S. Cellular Earnings Call (May 6, 2016) ("We are completing our planned fiber builds to reach approximately 21 percent of our ILEC service addresses, and when combined with copper service, our IPTV-enabled markets cover approximately 25 percent of our service addresses. For the remainder of the year we will focus on driving IPTV and high-speed broadband bundles in these markets. To further strengthen our broadband offerings we are deploying bonding technology to an additional one third of our ILEC service addresses to drive higher speeds in our middle-tier ILEC copper markets.") (emphasis added).

<sup>277</sup> See, e.g., Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q3 2016 TDS and U.S. Cellular Earnings Call (Nov. 4, 2016) ("Our planned fiber builds are almost complete, and will reach approximately 22 percent of our ILEC service addresses. When combined with copper service our IPTV enabled markets will cover approximately 25 percent of our ILEC service addresses. We have been focusing on further driving IPTV and high speed broadband bundles in these markets. To further strengthen our broadband offerings we are deploying bonding technology up to approximately 20 percent of our ILEC service addresses to drive higher speeds in our middle-tier ILEC copper markets.") (emphases added).

TDS Telecom's peak year for capex was 2015, when it completed much of its planned-fiber build.<sup>280</sup> Wireline and MSO capex decreased in 2016 because of project completion,<sup>281</sup> but is expected to rise again in 2017 as the company spends more on success-based capacity enhancement.<sup>282</sup> U.S. Cellular also told investors its capex would increase during 2017, as it spends more to provide "additional capacity to accommodate increased network usage."<sup>283</sup> The firm's customers are certainly taking advantage of access to these greater capacities (and the third-party edge-services to which they provide an open path) by subscribing to higher speed tiers.<sup>284</sup>

As TDS continued to invest, and to express confidence in its strategy of growth thanks to higher quality and higher capacity services, the subject of Title II and the FCC's Open Internet rules never came up during any of its post-vote investor calls. The only time TDS ever even hinted that any FCC policy might impact some of its deployment plans was when it mentioned the FCC's USF policies for rural monopoly LECs.<sup>285</sup> This is a common theme in ISP investor calls: the impact of FCC policy on network construction is solely a function of how much ratepayer money the FCC is willing to give monopolists through the USF program.

### Frontier Communications

Frontier, the nation's fourth-largest ILEC ISP, sharply increased its capital investments after the FCC's vote. Its 2015 capex was 25 percent higher than it was in 2014, the year prior to broadband reclassification, and that number jumped again in 2016 (for a two-year post-vote increase of 71 percent over the two-year pre-vote total). Though much of that large increase is due to the acquisition of former Verizon assets, Frontier's capex

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<sup>278</sup> See Comments of Dave Wittwer, CEO, TDS Telecom, Q4 2015 TDS and U.S. Cellular Earnings Call (Feb. 19, 2016) ("Where economically feasible, fiber technology is being deployed to provide Internet speeds up to 1 gigabit per second. By the end of 2015 we have deployed fiber-to-the-home to 21 percent of ILEC service addresses. . . . To support our strategy of growing broadband penetration, we will roll out speeds up to 300 megabits per second in our most competitive cable markets throughout the year.") (emphasis added).

<sup>279</sup> See Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q4 2016 TDS and U.S. Cellular Earnings Call (Feb. 27, 2017) ("We are now offering 300 megabit service [to] more than half of our cable service addresses.")

<sup>280</sup> See Comments of Dave Wittwer, CEO, TDS Telecom, Q4 2015 TDS and U.S. Cellular Earnings Call (Feb. 19, 2016) ("In 2016 we are completing our plan to fiber build to reach approximately 25 percent of our ILEC service addresses, and will focus on driving further penetration of triple play bundles in our existing markets. The completion of the planned fiber deployments is driving the lower capital spending for the wireline segment in 2016.") (emphasis added).

<sup>281</sup> See Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q4 2015 TDS and U.S. Cellular Earnings Call (Feb. 19, 2016) ("[W]ithin the segments, wireline capex, which is about two-thirds of total spend, is expected to decrease as we complete our planned fiber spending in targeted wireline markets. The cable capital budget includes funds for success-based growth, including the one-time analog reclamation project and increased broadband speeds.")

<sup>282</sup> See *id.* (noting TDS Telecom would have cable segment capex increases for broadband speed increases, but wireline decreases due to prior fiber deployment completion); see, e.g., Telephone and Data Systems Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016 ("TDS 2016 10-K") ("TDS Telecom's capital expenditures for 2017 are expected to be approximately \$225 million [to m]aintain and enhance existing infrastructure at Wireline, Cable and HMS; Improve broadband capacity and speeds associated with A-CAM and state level stimulus grants; and Success-based spending to sustain IPTV, Cable and HMS growth.")

<sup>283</sup> See TDS 2016 10-K ("U.S. Cellular's capital expenditures for 2017 are expected to be approximately \$500 million [to e]xpand and enhance network coverage, including providing additional capacity to accommodate increased network usage, principally data usage, by current customers; [and] Continue deployment of VoLTE technology in certain markets . . . .")

<sup>284</sup> See, e.g., Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q3 2016 TDS and U.S. Cellular Earnings Call (Nov. 4, 2016) ("Reflecting both our fiber and bonded copper deployments, residential broadband customers in these ILEC markets are continuing to choose higher speeds, with 52 percent choosing speeds of 10 megabits or greater, and 21 percent choosing speeds of 25 megabits or greater, which also contribute to the higher ARPUs we have experienced.")

<sup>285</sup> See, e.g., Comments of Vicki Villacrez, VP, Finance & CFO, TDS Telecom, Q3 2016 TDS and U.S. Cellular Earnings Call (Nov. 4, 2016) ("In our remaining markets, generally those with no cable competition, we are evaluating how the FCC's modified service funding mechanism will further support broadband buildout.")



was on a broadband deployment-driven uptick in the months prior to the FCC's vote, and that uptick continued afterwards. Like many ILECs, Frontier is seeing capex needs decline sharply in its legacy exchange business, replaced by investment opportunities in higher capacity residential and commercial services.<sup>286</sup>

Frontier is selective about where it invests in capacity upgrades, based on the economic realities facing LECs that serve a mix of (1) monopoly service territory high-cost rural markets, and (2) non-monopoly suburban and urban markets in which they typically face cable MSO competition. Frontier is pushing speed increases for its existing copper network by utilizing fiber-to-the-node network architecture in many cases (rather than full FTTH) in order to maintain some parity with cable's low-cost DOCSIS upgrades. This typifies LECs' strategy in light of harsh natural monopoly economics: they must invest some in order to remain viable against cable<sup>287</sup> and to lower their operating costs;<sup>288</sup> but the time required to recover the \$1,000-plus incremental cost of full fiber upgrades is often too long a period to ask investors to wait. While it remains to be seen how viable this fiber-to-the-node strategy is over the long term, copper-based upgrades do enable Frontier to offer 50–100 Mbps services to a large portion of its customers. This strategy is helping increase Frontier's per-customer revenues, even as it continues to experience net ISP customer loss because users in un-upgraded areas migrate to cable modem.

Frontier's ILEC-born challenges notwithstanding, the company has repeatedly made clear that it is committed to continued broadband investments even after the FCC's Title II reclassification. A large portion of the residential lines Frontier acquired from Verizon were first-generation DSL technology. Frontier told investors that it would bring next-generation DSLAM equipment to the central offices feeding many of these lines, enabling 50 Mbps or higher services. In an August 2016 investor presentation, Frontier spelled out a plan to bring 50+ Mbps service to 2 million more households by August 2017, and to extend its IPTV-capable network to an additional 3 million households by 2020–2021.<sup>289</sup>

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<sup>286</sup> See, e.g., Frontier Communications Corp., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2014 (“We continued to invest in network speed and capacity to support our goal of attracting additional customers and increasing broadband penetration. In 2014, our broadband availability increased by over 1.4 million new households, which includes 1.3 million new households attributable to the Connecticut Acquisition, and we are now able to offer broadband to over 7.8 million households as of December 31, 2014.”); Frontier Communications Corp., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2015 (“We continued to invest in network speed and capacity to support our goal of attracting additional customers and increasing broadband penetration. As of December 31, 2015, we are able to offer broadband to over 7.9 million households.”) (emphases added).

<sup>287</sup> See, e.g., Frontier Communications Corp., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016 (“A main component of our strategy is to enable and strengthen the broadband capabilities of our network. . . . In order to remain competitive, we must continue to evolve our product offerings to remain current with the changing needs of the market, to provide strong customer service and support, [and] to invest in our network so we maintain adequate capacity and can deliver new capabilities as needed, . . .”) (emphasis added).

<sup>288</sup> See, e.g., Comments of Dan McCarthy, President & CEO, Frontier Communications Corp., Q4 2015 Earnings Call (Feb. 23, 2016) (“We also continue to improve broadband capabilities [outside of our CAF-supported footprint]. For example, in Connecticut and other markets we are in the process of introducing speeds in excess of 100 megabits over copper, led by our fiber-to-the-node infrastructure. We have been investing to transform our operating support systems, our customer self-service capabilities, and our provisioning platforms. We believe these investments will position us well to lower operating expenses from our existing business as we deploy these enhancements and customers begin to adopt the new functionality.”) (emphasis added).

<sup>289</sup> See Frontier Communications Corp., Investor Update, Second Quarter 2016 (Aug. 1, 2016). Frontier laid out its plan to expand “the revenue opportunity by leveraging technology advantage,” with steps such as increasing broadband penetration and customer migration to higher speeds by increasing “speeds across the network,” and “leveraging existing investments and upgrading to next-generation IP-based copper broadband technology.”)

Frontier is making quick progress towards those speed upgrade goals. In its February 2017 investor call, it reported upgrading “1 million households to 50 megabits or higher speeds” during 2016.<sup>290</sup> In 2016, Frontier devoted half of its capex budget to broadband speed upgrades and FTTH expansion.<sup>291</sup> But it expects a decline in capex during 2017 with many of these projects nearing completion<sup>292</sup> and with the company’s shifting video service strategy.<sup>293</sup>

This video shift again shows how the FCC’s Open Internet policy can increase broadband competition by lowering a carrier’s capital and operational costs. Prior to the dawn of VSP competition, an ILEC had to invest in its own pay-TV service in order to compete with the triple-play offerings of traditional cable MSOs. This meant high operational costs (truck rolls, programming fees, administrative overhead) and greater capital costs (video server equipment, video CPE) – all to offer a service that, across the industry, is suffering overall margin and customer declines.<sup>294</sup> But today, a mid-sized ILEC like Frontier can either partner with a VSP like DirecTV Now or Sling TV; or it can simply encourage customers to “BYO-TV,” saving substantial operational and non-network capital costs while remaining competitive against cable’s triple-play bundles. This strategy, however, requires the carrier maintain a robust broadband network. This is something Frontier recognizes, as it told investors that it could achieve its priority of revenue generation by making sure its networks can deliver its customers a quality online video experience, all of which means its “not really cutting capex at this point.”<sup>295</sup>

Finally, for yet another company, we note there were no mentions of Title II or the Open Internet rules’ impact on investment on any Frontier quarterly investor call following the FCC vote. On the eve of that vote, then-CEO Maggie Wilderotter said, “we live by the net neutrality rules and regs today, even though we are not required to do so. And we have also been under a Title II regulatory framework for years. So we understand how to operate in that environment.”<sup>296</sup> This mirrors the sentiment of other ISPs, particularly mid-sized and small

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<sup>290</sup> See Comments of Dan McCarthy, President & CEO, Frontier Communications Corp., Q4 2016 Earnings Call (Feb. 27, 2017) (“Turning to speed improvements, during 2016, we upgraded 1 million households to 50 megabits or higher speeds. In the CTF markets, we upgraded approximately 200,000 copper-fed homes.”).

<sup>291</sup> See *id.* (Comments of Perley McBride, EVP & CFO) (“Approximately half of 2016 capital expenditures were in support of growth initiatives including broadband expansion speed upgrades and fiber to the home expansions.”).

<sup>292</sup> See *id.* (“Our capital spending plan for 2017 is in the range of \$1 billion to \$1.25 billion. This is a decline for 2016 as our larger size has enabled greater efficiency including better pricing and procuring services. We also have more than adequate inventory on consumer devices and as mentioned we’re scaling back our video build as we evaluate the opportunities created by the evolution of technology.”).

<sup>293</sup> See *id.* (“We also slowed new video deployment as we evaluate the opportunities now available as technology in this area continues to evolve. The remainder of our capital spending is combination of IT investments related to productivity enhancements and maintenance related projects.”).

<sup>294</sup> See *supra* note 262 (discussing CenturyLink’s decision to deemphasize PrismTV product in favor of OTT video to reduce costs and increase profits while remaining a reasonable substitute for triple-play cable service in its customers eyes).

<sup>295</sup> See, e.g., Comments of Dan McCarthy, President & CEO, Frontier Communications Corp., Q4 2016 Earnings Call (Feb. 27, 2017) (“[T]here ha[ve] been some advances and some changes in the landscape on the OTT side. So I think we could spend time developing our own; we may partner with others, but I think that will be an important part of the strategy going forward. But that’s not going to stop us from investing in the network. One of the key priorities is revenue generation, whether that’s really on the commercial side or it’s really making sure that our speeds and our network are congestion-free going forward, because more and more video traffic is flowing. Whether it’s our OTT product or it’s someone else’s, we want to make sure that’s a good experience for customers. So we’re not really cutting capex at this point.” (emphases added).

<sup>296</sup> See, e.g., Comments of Maggie Wilderotter, Chairman & CEO, Frontier Communications Corp., Q4 2016 Earnings Call (Feb. 27, 2017) (“We do expect the new rules to focus on obligations for Frontier, that we already embrace; things like transparency, disclosure requirements, nondiscrimination obligations, and no blocking mandates. We do think there will be some reporting requirements put on us that we don’t have today, which would include either performance characteristics of the broadband network or congestion management. Again, the devil is going to be in the details. We do not expect to file any lawsuits at this point in time. We want to wait and see what the final order looks like. We live by the net neutrality rules and regs today, even though we are not required to do so. And we have also been under a Title II regulatory framework for years. So we understand how to operate in that environment.”).

ILECs, that understand quite well the difference between the full application of Title II in a monopoly exchange access market and the Title II light touch applied by the FCC in other telecom service sectors and markets.

### Windstream

Windstream is the nation's fifth largest LEC ISP, with over one million residential high-speed access subscribers. After several years of decline, Windstream's capital expenditures rose dramatically following the FCC's February 2015 vote. Windstream's capital investments were nearly 26 percent higher in the two years following that vote than they were in the two-year period preceding it.

Windstream's increased broadband investments made after Title II's restoration are paying dividends for the company and its customers. In fact, the company saw such an immediate benefit from these increased post-vote investments that it decided to rollout higher speed services even more quickly than it had planned to do so prior to the FCC's vote.<sup>297</sup> In November 2015 Windstream announced "Project Excel," a plan to accelerate the company's ILEC network capacity upgrade plan from targeted completion in 2018 to a 2016 completion date.<sup>298</sup> That project took the percentage of Windstream's locations capable of 25 Mbps and higher from less than 20 percent (at the end of 2014) to 54 percent by the end of first quarter 2017.<sup>299</sup>

Prior to the FCC's vote, none of Windstream's consumer lines were capable of 50 Mbps; yet by the end of 2016, 26 percent could transmit data above this threshold, with 13 percent capable of downstream speeds above 75 Mbps.<sup>300</sup> Windstream's vectored DSL and fiber upgrades came quickly, with the company reporting that it had rolled out 50-plus megabit services to one million locations during the last 3 months of 2015 alone.<sup>301</sup> The company also began rolling out gigabit fiber services during the first half of 2016,<sup>302</sup> yet another sign that the

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<sup>297</sup> See, e.g., Comments of Tony Thomas, CEO, Windstream Holdings Inc., Q3 2015 Earnings Call (Nov. 5, 2015) ("Project Excel [] accelerates our plans to upgrade and modernize the Consumer and ILEC SMB broadband capabilities by year-end 2016, or two years ahead of our previous timeline. This program upgrades our entire fiber-fed DSLAM infrastructure with VDSL2 electronics to enable faster broadband speeds and enhances backhaul to address future capacity demands and improve reliability. As illustrated in the Internet speed availability chart, we made significant improvements to our speed profiles in 2015 and Project Excel will meaningfully advance offerings in 2016. Upon completion, 25 meg speeds will be available to 54 percent of our broadband footprint and 50 meg speeds to 30 percent, which are very competitive offerings in our rural markets. These network upgrades provide a great customer experience, drive higher ARPU and allow us to increase market share.") (emphasis added).

<sup>298</sup> See, e.g., Windstream Holdings Inc., Q3 2015 Earnings Presentation, at 9 (Nov. 5, 2015).

<sup>299</sup> See *id.*; see also Comments of Tony Thomas, CEO, Windstream Holdings Inc., Q4 2017 Earnings Call (Mar. 1, 2017) ("[O]ur operational strategy for ILEC consumer and SMB is to continue to enhance the broadband network and deliver more speed to more people by expanding premium speed availability, deploying additional gig markets and leveraging next-generation broadband technology such as vectoring and G.fast. As you know, Project Excel has been a big driver of increasing Internet speed availability, and once completed in the first quarter we will be able to offer premium Internet speeds of 25 meg or higher to over half of our footprint. Our focus will then transition to activating more customers and increasing our penetration where we have implemented premium broadband speeds. Currently 89 percent of our existing customer base subscribes to Internet speeds of less than 25 meg. With the increased availability of premium broadband speeds we have a significant opportunity to migrate customers to faster speeds which will reduce churn and improve the customer experience. This will position Windstream to take market share and grow revenue and contribution margin.")

<sup>300</sup> See, e.g., Windstream Holdings Inc., Q4 2016 Earnings Presentation, at 7 (Mar. 1, 2017).

<sup>301</sup> See Comments of Tony Thomas, CEO, Windstream Holdings Inc., Q4 2015 Earnings Call (Feb. 25, 2016) ("In 2016, we will benefit from the deployment of 50, 75 and 100 megabyte premium speeds, which were rolled out during the fourth quarter of 2015, to approximately one million locations.")

<sup>302</sup> See *id.* ("We will also continue to expand the availability of premium speeds throughout 2016 via Project Excel, which enhances backhaul capabilities in the middle mile to support current and future capacity demands and greatly improve broadband speed across all of our speed tiers. At the end of 2016, we estimate that 25 megabyte Internet service will be available to 54 percent of our broadband footprint and 50 megabytes to 30 percent. These are very competitive speeds in our rural markets. In addition, we are launching one gig service in four markets in the first half of 2016 and continue to")

FCC's Open Internet vote had no negative impact on even Windstream, an ISP that faces severe geographic service territory challenges and competitive challenges too for its legacy telco broadband deployment efforts.

With the capital-intensive portion of these upgrades largely complete (*i.e.*, the fiber deployment portion),<sup>303</sup> Windstream's capital expenditures are expected to decline during 2017.<sup>304</sup> But now that such a large portion of the company's network is (in Windstream's words) "future proof," this doesn't mean capacity upgrades won't continue.<sup>305</sup> This is something that anti-Title II propagandists often fail to acknowledge: broadband network capacity is a function not only of the quality of the line running between a node and the customer's location, but also of the electronics powering that line on both ends.

Cable companies have gone from offering single-digit megabits per second services to offering multi-gigabits per second services, simply by deploying new headend equipment and customer modems with no line upgrades necessary for much of this speed upgrade. LECs don't quite have this luxury, but once they shorten local loop lengths by pushing fiber into neighborhoods, they are able to use newer technologies like vectoring to take downstream speeds from single-digit megabits per second to more than 100 Mbps. The incremental costs of electronics upgrades are far lower than the incremental costs of fiber deployment.<sup>306</sup> In other words, speeds can go up – way up – even when capex goes down. ISPs can and do take advantage of what they've already invested in prior years. This is why fixating solely on changes in aggregate capex is a terrible way of measuring progress.

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expand the availability of our IPTV service. The network will further benefit from CAF investments which will support and expand broadband to an additional 470,000 locations. Collectively, these programs significantly enhance our broadband capabilities, improve our competitiveness and position us to grow consumer and SMB ILEC revenue and contribution margin." (emphasis added).

<sup>303</sup> See Comments of Bob Gunderman, CFO, Windstream Holdings Inc., Q4 2015 Earnings Call (Feb. 25, 2016) ("If you look further out, one of the things that we're doing obviously, with Project Excel is to accelerate the investment into the consumer and ILEC SMB broadband network. We'll address all of our fiber fed DSLAMs by the end of this year. Once that is done, it is done. We really have pulled in those investments from a multi-year period into 2016. . . . And after that, we really don't see that being a continuing need in the business. We'll have a more moderated capacity and expansion capex need on the consumer and ILEC SMB networks. We are really accelerating a lot of things to both put ourselves in a better competitive position and certainly drive some better financial results.") (emphases added).

<sup>304</sup> See Comments of Bob Gunderman, CFO, Windstream Holdings Inc., Q4 2016 Earnings Call (Mar. 1, 2017) ("At the midpoint of our capex guidance we are targeting total adjusted capex of \$815 million as we pursue strategic initiatives to advance our high-speed Internet capabilities, strategically expand the wholesale network, enhance overall network performance and reduce network operating expenses. . . . We came out of 2016 with really a lot of the physical plant builds in the field complete. And so now in first quarter we are really going through and finishing off some of what we call the test and turn-up activities and really making a big push with our vendor partners to get that completed in first quarter. So still tracking well there. Obviously, once those activities get done you would expect to have additional speed to sell to our consumer customers and ILEC SMB in some cases. So where that capex actually lands in terms of completion we could see some of it bleed over into 2Q as the vendor invoices come in. But we are excited about getting that wrapped up real soon, and that team is pushing really hard to really finish that off and get an even greater set of speed capabilities into the hands of our customers.") (emphasis added); see also Comments of Bob Gunderman, CFO, Windstream Holdings Inc., Q3 2016 Windstream Holdings Inc. Earnings Call (Nov. 7, 2016) ("As a reminder, if you look ahead, past 2017, we've consistently said that we would expect our organic capex to start to come down, really, based upon the wrap-up of some of our legacy IT integration projects, and as well as some of the wholesale projects starting to subside in terms of capex intensity.").

<sup>305</sup> See Comments of Tony Thomas, CEO, Windstream Holdings Inc., Q4 2016 Earnings Call (Mar. 1, 2017) ("And I think as you look forward in terms of capital intensity I think we feel comfortable where we've been. Obviously, one of the benefits of doing Project Excel was creating a scalable Internet infrastructure. So every fiber-fed node on the backend of Project Excel in our network will be a fully scalable Ethernet architecture, and that's a big advancement. Not only do we get the increased speed capability, we future proof the network.") (emphasis added).

<sup>306</sup> See, e.g., Comments of Tony Thomas, CEO, Windstream Holdings Inc., Q3 2015 Earnings Call (Nov. 5, 2015) ("[T]o just reinforce, these are network elements that we have today that already have fiber to them. So all we're doing is updating the electronics. That is what makes this such a compelling rate of return and opportunity we have, is we have already done the hard work of digging the ditch and laying the fiber. Now we're simply placing electronics there.") (emphasis added).

Finally, yet again and for yet another company, the topics of Title II and the FCC's *Open Internet Order* never came up on any of Windstream's post-vote quarterly investor calls. As with other smaller ILECs, mentions of FCC policy on these calls almost exclusively focused on the Connect America Fund. This yet another strong indicator of the total lack of material impact on – let alone harm to – ISP investment from Title II's restoration.

### Cincinnati Bell

Cincinnati Bell has been busy over the past few years deploying its “Fioptics” fiber-to-the-home service, and is close to its original goal of 70 percent coverage.<sup>307</sup> And though the company thought that its capital investment for 2015 would be its peak, the 2016 total was even higher,<sup>308</sup> despite 2015 itself having exceeded the company's pre-FCC vote guidance.<sup>309</sup> Cincinnati Bell's combined capital expenditures were more than 50 percent higher for the two years following the FCC's *Open Internet Order* vote than for the two years preceding it.

In 2014, the year before the FCC's February 2015 vote, Cincinnati Bell spent \$50 million to pass 59,000 additional locations with fiber.<sup>310</sup> In 2015, the company allocated 74 percent more than that (\$87 million) to deploy fiber to an additional 97,000 locations – far exceeding its target of 66,500 new passings for that year.<sup>311</sup>

And even though it had expected total capex to decline in 2016, that year the company spent an even higher amount (\$90 million) than it did in 2015 to pass even more (101,000) locations with fiber than it did in 2015, signing up a record number of new Fioptics customers.<sup>312</sup> The company's executives have publicly stated that declining deployment costs<sup>313</sup> and strong demand give it “confidence to accelerate [ ] fiber investments.”<sup>314</sup>

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<sup>307</sup> At the end of 2014, Fioptics was available to 335,000 addresses, or 41 percent of Cincinnati Bell's market. As of the end of 2016, the service is available to 533,400 addresses, or 67 percent of “greater Cincinnati.” *See, e.g.*, Presentation made by Cincinnati Bell Inc. at the Morgan Stanley Technology, Media & Telecom Conference (Mar. 2, 2017); Comments of Ted Torbeck, President & CEO, Cincinnati Bell Inc., Q4 2014 Earnings Call (Feb. 19, 2015) (“Our Fioptics suite of products is currently available to more than 40 percent of greater Cincinnati and we plan to expand that coverage to between 70 percent and 80 percent over the next few years.”).

<sup>308</sup> *See* Comments of Leigh Fox, CFO, Cincinnati Bell Inc., Q4 2015 Earnings Call (Feb. 18, 2016) (“In total, we expect [ ] capital expenditures to be down compared [to] 2015 and range between \$265 million and \$275 million. . . . [In 2016] we expect capex to begin declining. We stated in the past that on a normalized basis, capex is going to be . . . in the historic . . . 12 percent ranges of revenue, historic telco ranges. I don't see any different story right now as we sit here and look forward into 2017. We do believe we will be cash flow positive in 2017. We will make progress in 2016 compared to 2015 so you will see improvement in cash flow from 2015 to 2016. We won't be positive but we will be positive in 2017. I would expect ranges to be the normal telco ranges of capital spend. . . . It's not going to be – 2017 won't look like a normalized year. We will still be building out. We've said that the build will stretch into 2017. We will see a reduction. At this point, I don't want to go beyond that. We are intently focused on cash flow, being cash flow positive in 2017 so I can sit here and say we do see that in front of us but I don't want to get too detailed on the commitment on capital levels yet.”).

<sup>309</sup> *See* Comments of Leigh Fox, CFO, Cincinnati Bell Inc., Q4 2014 Earnings Call (Feb. 19, 2015) (“In total, 2015 capital expenditures are expected to be in the range between \$270 million and \$280 million.”).

<sup>310</sup> *See id.* (“In 2014, we invested \$50 million on the construction of Fioptics passing 59,000 addresses.”).

<sup>311</sup> *See* Comments of Leigh Fox, CFO, Cincinnati Bell Inc., Q4 2015 Earnings Call, Feb. 18, 2016 (“[C]apital expenditures for 2015 total \$180 million for Fioptics . . . . Specific to our Fioptics investment, the Company invested \$87 million to pass 97,000 new addresses during the year. [O]ur goal is to construct a fiber-to-the-home product for 95 percent of the 70,000 new addresses targeted to pass in 2016.”).

<sup>312</sup> *See* Comments of Ted Torbeck, President & CEO, Cincinnati Bell Inc., Q4 2016 Earnings Call (Feb. 15, 2017) (“[C]apital expenditures were \$286 million for the year as we ramped up investments significantly in the fourth quarter to capitalize on the continued strong demand for Fioptics. In total, we invested \$180 million in Fioptics during 2016. Construction costs to pass 101,000 new addresses accounted for \$90 million of the investment . . . as we experienced a record-high 44,000 Fioptics Internet activations – net activations. We also invested \$62 million for success-based fiber builds for business and managed service projects.”).

<sup>313</sup> *See id.* (Comments of Andy Kaiser, Chief Financial Officer) (“So for 2016, that number was around \$850 from a cost-to-pass perspective. And I believe Ted mentioned that was probably 10 percent, 15 percent better than what we had

Given Cincinnati Bell's massive increases in investment and fiber deployment following the FCC's Open Internet vote, it is not surprising that the topic of Title II never came up on any of the company's quarterly investor calls after that February 2015 vote. The closest it came was the company's Q2 2016 earnings call, when it was asked about the impact of the Open Internet rules on Cincinnati Bell's ability to implement "two tier pricing." CFO Leigh Fox responded, "there is really no impact on how we think about pricing in net neutrality right now[;] the way that[ ] our network[s] architected[ , it] is a non-issue, non-event."<sup>315</sup>

### Consolidated Communications

Consolidated Communications is a LEC with operations in portions of 11 states. The company has just under 500,000 high-speed Internet access subscribers and 100,000 pay-TV customers. It has grown significantly over the past decade, with its most recent acquisitions including a 2014 purchase of Eventis and a mid-2016 purchase of Champaign Telephone Company. In December 2016, Consolidated announced it would acquire FairPoint Communications in an all-stock transaction. This deal would double Consolidated's revenues and make it the nation's 6th largest publicly traded ILEC ISP, behind Windstream.

Consolidated Communication's capital investments increased during the two years following the FCC's Open Internet vote (increasing in 2015, then declining in 2016). This as-reported increase came during a period in which the company made acquisitions (the Eventis and Champaign deals mentioned above) and divestitures too (Iowa ILEC assets, along with Consolidated's equipment and services business).<sup>316</sup>

Though Consolidated did not report *pro forma* results, we estimate that the company's capex (including capital expenditures by pre-merger Eventis and accounting for these subsequent divestments) was essentially flat for the 2015–2016 period when compared to the 2013–2014 period. Given the secular declines in investment seen at most ILECs, this result is par for the course. Consolidated's post-FCC vote capital expenditures also exceeded the company's pre-vote guidance.<sup>317</sup>

Though Consolidated's *pro forma* capital investments are essentially flat over several years, the company is still aggressively investing in fiber optic infrastructure deployment. This fiber expansion began before the FCC's

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anticipated. So we continue to see opportunities to build out at a significantly reduced cost relative to what we had anticipated. From a CapEx per install, we are around the \$900 range. We continue to see – and we were having a discussion earlier this morning where pieces of that install are coming down in price. But what we saw in 2016 was around \$800-\$900 per install.”)

<sup>314</sup> See, e.g., Comments of Ted Torbeck, President & CEO, Cincinnati Bell Inc., Q4 2014 Earnings Call (Feb. 19, 2015) (“Our goal is to get our fiber products in the hands of as many consumers as soon as possible. The ongoing success of Fioptrics combined with our unique market opportunity gives us the confidence to accelerate our fiber investments.”); see also Comments of Ted Torbeck, President & CEO, Cincinnati Bell Inc., Q4 2015 Earnings Call (Feb. 18, 2016) (“On the penetration, year one, when we add fiber to the home, we get about 36 percent on high-speed internet and on video we get about 25 percent. Second year, we get 33 percent and 24 percent. So that’s kind of what we are seeing. In fiber then, the node’s a little less than that. That’s why we’re accelerating the fiber to the home. It’s significantly higher. Year three, we are up in 40 percent in high speed and close to 30 percent in video.”).

<sup>315</sup> See Comments of Leigh Fox, CFO, Cincinnati Bell Inc., Q2 2016 Earnings Call (Aug. 4, 2016).

<sup>316</sup> See Comments of Bob Udell, President & CEO, Consolidated Communications Holdings Inc., Q4 2016 Earnings Call (Feb. 23, 2017) (“We also took steps in 2016 to refine and focus on our core strategy by completing two divestitures. First we sold our rural Iowa ILEC property last August. These communities will be better served by adjacent incumbents who acquired the assets, allowing us to allocate our capital dollars to best support our broadband strategy in [ ] markets with higher returns. Second, we completed the divestiture of our equipment and services business in December, which allows us to concentrate on our network-based business and broadband services.”).

<sup>317</sup> See Comments of Steve Childers, SVP & CFO, Consolidated Communications Holdings Inc., Q4 2014 Earnings Call (Feb. 26, 2015) (“Now, let me discuss our 2015 guidance as compared with the pro forma results for 2014. Capital expenditures are expected to be in a range [of] \$122 million to \$129 million.”). Actual 2015 capex was \$133.9 million.

vote<sup>318</sup> and continued thereafter.<sup>319</sup> Following that vote, Consolidated continued to offer its residential customers higher-capacity service, and an increasing proportion of them subscribe to 100 Mbps and 1 gigabit plans.<sup>320</sup>

The topic of the impact of Title II and the FCC's Open Internet rules did not come up in any of Consolidated's investor calls following the February 2015 FCC vote. The company was asked about it on its Q4 2014 investor call, held the same day as the FCC's vote. Consolidated's CEO Bob Udell made it quite clear that the regulatory framework was of no concern, telling analysts "regarding the Title II, this discussion is actually interesting internally, and the way we look at this is really along the lines of having lived with Title II for our existence. We're familiar with it, we understand it, would prefer to have less regulation, but in some ways this levels the playing field. And so, Title II regulation really is more of an issue for cable competitors to get used to and we're anxious like everyone else to see how significantly the move is by the FCC to impose reporting requirements and things that largely we're familiar with already."<sup>321</sup> Judging by the disappearance of this issue from subsequent calls, it's clear that this anxiousness disappeared as it became clear that the FCC's policy was a highly deregulatory framework preserving the status quo.

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<sup>318</sup> See Comments of Bob Udell, President & CEO, Consolidated Communications Holdings Inc., Q4 2014 Earnings Call (Feb. 26, 2015) ("The success and demand we see for these services will drive continued investment in our fiber network and expansion into additional markets during 2015. Some of the expansion will come from commercial business plans and others will be initially driven by winning new fiber-to-the cell sites. The positive results from our expansion efforts during 2014 paved the way for us to do more in the future, all of which will be accomplished within our capex guidance.").

<sup>319</sup> See Comments of Steve Childers, SVP & CFO, Consolidated Communications Holdings Inc., Q4 2016 Earnings Call (Feb. 23, 2017) ("We have flexibility in our capital plans with two-thirds tied to success-based opportunities with a continued focus on fiber deployment, and our capital investments have to meet our internal paybacks and returns . . . . And we expect capital expenditures [for 2017] to be in the range of \$115 million to \$120 million.") (emphasis added).

<sup>320</sup> See, e.g., Comments of Bob Udell, President & CEO, Consolidated Communications Holdings Inc., Q2 2015 Earnings Call (Aug. 6, 2015) ("On the consumer side, we continue to increase broadband speed offerings, where 50 percent of our marketable homes can now receive 100 megabytes or more and we can deliver 1 gig to portions of all of our major markets. Consumers taking 20 megabytes or more have increased from 9 percent last year in the second quarter to 22 percent this year."); see also Comments of Bob Udell, President & CEO, Consolidated Communications Holdings Inc., Q4 2015 Earnings Call (Feb. 25, 2016) ("Well, we're not giving prospective guidance on that, but let me do it this way and talk about what we've accomplished 2014 to 2015, and I think it might be representative. We've got roughly 89 percent of our market that can get the 20-meg product, and in terms of the 100-meg product in actual homes passed, we have roughly 42 percent of our addressable market that can take that product and receive it. That's up from 31 percent in 2014, so you can see we've continued to expand our capability and backbone network ability to support those capacity adds."); Comments of Bob Udell, President & CEO, Consolidated Communications Holdings Inc., Q4 2016 Earnings Call (Feb. 23, 2017) ("We now offer over 90 percent of our marketable homes a broadband connection of 20 meg per second or higher and 42 percent can receive our 100 meg product. The number of customers subscribing to our 1-gig speed offering has more than doubled in the last year. And the demands for higher speeds will continue and our network, our service, and our support are key differentiators.").

<sup>321</sup> See Comments of Bob Udell, President & CEO, Consolidated Communications Holdings Inc., Q4 2014 Earnings Call (Feb. 26, 2015) (emphasis added).

## FairPoint Communications

FairPoint's 2015 capital spending was down slightly from 2014, something the company told investors to expect in its fourth quarter 2014 earnings release.<sup>322</sup> FairPoint explained that this slight decline was due to "the flow of our business as we have completed major build out."<sup>323</sup> FairPoint's 2016 capex rose slightly above that 2015 level, the first increase at the company since 2010, and in line with the guidance given a year prior.<sup>324</sup>

FairPoint's decline in capital investment from 2014 to 2015 is not in any way an impact from Title II's restoration or the Net Neutrality rules. The company – like all ILECs – finds its legacy core business in a long-term, secular decline. In fact, the 2.8 percent drop in capex from 2014 to 2015 was the smallest percentage point decrease in nearly a decade straight of annual capex declines at FairPoint.<sup>325</sup>

FairPoint's capital expenditures peaked in 2008, following its purchase of certain Verizon landline assets, and they have been in a relative steady decline ever since, even as the company has continued to make targeted investments in growth capital in addition to maintenance capital. There's no mystery as to what's been happening at FairPoint: it is a mid-sized ILEC that's been clinging to a 20th century monopoly mindset; and, in fairness, unable to do much in the face of its cable competitors' natural monopoly and cost advantages. Like many other ISPs, Frontier's approach to capital investments is largely driven by a need to balance opportunities for growth against its desire to keep capital intensity in the low- to mid-teens in order to maintain EBITDA in line with analyst expectations. By the company's own admission, its investment ups-and-downs are driven more by expectations of future FCC Universal Service Fund receipts than by concerns about regulation.<sup>326</sup>

In December 2016, Consolidated Communications announced plans to acquire FairPoint in a pure stock transaction. That could impact short-term capital spending at both companies and (if consummated) would create a synergy-related capex decline at the combined firm.<sup>327</sup>

As usual in our exhaustive review, there were no mentions (prompted or unprompted) of Title II or the Open Internet rules on FairPoint's investor calls following the FCC's February 2015 vote. There was, however, ample discussion of FCC subsidies and the impact of the Commission's Connect America Fund policy on the company's investments. Clearly, Title II authority was not of concern for FairPoint or the financial analysts whose job it is to worry about every possible factor impacting FairPoint's cash flows.

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<sup>322</sup> See FairPoint Communications Inc., 2014 Earnings Release (Mar. 4, 2015) ("In addition [for 2015] . . . annual capital expenditures are expected to be less than \$120 million.").

<sup>323</sup> See Comments of Ajay Sabherwal, Chief Financial Officer, FairPoint Communications Inc., Q4 2014 Earnings Call (Mar. 4, 2015) ("So the CapEx one is the easier one, Mike. No, that is the flow of our business as we have completed major build out. Our greatest asset is our network, so that is already in place. There is a natural progression of that capital spending and we are getting much better at managing that spending as well, so I wouldn't attribute it directly to this particular labor negotiation.") (emphasis added).

<sup>324</sup> See FairPoint Communications Inc., 2015 Earnings Release (Mar. 2, 2016) ("For full year 2016 . . . annual capital expenditures are expected to be \$115 million to \$120 million.").

<sup>325</sup> FairPoint's annual capital expenditures for 2005–2016 were as follows (in millions): \$28, \$32.3, \$149.5, \$297, \$178.8, \$197.8, \$176.1, \$145.1, \$128.3, \$119.5, \$116.2, \$117.

<sup>326</sup> See, e.g., Comments of Paul Sunu, CEO, FairPoint Communications Inc., Q4 2015 Earnings Call (Mar. 2, 2016) ("In addition, our August acceptance of CAF II provides financial support to extend the network to certain un-served and underserved locations in our service areas. Using our outstanding complex project management platform, we are confident we have the wherewithal to complete this six-year project on time and on budget. And, in the near term, we expect to meet or exceed the FCC's 2017 year-end mandate of 40 percent completion. Overall, we expect to be able to maintain our capex level in the low teens as a percentage of total revenue while we deliver this needed bandwidth to these high-cost and hard-to-reach locations.").

<sup>327</sup> See FairPoint Communications Inc., 2016 Earnings Release (Mar. 6, 2017) ("For full year 2017 . . . annual capital expenditures are expected to be \$110 million to \$115 million.").



## Shenandoah Telecommunications Company

Shenandoah Telecommunications Company (“Shentel”) is a small but rapidly growing telecom company with LEC, MSO, and mobile wireless segments. The company serves mostly exurban and rural service territories in Virginia, West Virginia, Pennsylvania, Maryland, Kentucky, and Ohio. Shentel’s as-reported capital expenditures during 2015 were slightly higher than its 2014 investments. Its expenditures were massively higher again in 2016, but due in part to the May 2016 closing of its acquisition of wireless carrier nTelos.<sup>328</sup> On a *pro forma* basis, Shentel’s two-year post-FCC vote capex was slightly higher than it was for the two years preceding the vote, with 2016’s investments a peak year for the company on a *pro forma* basis. This uptick in investment comes just a few years after another, earlier period of elevated capex during 2011–2013,<sup>329</sup> illustrating the cyclical nature of spending – particularly at an ISP with diversified wireline, cable, and wireless operations.

Based on its recent public statements, it appears that Shentel’s capital expenditures will decline during 2017, because the company completed a large portion of its upgrade plans in 2016. But even with that pending predicted decline, Shentel has made clear that going forward the “biggest item in both the cable and wireline budgets is for the expansion of our fiber network.”<sup>330</sup> These continued capacity upgrades are benefiting the company’s bottom line and benefiting Shentel’s customers too, the overwhelming majority of whom can receive 100 Mbps and faster services even in these less densely populated areas. These higher-speed wired offerings were launched after the FCC’s vote – yet another indicator that Title II had no negative impact on broadband market progress.<sup>331</sup> Based on these results it is not surprising that the topics of Title II and the *Open Internet Order* were not raised or mentioned on any of Shentel’s investor calls following the FCC’s 2015 vote.

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<sup>328</sup> See Comments of Earle MacKenzie, EVP & COO, Shenandoah Telecommunications Company, Q4 2015 Earnings Call (Feb. 26, 2016) (“The 2016 capital plan includes \$123.3 million that we now plan to spend in the nTelos service area, as we finish the LTE upgrade, and 50 new coverage sites. Omitting the \$123 million for nTelos, the remaining CapEx plan is \$95.1 million, an increase over our previous two years, due to approximately \$36 million of non-nTelos expenditures for network expansion. The major projects of the upgrade [are] the Colane Cable, a fiber build along Interstate 81 in Virginia from Harrisonburg to Roanoke, and plans to continue to build fiber to the tower.”).

<sup>329</sup> See Comments of Christopher Finch, President & CEO, Shenandoah Telecommunications Company, Q4 2014 Earnings Call (Feb. 27, 2015) (“The major investments we made to upgrade our wireless network to 4G capabilities and to improve our cable network are paying off as we can now deliver the combination of high-speed, reliability and overall quality typically found in larger metropolitan areas. On the Wireless side of our business, our 4G upgrade has enabled us to meet the growing consumer demand for consistent coverage in any location. On the Cable side, our improved network meets customer demand for high-speed broadband and access to premium television packages. We have aggressively marketed our enhanced service offerings with the result of attracting new customers and signing up existing customers for expanded services. With the system upgrades completed, our capital expenditures have decreased, resulting in higher free cash flow.” (emphasis added).

<sup>330</sup> See Comments of Earle MacKenzie, EVP & COO, Shenandoah Telecommunications Company, Q4 2016 Earnings Call (Mar. 20, 2017) (“We are projecting 2017 [actual capex] at \$152.3 million, with 57 percent going towards completion of the upgrade of the nTelos network and the expansion of the coverage. The biggest item in both the cable and wireline budgets is for the expansion of our fiber network.”) (emphasis added).

<sup>331</sup> See Comments of Earle MacKenzie, EVP & COO, Shenandoah Telecommunications Company, Q4 2015 Earnings Call (Feb. 26, 2016) (“We also launched broadband speeds of 15 megabytes to 101 megabytes on our cable network, which overlaps approximately two-thirds of the homes passed in our regulated home service area.”).

## Hawaiian Telcom

Hawaiian Telcom is an ILEC formed in 2005 when Verizon spun off its assets in Hawaii. As a company serving a geographically isolated location, Hawaiian Telcom faces even more challenges than those typically confronting ILECs in an era of cable company ascent. To remain competitive and grow its business, Hawaiian Telcom has made infrastructure deployment and investment a top priority.

After peaking in 2009, Hawaiian Telcom's capital investments declined for three straight years. In late 2011, however, the company began a six-year fiber deployment project to help it compete directly with the triple-play offerings of its primary competitor (Time Warner Cable) and help it meet the increased backhaul bandwidth demands of cellular companies.<sup>332</sup> This fiber project resulted in sustained capital investment that started in 2013 and continues to this day, even as the company completed its 6-year targeted consumer fiber build plan.<sup>333</sup>

The company's elevated capital spending continued after the FCC's 2015 vote. Capex was up nearly 8 percent in the two years since the FCC adopted Title II-based Net Neutrality rules, compared to the two years preceding that decision. The company's capital investments during the year following the FCC's vote were the highest in its history, exceeding its investor guidance given two weeks after the vote.<sup>334</sup> Hawaiian Telcom began offering gigabit fiber-to-the-home service in the months just after the FCC restored Title II classification.<sup>335</sup>

Hawaiian Telcom's 2016 capex was slightly down from that 2015 highpoint,<sup>336</sup> and it has told investors to expect a further drop during 2017. This is not due to any concerns about the regulatory or economic climate, but simply because Hawaiian Telcom has largely finished deploying fiber throughout its footprint, and thus "growth" capex will decline while "maintenance" capex will remain flat.<sup>337</sup>

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<sup>332</sup> See Comments of Bob Reich, SVP & CFO, Hawaiian Telcom Holdco Inc., Q4 2014 Earnings Call (Mar. 12, 2015) ("Reported capex was \$96.7 million for the full-year 2014, up from \$86.3 million in 2013. The year-over-year increase was largely attributable to success-based spending related to the fiber-to-the-tower initiatives, costs associated with consolidating and virtualizing internal data centers, and increased success-based spending related to the growth and video subscribers, with more of our new subscribers being fiber-to-the-premise. As we've discussed on prior calls, the pace of the fiber-to-the-tower builds accelerated throughout 2014 at the request of our carrier customers. We ended the year completing 122 sites, more than double the 59 sites we completed in 2013. In addition, we've done the outside plant work on an additional 39 sites so we've already spent most of the required capital. We haven't included these sites in our year-end completed count, because additional customer work was required to make these sites Ethernet ready.").

<sup>333</sup> See Comments of Scott Barber, CEO, Hawaiian Telcom Holdco Inc., Q4 2016 Earnings Call (Mar. 14, 2017) ("Hawaiian Telcom TV and our fiber internet is now available to 202,000 homes on Oahu. And as I shared with you on our last call, this officially brings our targeted consumer fiber build program to its conclusion. Any incremental build going forward will be success-based when we have signed bulk MDU contracts or for Greenfield homes.") (emphasis added).

<sup>334</sup> See *id.* ("Our capital program in 2015 is expected to be consistent with 2014 levels, as we continue to expand the reach of our next-generation fiber network and deploy success-based capital to support the subscriber growth of Hawaiian Telcom TV.").

<sup>335</sup> See Comments of Scott Barber, CEO, Hawaiian Telcom Holdco Inc., Q4 2015 Earnings Call (Mar. 8, 2016) ("I'm also proud of a number of achievements we were able to deliver in all of our customer channels in 2015. Hawaiian Telcom became the home of Hawaii's fastest Internet service when we launched our 1 gigabit Internet product in mid year.").

<sup>336</sup> See Comments of Dan Bessey CFO, Hawaiian Telcom Holdco Inc., Q4 2015 Earnings Call (Mar. 8, 2016) ("Reported capex was \$99 million for the full year 2015, up from \$96.7 million in 2014. The year-over-year increase in growth capex was largely attributable to success-based spending to support the growth of our next-generation services, including the spending to provision high-capacity circuits for the large government agency contract mentioned earlier. This increase in growth capex is offset by a decrease in maintenance capex. . . . Our capital program in 2016 is expected to be consistent with 2015 levels as we continue to focus on efficiently expanding our next-generation fiber network. We plan to enable 10,000 to 15,000 single family homes and MDU you units on Oahu this year, thus reflecting a shift towards more success-based marketable homes.") (emphasis added).

<sup>337</sup> See Comments of Dan Bessey CFO, Hawaiian Telcom Holdco Inc., Q4 2016 Earnings Call (Mar. 14, 2017) ("Capex was \$97.8 million for the full year 2016, a decrease of \$1.2 million compared to 2015. The year-over-year decrease

Like many other ISPs reaching the end of a fiber-upgrade cycle, Hawaiian Telcom is entering a “harvest” mode where it reaps higher earnings from the increased business enabled by prior upgrades, even as operating and capital requirements decline.<sup>338</sup>

It’s instructive to examine how the quality of Hawaiian Telcom’s available infrastructure has changed in recent years, since total capex alone is a poor metric for measuring such developments. Prior to the FCC’s Open Internet vote, Hawaiian Telcom passed 160,000 locations with its IPTV service, and 92,000 of these were FTTH-enabled.<sup>339</sup> One year after the FCC’s Title II restoration, the company’s progress continued unabated, with 190,000 IPTV passings and 114,000 gigabit FTTH-enabled locations – with promises for additional upgrades to enable higher speeds on DSL too.<sup>340</sup> By the end of 2016, with completion of its 6-year fiber deployment plan, the company’s IPTV passings totaled 202,000 and FTTH-enabled locations exceeded 127,000.<sup>341</sup>

Finally, we note that the topics of Title II and the FCC’s *Open Internet Order* were not mentioned on any of Hawaiian Telcom’s investor calls following the FCC’s February 2015 vote.

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was from lower growth capex, partially offset by higher maintenance capex due to investments in fleet and plant modernization to improve the reliability of our copper network. For 2017, our total level of capital expenditures is expected to be in the high \$80 million range. Maintenance capex for 2017 is expected to remain consistent with 2016 levels as we continue to optimize and modernize our copper plant to reduce future maintenance costs and improve customer service. Program capex consists of investments in our core network and IT infrastructure that provide the platform for future growth. Our consumer fiber build, CAF, [and] fiber-to-the-business initiative . . . are all included in this category. In 2016 we spent \$9 million on our targeted consumer home fiber build, which is now concluded, so we expect a similar [ ] drop . . . in our total program capex for 2017. . . . For 2017 we expect our total growth capex category to be consistent with 2016 levels as demand for our next generation IP-based services continue[s] to grow across all three customer channels. If we exclude trans-Pac related payments, our total capex expenditures have consistently declined year-over-year for the last few years from a high \$90 million level in 2014 to a mid \$80 million level in 2016. And we will continue to reduce further this year as we have completed our targeted consumer fiber build.”) (emphases added).

<sup>338</sup> See *id.* (Comments of Scott Barber, CEO) (“Overall, I’m pleased with our 2016 results and the progress we’ve made in executing our four core strategies: to invest in our network and systems, grow the business, deliver superior service and improve financial performance. Over the last six years we have made robust investments to expand our fiber network and upgrade our systems. . . . This consistent increase in strategic revenue is directly attributable to our fiber investment which has enabled new products and services and offset declines in legacy services revenues.”) (emphasis added).

<sup>339</sup> See Comments of Eric Yeaman, Hawaiian Telcom Holdco Inc., Q4 2014 Earnings Call (Mar. 12, 2015) (“In terms of footprint, we enabled 8,000 households in the quarter, expanding our service footprint to 160,000 households enabled. It’s notable that 57.5 percent of those households are capable of directly connecting to our next-generation fiber network, which is up from 44 percent at the end of 2013.”).

<sup>340</sup> See Comments of Scott Barber, CEO, Hawaiian Telcom Holdco Inc., Q4 2015 Earnings Call (Mar. 8, 2016) (“In terms of footprint, at the end of the year 60 percent of our 190,000 next-generation households enabled on Oahu are capable of utilizing fiber-to-the-home technology, enabling the market-leading 1 gigabit Internet speed. We continue to see excellent Internet take rates in our fiber footprint and are looking to deploy technologies in the near future to increase Internet speed over existing copper network.”) (emphasis added).

<sup>341</sup> See Hawaiian Telcom Holdco Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016 (“During the fourth quarter, 1,000 additional households were fiber-enabled, increasing the total number . . . to 202,000 with 63 percent of those households capable of utilizing fiber-to-the-premise technology. This brings the Company’s targeted consumer fiber build program to its conclusion.”).

## Alaska Communications Systems

Alaska Communications Systems (“ACS”) is a wireline carrier primarily serving business and wholesale customers in Alaska. ACS divested its wireless assets to GCI during a series of transactions beginning in 2013. These divestitures are part of the reason ACS’s capital investments declined in recent years. (Its capex peaked in 2008). ACS’s recent capex decline is also due to the company’s completion of major fiber system deployments that have future-proofed the company’s operations and reduced its annual need for new investments.<sup>342</sup>

As its CEO told investors a week after the FCC’s 2015 vote: “Six years ago, we made a substantial \$200 million investment in our [submarine] cables and in-state long-haul fiber network. Since then, we’ve continued to strengthen our last mile access network. A lot of our growth today derives from these investments.”<sup>343</sup>

Though ACS’s exit from the wireless business and its completion of prior projects led to a decline in capex in recent years, the company’s post-vote capex exceeded guidance given at the time of the vote.<sup>344</sup> ACS continues to expand its fiber systems,<sup>345</sup> which benefits the company’s more than 30,000 high-speed internet access service customers. After reclassification, ACS increased its entry-level offering to 10 Mbps downstream, and increased the percentage of its customers on 10 Mbps and higher tiers from 25 percent in May 2015 to 50 percent in May 2016.<sup>346</sup> The upgrades are improving ACS’s earnings per customer and reducing churn.<sup>347</sup>

Finally, as for most other ISPs, the topics of Title II and the FCC’s *Open Internet Order* were not raised on any of ACS’s investor calls following the FCC’s February 2015 vote.

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<sup>342</sup> See, e.g., Comments of Anand Vadapalli, President & CEO, Alaska Communications Systems Group, Inc., Q3 2016 Earnings Call (Nov. 2, 2016). In response to a question about its capex decline, which posited that “you’re obviously selling into locations where you’ve already brought fiber to the location, so you don’t need to install the fiber again,” the CEO said “[Y]ou are right, this year the nature of sales opportunities that we got required us to spend less capital than we had originally thought. So this is a little nice surprise for us, a favorable term, and we’ll take it.” *Id.* (emphases added); see also Comments of Laurie Butcher, SVP of Finance, Alaska Communications Systems Group, Inc., Q3 2015 Earnings Call (Nov. 5, 2015) (“We were able to reduce net capital spending coming in at \$30.9 million for the year, primarily due to the nature of customer opportunities in our sales funnel, as well as operational efficiencies around capital governance.”).

<sup>343</sup> See Comments of Anand Vadapalli, President & CEO, Alaska Communications Systems Group, Inc., Q4 2014 Earnings Call (Mar. 5, 2015) (emphasis added).

<sup>344</sup> See *id.* (“[2015] Capital spending is expected to be between \$34 million and \$36 million and we are allocating \$16 million of that to success based capital spending.”). ACS’s 2016 capex also exceeded prior guidance. See Comments of Laurie Butcher, SVP of Finance, Alaska Communications Systems Group, Inc., Q4 2015 Earnings Call (Mar. 3, 2016) (“Starting with 2016 guidance . . . Capital spending is expected to be approximately \$35 million.”). ACS’s 2017 capex guidance indicates a continuation of this slight sequential decline. See Comments of Laurie Butcher, SVP of Finance, Alaska Communications Systems Group, Inc., Q4 2016 Earnings Call (Mar. 14, 2017) (“[C]apital spending [will be] between \$35 million and \$38 million.”).

<sup>345</sup> See, e.g., Comments of Anand Vadapalli, President & CEO, Alaska Communications Systems Group, Inc., Q3 2015 Earnings Call (Nov. 5, 2015) (“Certainly we continue to deploy more fiber behind each one of these opportunities. In fact that is one of the consumers of our success based capital is investing behind these kind of opportunities. So we continue to drive fiber investments and build on those relationships.”) (emphasis added).

<sup>346</sup> See Comments of Anand Vadapalli, President & CEO, Alaska Communications Systems Group, Inc., Q1 2016 Earnings Call (May 9, 2016) (“[I]n terms of the consumer business, we have been focused for the last almost 18 months in increasingly moving to 10 meg or higher services. I think we’ve said in the past that we stopped selling anything less than 10 meg though we have grandfathered existing customers who have lower speeds. Today when I look at the broadband subscriber base on consumer, almost half of our subscribers are 10 meg or higher compared with about a quarter of the customers who were 10 meg or higher a year ago.”) (emphasis added).

<sup>347</sup> See *id.* (“So, we have significantly increased the percentage of the higher-speed customers in our base. That is by design, it helps with ARPU, it helps with churn, it helps to the value proposition that we have in the marketplace.”).

## Otelco

Otelco is a very small, publicly traded rural LEC serving just over 22,000 ISP customers and 3,350 video subscribers in portions of six states. With just under \$70 million in annual revenues (\$15.6 million from internet access), it is by far the smallest publicly traded ISP covered in this report.<sup>348</sup> Like most ILECs, Otelco's core business continues to decline as businesses migrate to less expensive enterprise services and households substitute wireless voice service for traditional landlines. Otelco's annual revenues in 2012 were \$98.4 million, declining to \$68.9 million by 2016. The entirety of these revenue declines comes from the company's traditional voice services business.<sup>349</sup>

Despite these challenges, Otelco's capital investments increased during 2015 and again in 2016, after declining sequentially in previous years since 2011. Otelco's post-vote two-year capital investment total was 10 percent higher than the total for the two years prior to the vote.<sup>350</sup> Otelco's 2017 guidance suggests that this trend of increased investments in the Title II era will continue as the company expands its fiber offerings.<sup>351</sup>

As a small RLEC, Otelco is very used to Title II oversight. Not surprisingly, the topics of Title II and the FCC's *Open Internet Order* were not raised on any of Otelco's investor calls following the FCC's vote. The company did get dozens of questions about the FCC's USF policy changes for rate-of-return carriers and other issues around A-CAM funding during this time, because these factors actually impact Otelco's investments and business prospects.

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<sup>348</sup> See Otelco Inc., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the Fiscal Year Ended December 31, 2016.

<sup>349</sup> Otelco's local service and network access annual revenues (*i.e.*, local voice services and revenues earned from interconnecting with long-distance carriers) declined \$30.179 million from 2012, with its total annual revenues declining by \$29.46 million.

<sup>350</sup> These two years of capex growth came after the company was asked by a shareholder in 2015 if it was "leaving [] opportunities on the table by underinvesting in capex in any way," to which Otelco's CEO replied "no, not at this time." See Comments of Sam Yake, Private Investor, and Rob Souza, President and CEO, Otelco Inc., Q4 2014 Earnings Call (Mar. 3, 2015). Yake said, "I own stock in other companies in the industry and I watch them closely. It seems to me with all due respect that you have the lowest CapEx in the industry and it seems to me like it's a little bit pushing the envelope. And I think you might be leaving some growth opportunities on the table or whatever." Souza said that "I think we've made reasonable capital expenditures not only this past year but in the past. I think we continue to invest in our IP technology including Hosted PBX. We've got the cloud hosting platform where we continue to invest money. As a matter of fact this year we invested \$300,000 in our cloud hosting capability to give us some additional diversity and capacity. So I believe that we're making the correct capital expenditures and I don't believe we're leaving anything on the table."

<sup>351</sup> See Comments of Rob Souza, President and CEO, Otelco Inc., Q4 2016 Earnings Call (Mar. 7, 2017) ("I would imagine the 2017 trend would be similar to 2016. . . . Our primary strategy consists of leveraging our strong incumbent RLEC position, including expanding our fiber network and providing better service and support levels and a broad suite of services, including managed services and hybrid cloud-based hosting.").

## Cellular-Only Internet Service Provider Investment Summaries and Disclosures.

### T-Mobile US Inc.

T-Mobile US Inc. (“T-Mobile”) lagged AT&T and Verizon for its initial 4G network upgrades. But once it found itself flush with cash (from the AT&T/T-Mobile merger break-up fee) and spectrum (from Verizon’s SpectrumCo divestiture), T-Mobile quickly ramped up capital investments in order to deploy nationwide 4G LTE service. T-Mobile’s two-year post-vote capital investments (for 2015 and 2016) were 13 percent higher than they were during the two years preceding that vote (2013 and 2014). In fact, the company’s post-vote capital spending exceeded the guidance given to investors ahead of the FCC’s Title II reclassification.<sup>352</sup> During the two years since the FCC’s vote, T-Mobile has increased its 4G LTE coverage from 265 million persons at the end of 2014 to 314 million at the end of 2016.<sup>353</sup> It also increased the number of markets with wideband LTE four-fold during those two years, ending 2016 with 252 million persons now able to access this higher-capacity 4G LTE service.<sup>354</sup> T-Mobile told investors its capital spending will remain elevated, even as it completes its initial upgrade plans.<sup>355</sup>

There were no mentions of Title II or the FCC’s Net Neutrality rules on any of T-Mobile’s quarterly investor calls following the February 2015 vote. On eve of that vote, T-Mobile’s CEO John Legere said, “I’m comfortable that if passed as we understand it, it will have no impact on music freedom. And relative to our competitors, I think we would continue to drive forward with our business as it is.”<sup>356</sup> Judging by T-Mobile’s continued investments and its launch of a data cap-exempted video streaming service in the interim, Legere was right: the FCC’s rules had “no impact” on any aspect of T-Mobile’s business, much less a negative impact.

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<sup>352</sup> See Comments of Braxton Carter, CFO, T-Mobile US Inc., Q4 2014 Earnings Call (Feb. 19, 2015) (“We have a strong outlook for 2015 that balances growth and profitability. . . . Cash capex is expected to be in the range of \$4.4 billion to \$4.7 billion, slightly up from 2014.”).

<sup>353</sup> See Comments of John Legere, President & CEO, T-Mobile US Inc., Q4 2014 Earnings Call (Feb. 19, 2015) (“We ended 2014 with 265 million 4G LTE POPs, that was significantly ahead of our committed 250 million target. And by expanding our network to 300 million 4G LTE POPs by the end of 2015, we intend to further level the playing field with our major competitors. We are quickly deploying wide band LTE already live in 121 market areas.”); see also Comments of John Legere, President & CEO, T-Mobile US Inc., Q4 2015 Earnings Call (Feb. 17, 2016) (“Now we have 305 million 4G LTE POPs covered, and we continue to close in on Verizon. . . . Our deployment of extended range LTE on 700 megahertz A Block spectrum is way ahead of schedule. More than 300 markets [are] live, covering approximately 190 million people.”); Comments of John Legere, President & CEO, T-Mobile US Inc., Q4 2016 Earnings Call (Feb. 14, 2017) (“Our 4G LTE coverage is at 314 million pops today, and we’re targeting 320 million by year-end 2017. We are reaping huge benefits from this. . . . Our deployment of extended range LTE on the 700 megahertz A Block spectrum band is way ahead of schedule – 500 markets live covering more than 252 million people.”).

<sup>354</sup> See *id.*

<sup>355</sup> See, e.g., Comments of Braxton Carter, CFO, T-Mobile US Inc., Q4 2015 Earnings Call (Feb. 17, 2016) (“Free cash flow in the quarter was impacted by higher cash CapEx, which amounted to \$1.4 billion in the fourth quarter and \$4.7 billion for the year, reflecting the continued investment in the expansion of our 4G LTE network.”); see also Comments of Braxton Carter, CFO, T-Mobile US Inc., Q4 2016 Earnings Call (Feb. 14, 2017) (“Cash capex was flat year-over-year at \$4.7 billion. . . . We target cash capex of \$4.8 billion to \$5.1 billion in 2017 excluding capitalized interest compared to \$4.6 billion in 2016 on a like for like basis.”).

<sup>356</sup> See Comments of John Legere, President & CEO, T-Mobile US Inc., Q4 2014 Earnings Call (Feb. 19, 2015).

## Sprint

Sprint's 2015 capital spending was up sharply from 2014, due in large part to its new strategy of purchasing smartphones and then leasing them to its customers. USTA and Hal Singer ignore the capital Sprint spent to buy these leased devices, in their strenuous efforts to manufacture a decline in aggregate ISP industry investment. But this is a real capital expense and a real risk of capital. Sprint, not its customers, owns these devices. It is on the hook for selling them on the secondary market if it wishes to recover the remaining capital value of these assets after a lease ends. Sprint's capital spending for leased devices is no different than a cable company's spending on set-top boxes or a DSL company's spending on modems. Furthermore, ensuring that its customers are using the tri-band devices necessary to receive the full capacities of its network is a key component of Sprint's business strategy. Excluding Sprint's equipment purchases from the analysis while including all other companies' CPE capital spending is a biased approach.

Sprint continues to invest capital to improve its network, even as it finds itself under enormous pressure to cut costs. Sprint's 2016 capital investments were down sharply, but this decline was largely due to its completion of its 4G LTE rollout, and near completion of its "LTE Plus" tri-banded service, which enables speeds above 200 Mbps.<sup>357</sup> Sprint is now in a phase of capacity expansion through network densification, which requires less capital than its initial nationwide 4G LTE rollout and multi-band deployment.<sup>358</sup> Sprint has indicated that the primary factor limiting its capex is municipal government approval for its network densification work.<sup>359</sup>

Sprint's historical capital spending pattern is another important illustration of the fact that improvements in capacity do not always require annual increases in total capital investment. Sprint's annual capital expenditures reached a low during 2009, then increased sequentially through 2013 as Sprint rolled out its 4G LTE network. Sprint launched LTE in mid-2012,<sup>360</sup> and extended it to more than 200 million persons by the end of 2013.<sup>361</sup> Then its capex declined during 2014, even as it extended 4G LTE to an additional 70 million persons reaching

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<sup>357</sup> See Comments of Marcelo Claure, President & CEO, Sprint Corp., Q3 2016 Earnings Call (Jan. 31, 2017) ("LTE Plus is now available in over 250 markets in the US, and I am proud of our network team for having the foresight two plus years ago to deploy 8T8R radios as part of the 2.5 rollout . . . providing a stronger signal delivery for better performance. In addition, Sprint has already deployed three-channel carrier aggregation in over 100 markets, which is expected to provide big download speeds of more than 200 megabits per second on capable devices.").

<sup>358</sup> See Comments of Tarek Robbiati, CFO, Sprint Corp., Q3 2016 Earnings Call (Jan. 31, 2017) ("While Sprint is uniquely positioned to operate [at] lower capital intensity as a result of our tri-band LTE network foundation and our deep spectrum position, we do expect CapEx to accelerate in the fourth quarter and into FY17 as part of our densification program.").

<sup>359</sup> See Comments of Marcelo Claure, President & CEO, Sprint Corp., Q4 2015 Earnings Call (May 3, 2016) ("One of the things we have to realize is that our network is performing quite well today. So therefore, we're going to continue to make the necessary investments in our network. We're still fully committed to our densification and optimization strategy, including tens of thousands of small cells and more macros. While at the same time, we're continuously looking at ways to deliver the benefit at a lower cost, based on various radio access equipment and structures that we have available. We have not changed our strategy at all, and we're going to continue to invest. The reason why we might push some of the capex to the following year is . . . approvals that we get from municipalities and others for the new structures that we have applied for leasing and permitting at this point in time. Therefore, nothing has changed.") (emphasis added).

<sup>360</sup> See Sprint Corp., Full Year 2011 Earnings Release (Feb. 8, 2012) ("[A]s part of Network Vision Sprint has announced it expects to begin launching 4G LTE by mid-year 2012. In addition to Houston, Dallas, San Antonio and Atlanta, Sprint today announced Kansas City and Baltimore will be among the initial six major cities to launch.") (emphasis added).

<sup>361</sup> See Sprint Corp., Full Year 2013 Earnings Release (Feb. 11, 2014) ("LTE coverage is now available to more than 200 million people. The company continues to expect that by the middle of this year LTE coverage will reach 250 million people.") (emphasis added).

270 million total.<sup>362</sup> Sprint's 2015 capex was the highest in the firm's history, largely due to its new handset program, but also due to further LTE expansion and new banded-LTE deployment.<sup>363</sup> With its LTE network reaching more than 300 million persons by 2016,<sup>364</sup> its capex for that year declined to a more "normal" level.<sup>365</sup> The elevated levels for 2012–2016's LTE deployment were temporary, and driven by that deployment cycle.<sup>366</sup>

When a carrier constructs a new network, it incurs substantial capital costs primarily due to the deployment of fiber to towers (and the construction of these towers, if space is not leased on existing towers). Once the initial network is in place, capacity expansions can take several forms, not all of which come with the same capital requirements. The move from 4G LTE to banded-LTE involves the installation of electronics that virtually bond different spectrum frequencies. If a carrier has ample unused spectrum (as Sprint does, with its 2.5 GHz portfolio, which it is also using for backhaul in order to lower costs),<sup>367</sup> then it can increase capacity at a

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<sup>362</sup> See Sprint Corp., Third Fiscal Quarter of 2014 Earnings Release (Feb. 5, 2015) ("During the quarter, Sprint's 800 MHz voice deployment reached nationwide availability, 4G LTE coverage expanded to cover 270 million people, and the 2.5 GHz 4G LTE deployment now covers 125 million people.") (emphasis added).

<sup>363</sup> See, e.g., Comments of Marcelo Claure, President & CEO, Sprint Corp., Q3 2015 Earnings Call (Jan. 26, 2016) ("Our new LTE Plus network is now in more than 150 markets across the country and takes advantage of our rich spectrum position, coupled with technology enhancement like carrier aggregation and antenna beamforming to create wider channels, producing more capacity and faster speeds and better sales performance.")

<sup>364</sup> See Sprint Corp., FY 2015 Earnings Release (May 3, 2016) ("The Sprint LTE Plus Network, which takes advantage of the company's rich tri-band spectrum portfolio and uses some of the world's most advanced technologies in wireless such as carrier aggregation and antenna beamforming, is now available in 204 markets across the country, including recent launches in New York City, Boston, and Philadelphia. . . . Total LTE coverage now reaches nearly 300 million people, including approximately 70 percent being covered by the 2.5 GHz spectrum deployment.") (emphasis added).

<sup>365</sup> See Comments of Joe Euteneuer, CFO, Sprint Corp., Q1 2015 Earnings Call (Aug. 4, 2015) ("[W]e are very focused on capital efficiency, and concentrating our resources on evolving our network to be highly competitive. As a result, we expect to deliver a great network, while our CapEx over the next three years including 2015 is expected to be less than \$15 billion."). This August 2015 capex guidance appears to have been close to accurate, as 2015–2016 capex totaled \$12 billion, and Sprint's guidance for 2017 is less than \$3 billion. See Comments of Tarek Robbiati, CFO, Sprint Corp., Q3 2016 Earnings Call (Jan. 31, 2017) ("Regarding our guidance for cash capital expenditures, excluding leased devices, we now expect to spend between \$2 billion and \$2.3 billion, given better visibility to the timing of cash payments related to the densification. We continue to expect to further ramp up our densification and utilize the expanded toolbox of various cost-efficient coverage and capacity options in the fourth quarter of FY16, and into FY17.")

<sup>366</sup> See Comments of Marcelo Claure, President & CEO, Sprint Corp., Q4 2015 Earnings Call (May 3, 2016) ("The right way to look at this is – I think we're coming from an advantaged position that few come to realize. Most of the heavy investment was done doing network vision, in which we were setting the foundation to have a pretty solid network. You're seeing the results today, out of which – if you look at RootMetrics ratings, we're already number two in voice, surpassing AT&T. If you look at Nielsen, we can claim that we have the fastest speeds in the country.") (emphasis added); see also Comments of Tarek Robbiati, CFO, Sprint Corp., at the Deutsche Bank Media, Internet and Telecom Conference (Mar. 7, 2017) ("Relative to the history, our capex spend in fiscal year 2016 was lower. And there was an element of also deferral of some of the spend as we are awaiting permits to densify and optimize our network. There will be possibly some capex increase in fiscal year 2017, we foreshadowed that. But we do not expect our capital spend to reach back the levels of the years where Sprint had three platforms. I'm referring to the years of network division back all the way up to 2013. We now have an incredibly strong position with our spectrum assets and we can exploit this position with very creative solutions that will drive capital intensity down.") (emphasis added).

<sup>367</sup> See Comments of Marcelo Claure, President & CEO, Sprint Corp., Q1 2015 Earnings Call (Aug. 4, 2015) ("Also we expect to utilize various options for deployment of backhaul for small cell, in order for us to balance the performance, cost and the speed to market. The team is extremely excited about not only the performance enhancement these plans expect to deliver, but also the significant expected financial efficiency from both a capital and operating perspective . . . , requiring significantly less CapEx to achieve the desired performance and capacity, as well as lower anticipated operating costs to support.") (emphases added). Comments of Tarek Robbiati, CFO, Sprint Corp., at the Deutsche Bank Media, Internet and Telecom Conference (Mar. 7, 2017) ("I would point you to the fact that we can use a lot of our spectrum to do wireless backhaul for example. We know so with big data where we have to deploy capacity, where we have to enhance our coverage. And that is helping us a lot in being very, very efficient from a CapEx standpoint.") (emphases added).



very small incremental cost.<sup>368</sup> All of the national wireless carriers have fully deployed the most-expensive parts of their networks, and are moving into a densification phase, in which capital costs can vary depending upon the specific company's existing architecture, densification technique,<sup>369</sup> and unused spectrum portfolio.<sup>370</sup>

Finally, as with other carriers, the topics of Title II and the Open Internet rules did not come up on any of Sprint's quarterly investor calls following the 2015 vote. To the extent Sprint is concerned about any aspect of FCC policy, it is the agency's efforts to streamline carriers' ability to deploy small cells.<sup>371</sup>

This is again illustrative of how Chairman Pai is wholly wrong to focus on Title II, especially when carriers are making it clear that there are actual deployment barriers that warrant attention (*e.g.*, high-cost rural areas, utility pole access, small cell deployment hurdles, high-frequency 5G spectrum), but Title II is no concern.

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<sup>368</sup> See Comments of Tarek Robbiati, CFO, Sprint Corp., Q1 2016 Earnings Call (July 25, 2016) (“We expect site acquisitions and the associated capex to accelerate as we progress through the year. . . . Sprint is uniquely positioned to operate at a lower capital intensity as a result of our tri-band LTE network foundation today and our deep spectrum position.”) (emphasis added).

<sup>369</sup> See *id.* (“I would call [Network Vision’s deployment] phase 1. Phase 2 is a massive densification of our network, in which we’re doing it a bit different. The traditional way network vision was done and many of the network buildups have done is you basically outsource the deployment, and you go to the traditional tower companies and you spend several billions of dollars. . . . We have a very clear densification strategy. And what we’re seeing – leveraging big data is we’re actually figure out where is the exact point in which we have to put additional structures in order for us to better serve our customers? Then we’re going and seeing what is the least cost way to actually put the structure. It’s a combination of going to tower companies in many cases. It’s a combination of putting our own monopoles, of using small cells, of using femtocells. A lot of this [ ] depending on getting approvals from the different municipalities or different cities. [W]e have an estimate that we intend to spend around \$3 billion of capex this year. In the case that those approvals come faster, out of which, so far we’re satisfied the rate they’re coming, we will be spending potentially more than \$3 billion. If these approvals get delayed, then we will move it forward. . . . [T]here is not an intent to basically defer capex into FY17. We’re going to spend as much as is necessary in order for us to provide a good experience to our customers, and continue with the densification of our network. As you know, when you’re building things different in a way that hasn’t been done, . . . it’s a little harder to predict the actual capex.”) (emphases added).

<sup>370</sup> See Comments of Masayoshi Son, Chairman, Sprint Corp., Q1 2015 Earnings Call (Aug. 4, 2015) (“[W]ithin Japan, SoftBank spent almost half in capex compared to our competitor, but the result of our network coverage, the speed is number one. So what we are good at is spending less in capex, and create a number one network. Of course, it’s easy to spend money and get the result. But if you have less money, . . . you have to use [your] brain, instead of money and muscle. . . . [W]e discussed with Sprint [ ] and SoftBank engineers, and initially the reaction was, [the] US environment is different. However, after all these studies, most of the key fundamentals are exactly identical. . . . So I am now very, very confident that Sprint will be able to create [an] equal or better . . . network very soon with much lower capex.”) (emphases added).

<sup>371</sup> See Comments of Tarek Robbiati, CFO, Sprint Corporation, at the Deutsche Bank Media, Internet and Telecom Conference (Mar. 7, 2017) (“[T]here needs to be legislation that facilitates a rollout of dense sites and networks from a federal side, but each state has to define within that how they’re going to implement it. So there needs to be a bit of a harmonization of the legislation to make that happen nationwide. But we see more and more positive momentum and we are encouraged by the changes. Marcello, our CEO, is currently chairing CTIA and all the carriers are very much focused on streamlining this process because everybody wants to densify their networks.”).

## CONCLUSION

Chairman Pai's main (and possibly only) supposed justification for dismantling the FCC's Title II-based Open Internet framework is the utterly false claim that the current legal framework dampens ISP investment. This is not just the wrong metric to use, it is also demonstrably false and illogical.

In the two years since the FCC's February 2015 vote, Open Internet rules have re-set carriers' incentives towards growth and away from artificial scarcity. The country has seen an explosion in over-the-top video competition, but also realized as well a dramatic increase in next-generation broadband network deployment. The FCC's 2015 decision is working as intended. Carriers have clarity about their legal obligations, and so do the hundreds of millions of people and businesses that rely on broadband services for their everyday lives and most important activities. Whatever they say or do online, these users have the assurance of their communications rights granted to them by Congress. They know that carriers are subject to limited but essential obligations, requiring these internet access providers to transmit their customers' data in a reasonably nondiscriminatory manner.

ISPs now understand the path to profit is capacity growth, not unreasonable discrimination and artificial scarcity. This virtuous cycle of innovation and investment is only possible with the continued existence of nondiscriminatory telecommunications services; and its continued existence depends on retaining strong and enforceable Net Neutrality rules, based on a strong legal foundation. If Chairman Pai eradicates the telecom services market by fiat, it will stop the virtuous cycle.

Chairman Pai's anti-Title II ideology has led him to ignore not only the successes of the broadband market in the two years since the FCC's vote, but also the historic investment and competition happening on the Open Internet too. More new U.S. OTT services launched in the two years following that vote than in the seven years prior. The certainty of the order spurred the entry of numerous viable full pay-TV replacement services, with even vertically integrated carriers such as AT&T now distributing their pay-TV services via other ISPs' last mile networks.

Other incumbent ISPs with legacy pay-TV businesses may soon join that competition. The existence of this market (and of robust OTT video in general) is improving the choices available to video consumers, driving down the prices they pay, and increasing the diversity of offerings available to them. Without the certainty that Title II and the Open Internet rules provide against unreasonable discrimination, it would be impossible to imagine a world in which cable companies entered each other's markets, offered their pay-TV services to customers via their competitors' distribution facilities, or even scaled back and eliminated their own bloated channel bundles in favor of third-party video streaming over the top of their high-capacity broadband networks.

The FCC's return to the sound law of Title II is working. It's exactly what Congress envisioned for these markets when it overhauled the Communications Act at the dawn of the broadband-era: a highly deregulatory framework that nevertheless preserves the most basic and essential communications rights. The FCC's rules prohibit the worst discriminatory abuses, and they set norms that all ISPs claim to support. But as the courts have made clear, Title II authority is required for these rules, and it's also required to allow the FCC step in and stop any future unreasonably discriminatory practices that we may not foresee today. There's simply no good reason for the FCC to return the internet economy to an era of uncertainty under Title I or some other unworkable regime.

Chairman Pai is carrying out his anti-Title II crusade in service of a warped ideology, not in the service of internet users, and certainly is not in the pursuit of truth. And policymakers should care about the truth. Policy changes should be guided by facts and logic, not unbending ideology. If Chairman Pai is allowed to continue peddling his lies about Title II's impact on investment, the result will be dire.

**APPENDIX – ADDITIONAL FIGURES ON ISP PROFITABILITY AND OTHER METRICS**

**Figure A1: Operating Cash Flow at Publicly Traded Broadband Providers (2013–2016)**

Operating Cash Flow (\$ thousands)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Comcast (cable)	\$17,205,000	\$18,097,000	\$19,037,000	\$20,109,000	\$35,302,000	\$39,146,000	10.9%
Charter	\$2,158,000	\$2,359,000	\$2,359,000	\$8,041,000	\$4,517,000	\$10,400,000	130.2%
TWC	\$5,753,000	\$6,350,000	\$6,539,000	N/A			
Cablevision	\$1,333,983	\$1,377,072	\$1,257,603	N/A			
Suddenlink	\$510,605	\$690,663	\$695,714	\$771,824	\$1,201,268	\$1,467,538	22.2%
Wide Open West	\$168,300	\$201,500	\$213,000	\$201,500	\$369,800	\$414,500	12.1%
Cable ONE	\$236,647	\$205,833	\$246,413	\$251,831	\$442,480	\$498,244	12.6%
GCI	\$159,634	\$258,203	\$253,955	\$200,276	\$417,837	\$454,231	8.7%
Verizon	\$38,818,000	\$30,631,000	\$38,930,000	\$22,715,000	\$69,449,000	\$61,645,000	-11.2%
AT&T	\$34,796,000	\$31,338,000	\$35,880,000	\$39,344,000	\$66,134,000	\$75,224,000	13.7%
CenturyLink	\$5,559,000	\$5,188,000	\$5,152,000	\$4,608,000	\$10,747,000	\$9,760,000	-9.2%
Frontier	\$1,495,627	\$1,270,072	\$1,301,000	\$1,666,000	\$2,765,699	\$2,967,000	7.3%
Windstream	\$1,519,400	\$1,467,300	\$1,026,600	\$924,400	\$2,986,700	\$1,951,000	-34.7%
TDS Telecom +US Cellular	\$494,610	\$394,812	\$789,694	\$782,000	\$889,422	\$1,571,694	76.7%
Fairpoint	\$171,085	\$121,063	\$112,001	\$134,252	\$292,148	\$246,253	-15.7%
Cincinnati Bell	\$78,800	\$175,200	\$110,900	\$173,200	\$254,000	\$284,100	11.9%
Consolidated Communications	\$164,356	\$187,785	\$219,179	\$218,233	\$352,141	\$437,412	24.2%
Shenandoah Telecom Co.	\$94,264	\$114,993	\$119,321	\$161,526	\$209,257	\$280,847	34.2%
Alaska Communications System	\$67,707	\$51,169	\$12,581	\$37,253	\$118,876	\$49,834	-58.1%
Hawaiian Telecom	\$76,961	\$90,490	\$90,596	\$90,088	\$167,451	\$180,684	7.9%
T-Mobile	\$3,454,000	\$4,146,000	\$5,414,000	\$6,135,000	\$7,600,000	\$11,549,000	52.0%
Otelco	\$18,650	\$18,122	\$21,013	\$18,637	\$36,772	\$39,650	7.8%
Sprint	\$2,610,000	\$1,996,000	\$3,579,000	\$4,194,000	\$4,606,000	\$7,773,000	68.8%
<b>TOTAL PUBLICLY TRADED ISP (less Cablevision)</b>	<b>\$115,609,646</b>	<b>\$105,352,205</b>	<b>\$122,101,967</b>	<b>\$110,777,020</b>	<b>\$220,961,851</b>	<b>\$232,878,987</b>	<b>5.4%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).

Figure A2: Operating Income at Publicly Traded Broadband Providers (2013–2016)

Operating Income (\$ thousands)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Comcast (cable)	\$10,811,000	\$11,661,000	\$11,986,000	\$12,439,000	\$22,472,000	\$24,425,000	8.7%
Charter	\$909,000	\$971,000	\$1,114,000	\$3,355,000	\$1,880,000	\$4,469,000	137.7%
TWC	\$4,580,000	\$4,632,000	\$4,239,000	N/A			
Cablevision	\$699,224	\$921,258	\$848,471	N/A			
Suddenlink	\$184,668	\$258,499	\$49,236	\$385,287	\$443,167	\$434,523	-2.0%
Wide Open West	\$141,900	\$138,500	\$204,900	\$243,600	\$280,400	\$448,500	60.0%
Cable ONE	\$164,446	\$163,813	\$161,742	\$188,207	\$328,259	\$349,949	6.6%
GCI	\$112,862	\$143,562	\$106,211	\$79,103	\$256,424	\$185,314	-27.7%
Verizon	\$31,968,000	\$19,599,000	\$33,060,000	\$27,059,000	\$51,567,000	\$60,119,000	16.6%
AT&T	\$30,479,000	\$12,212,000	\$24,785,000	\$24,347,000	\$42,691,000	\$49,132,000	15.1%
CenturyLink	\$1,453,000	\$2,410,000	\$2,605,000	\$2,331,000	\$3,863,000	\$4,936,000	27.8%
Frontier	\$980,721	\$819,941	\$745,000	\$888,000	\$1,800,662	\$1,633,000	-9.3%
Windstream	\$1,009,000	\$507,100	\$509,400	\$515,400	\$1,516,100	\$1,024,800	-32.4%
TDS Telecom +US Cellular	\$235,359	-\$189,864	\$397,071	\$30,318	\$45,495	\$427,389	839.4%
Fairpoint	-\$113,186	-\$93,274	\$169,592	\$229,345	-\$206,460	\$398,937	-293.2%
Cincinnati Bell	\$163,800	\$176,900	\$128,000	\$93,000	\$340,700	\$221,000	-35.1%
Consolidated Communications	\$103,661	\$91,189	\$87,775	\$87,440	\$194,850	\$175,215	-10.1%
Shenandoah Telecom. Co.	\$55,407	\$61,943	\$74,086	\$22,526	\$117,350	\$96,612	-17.7%
Alaska Communications System	\$256,961	\$29,760	\$47,746	\$19,509	\$286,721	\$67,255	-76.5%
Hawaiian Telecom	\$41,771	\$30,471	\$19,262	\$18,792	\$72,242	\$38,054	-47.3%
T-Mobile	\$996,000	\$1,416,000	\$2,065,000	\$3,802,000	\$2,412,000	\$5,867,000	143.2%
Otelco	\$18,651	\$16,858	\$19,255	\$18,813	\$35,509	\$38,068	7.2%
Sprint	-\$1,855,000	-\$1,793,000	\$620,000	\$1,302,000	-\$3,648,000	\$1,922,000	-152.7%
<b>TOTAL PUBLICLY TRADED ISP (less Cablevision)</b>	<b>\$82,697,021</b>	<b>\$53,263,398</b>	<b>\$83,193,276</b>	<b>\$77,454,340</b>	<b>\$135,960,419</b>	<b>\$160,647,616</b>	<b>18.2%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).

Figure A3: EBITDA at Publicly Traded Broadband Providers (2013–2016)

EBITDA (\$ thousands)	2013	2014	2015	2016	2013-2014	2015-2016	Percent Change (2015–2016 vs. 2013–2014)
Comcast	\$21,449,000	\$22,985,000	\$24,639,000	\$26,730,000	\$44,434,000	\$51,369,000	15.6%
Charter+TWC+BHN (pro forma)	N/A	\$12,918,000	\$13,004,000	\$14,464,000			
Charter	\$2,651,000	\$3,066,000	\$3,100,000	\$10,226,000	\$5,717,000	\$13,326,000	133.1%
TWC	\$7,872,000	\$8,038,000	\$8,085,000	N/A			
Cablevision	\$1,700,000	\$1,904,700	\$1,815,600	\$2,219,600	\$3,604,700	\$4,035,200	11.9%
Suddenlink	\$836,600	\$870,300	\$985,900	\$1,170,600	\$1,706,900	\$2,156,500	26.3%
Wide Open West	\$438,100	\$412,300	\$443,900	\$463,600	\$850,400	\$907,500	6.7%
Cable ONE	\$209,020	\$372,176	\$302,145	\$335,511	\$581,196	\$637,656	9.7%
GCI	\$259,668	\$312,054	\$239,442	\$280,927	\$571,722	\$520,369	-9.0%
Verizon	\$48,486,000	\$36,610,000	\$49,062,000	\$41,231,000	\$85,096,000	\$90,293,000	6.1%
AT&T	\$50,018,000	\$32,144,000	\$46,733,000	\$50,451,000	\$82,162,000	\$97,184,000	18.3%
CenturyLink	\$6,063,000	\$6,849,000	\$6,817,000	\$6,254,000	\$12,912,000	\$13,071,000	1.2%
Frontier	\$1,997,217	\$1,996,386	\$2,065,000	\$2,926,000	\$3,993,603	\$4,991,000	25.0%
Windstream	\$2,308,500	\$1,892,600	\$2,173,400	\$1,583,000	\$4,201,100	\$3,756,400	-10.6%
TDS Telecom + US Cellular	\$1,400,060	\$778,748	\$1,381,899	\$1,049,944	\$2,178,808	\$2,431,843	11.6%
Fairpoint	\$167,328	\$134,952	\$393,896	\$451,944	\$302,280	\$845,840	179.8%
Cincinnati Bell	\$294,400	\$576,000	\$723,900	\$420,800	\$870,400	\$1,144,700	31.5%
Consolidated Communications	\$272,517	\$260,387	\$261,644	\$288,994	\$532,904	\$550,638	3.3%
Shenandoah Telecom. Co.	\$118,580	\$129,888	\$146,513	\$170,622	\$248,468	\$317,135	27.6%
Alaska Communications System	\$297,476	\$62,343	\$76,735	\$53,915	\$359,819	\$130,650	-63.7%
Hawaiian Telecom	\$115,412	\$108,465	\$107,141	\$108,708	\$223,877	\$215,849	-3.6%
T-Mobile	\$4,712,000	\$5,817,000	\$6,742,000	\$10,039,000	\$10,529,000	\$16,781,000	59.4%
Otelco	\$140,451	\$27,441	\$28,133	\$26,680	\$167,892	\$54,813	-67.4%
Sprint	\$6,791,000	\$3,405,000	\$7,282,000	\$9,131,000	\$10,196,000	\$16,413,000	61.0%
TOTAL PUBLICLY TRADED ISP (less Cablevision)	\$158,597,329	\$130,566,740	\$165,424,248	\$170,557,845	\$289,164,069	\$335,982,093	16.2%

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: Charter pro forma values represent "Adjusted" EBITDA, which Charter defines as "consolidated net income (loss) plus net interest expense, income taxes, depreciation and amortization, stock compensation expense, loss on extinguishment of debt, (gain) loss on financial instruments, other (income) expense, net and other operating (income) expenses, such as merger and restructuring costs, other pension benefits, special charge." Cablevision and Suddenlink values for 2015 and 2016 represent Altice-calculated "Adjusted" EBITDA; 2013 and 2014 values are author-calculated values to conform with this reporting. Altice defines Adjusted EBITDA as "operating profit before depreciation and amortization, restructuring, deal fees, litigation and other non-cash items." Wide Open West's values represent "Adjusted" EBITDA.

**Figure A4: Return on Invested Capital at Publicly Traded Broadband Providers (2013–2016)**

Return on Invested Capital	2013	2014	2015	2016	2013-2014 (average)	2015-2016 (average)	Percentage Point Change (2015–2016 vs. 2013–2014)
Comcast	9.79%	11.56%	11.99%	11.74%	10.68%	11.87%	1.2%
Charter (as reported)	7.04%	6.49%	5.27%	4.19%	6.77%	4.73%	-2.0%
Cablevision	16.01%	19.74%	18.05%	N/A			
Suddenlink	2.89%	4.18%	2.06%	5.00%	3.54%	3.53%	0.0%
Cable ONE	N/A	18.74%	14.16%	12.33%	18.74%	13.25%	-5.5%
GCI	8.61%	9.00%	8.87%	5.15%	8.81%	7.01%	-1.8%
Verizon	19.94%	10.99%	21.81%	14.57%	15.47%	18.19%	2.7%
AT&T	17.93%	8.03%	12.09%	9.02%	12.98%	10.56%	-2.4%
CenturyLink	7.34%	6.95%	7.78%	6.46%	7.15%	7.12%	0.0%
Frontier	7.61%	7.13%	5.60%	6.91%	7.37%	6.26%	-1.1%
Windstream	10.53%	6.36%	8.85%	10.16%	8.45%	9.51%	1.1%
TDS w/ US Cellular	-5.21%	-1.91%	3.25%	3.42%	-3.56%	3.34%	6.9%
Fairpoint	-4.81%	-3.44%	0.27%	2.17%	-4.13%	1.22%	5.3%
Cincinnati Bell	12.53%	11.27%	12.05%	10.66%	11.90%	11.36%	-0.5%
Consolidated Communications	10.46%	9.12%	7.36%	7.57%	9.79%	7.47%	-2.3%
Shenandoah Telecom, Co.	8.31%	9.32%	11.53%	2.24%	8.82%	6.89%	-1.9%
Hawaiian Telecom	6.20%	5.04%	3.23%	3.17%	5.62%	3.20%	-2.4%
Alaska Communications System	9.19%	6.18%	-0.93%	5.84%	7.69%	2.46%	-5.2%
Otelco	24.30%	16.69%	19.67%	20.72%	20.50%	20.20%	-0.3%
Sprint	-6.93%	1.42%	2.11%	3.52%	-2.76%	2.82%	5.6%
T-Mobile	3.77%	2.20%	5.36%	6.42%	2.99%	5.89%	2.9%

*Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: Return on invested capital is the firm's net operating profit after tax (plus any partnership income), expressed as a percentage of the firm's average annual value of equity plus debt.*

**Figure A5: Value of Stock Repurchases at Publicly Traded Broadband Providers (2013–2016)**

Value of Stock Repurchases (\$000)	2013	2014	2015	2016
Comcast	\$2,000,000	\$4,251,000	\$6,750,000	\$5,000,000
Charter (as reported)	\$15,000	\$19,000	\$38,000	\$1,562,000
TWC	\$2,509,000	\$259,000	\$0	N/A
Cablevision	\$12,262	\$6,608	\$19,141	N/A
Cable ONE	\$0	\$0	\$16,367	\$56,370
GCI	\$17,208	\$6,850	\$55,774	\$58,679
Verizon	\$153,000	\$0	\$5,134,000	\$0
AT&T	\$13,028,000	\$1,617,000	\$269,000	\$512,000
CenturyLink	\$1,586,000	\$650,000	\$819,000	\$16,000
Windstream	\$0	\$0	\$46,200	\$28,900
TDS w/ US Cellular	\$28,236	\$58,039	\$6,188	\$8,000
Cincinnati Bell	\$0	\$0	\$0	\$4,800
Consolidated Communications	\$887	\$1,856	\$1,125	\$1,231
Shenandoah Telecom. Co.	\$1,600	\$1,785	\$1,885	\$5,097
<b>TOTAL</b>	<b>\$19,351,193</b>	<b>\$6,871,138</b>	<b>\$13,156,680</b>	<b>\$7,247,980</b>

*Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: Only companies that repurchased shares during the 4-year period are shown.*

**Figure A6: Dividends Paid at Publicly Traded Broadband Providers (2013–2016)**

Dividends Paid (\$000)	2013	2014	2015	2016
Comcast	\$1,964,000	\$2,254,000	\$2,437,000	\$2,601,000
TWC	\$758,000	\$857,000	\$865,000	N/A
Cablevision	\$159,709	\$160,545	\$127,170	N/A
Cable ONE	\$0	\$0	\$458,782	\$34,445
Verizon	\$5,936,000	\$7,803,000	\$8,538,000	\$9,262,000
AT&T	\$9,696,000	\$9,552,000	\$10,200,000	\$11,797,000
CenturyLink	\$1,301,000	\$1,228,000	\$1,198,000	\$1,167,000
Frontier	\$399,768	\$200,892	\$576,000	\$707,000
Windstream	\$593,600	\$602,200	\$369,200	\$58,600
TDS w/ US Cellular	\$130,528	\$58,040	\$61,219	\$65,000
Cincinnati Bell	\$10,400	\$10,400	\$10,400	\$10,400
Consolidated Communications	\$62,064	\$62,341	\$78,209	\$78,419
Shenandoah Telecom. Co.	\$8,191	\$10,761	\$11,085	\$11,705
T-Mobile	\$0	\$0	\$55,000	\$55,000
<b>TOTAL</b>	<b>\$21,019,260</b>	<b>\$22,799,179</b>	<b>\$24,985,065</b>	<b>\$25,847,569</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements). Notes: Only companies that paid dividends during the 4-year period are shown.



**Figure A7: Earnings per Share at Publicly Traded Broadband Providers (2013–2016)**

Basic Earnings per Share (before extraordinary)	2013	2014	2015	2016
Comcast	\$1.30	\$1.62	\$1.64	\$1.81
Charter (as reported)	-\$1.65	-\$1.88	-\$2.68	\$17.05
TWC	\$6.76	\$7.21	\$6.46	N/A
Cablevision	\$0.49	\$1.17	\$0.70	N/A
Cable ONE	N/A	N/A	\$15.21	\$17.23
GCI	\$0.23	\$0.18	-\$0.69	-\$0.10
Verizon	\$4.01	\$2.42	\$4.38	\$3.22
AT&T	\$3.39	\$1.24	\$2.37	\$2.10
CenturyLink	-\$0.40	\$1.36	\$1.58	\$1.16
Frontier	\$0.11	\$0.13	-\$0.29	-\$0.51
Windstream	\$2.35	-\$0.45	\$0.24	-\$4.11
TDS w/ US Cellular	\$1.31	-\$1.26	\$2.02	\$0.39
Fairpoint	-\$3.95	-\$5.15	\$3.39	\$3.88
Cincinnati Bell	-\$1.60	\$2.57	\$6.69	\$2.17
Consolidated Communications	\$0.73	\$0.35	-\$0.02	\$0.29
Shenandoah Telecom. Co.	\$0.62	\$0.70	\$0.84	-\$0.02
Hawaiian Telecom	\$1.01	\$0.76	\$0.10	\$0.10
Alaska Communications System	\$3.37	-\$0.06	\$0.26	\$0.05
Otelco	\$37.36	\$1.62	\$2.31	\$1.57
Sprint	N/A	-\$0.82	-\$0.43	-\$0.38
T-Mobile	\$0.05	\$0.31	\$0.83	\$1.71

*Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).*

**Figure A8: Capital Intensity at Publicly Traded Broadband Providers (2013–2016)**

Capital Intensity (capital expenditures as a percent of revenue)	2013	2014	2015	2016	2013-2014	2015-2016	Percentage Point Change (2015–2016 vs. 2013–2014)
Comcast (cable)	12.9%	13.9%	15.0%	15.2%	13.4%	15.1%	1.7%
Charter+TWC+BHN (pro forma)	16.5%	19.8%	18.6%	18.9%	18.2%	18.7%	0.6%
Cablevision (excluding Newsday)	15.5%	13.9%	12.4%	10.7%	14.7%	11.6%	-3.1%
Suddenlink	16.5%	18.0%	19.8%	12.7%	17.3%	16.1%	-1.1%
Mediacom	16.3%	15.5%	16.7%	18.5%	15.9%	17.7%	1.7%
Wide Open West	18.5%	19.9%	19.1%	23.6%	19.2%	21.3%	2.1%
Cable One	19.4%	20.3%	20.6%	15.3%	19.9%	17.9%	-1.9%
GCI	22.2%	19.3%	18.0%	20.8%	20.7%	19.4%	-1.3%
AT&T	16.5%	16.2%	13.6%	13.7%	16.3%	13.7%	-2.7%
Verizon	13.8%	13.5%	13.5%	13.5%	13.6%	13.5%	-0.1%
CenturyLink	16.8%	16.9%	16.0%	17.1%	16.9%	16.5%	-0.3%
Frontier	13.3%	14.4%	15.5%	15.7%	13.9%	15.6%	1.8%
Windstream	14.0%	13.5%	18.3%	18.4%	13.8%	18.3%	4.6%
Cincinnati Bell	15.7%	15.7%	24.3%	24.2%	15.7%	24.2%	8.5%
TDS (excluding US Cellular)	17.5%	19.1%	19.2%	15.8%	18.3%	17.5%	-0.9%
Fairpoint	13.7%	13.3%	13.5%	14.2%	13.5%	13.8%	0.4%
Consolidated Communications	17.8%	17.1%	17.3%	16.8%	17.5%	17.1%	-0.4%
Hawaiian Telecom	22.1%	24.7%	25.2%	24.9%	23.4%	25.0%	1.6%
Shenandoah Telecom Co. (pro forma)	29.6%	25.5%	25.0%	31.6%	27.5%	28.2%	0.7%
Alaska Communications System	13.8%	16.3%	20.8%	17.8%	15.0%	19.3%	4.3%
Otelco	7.9%	8.1%	9.3%	10.0%	8.0%	9.6%	1.6%
Sprint	19.7%	15.5%	23.9%	12.9%	17.6%	18.3%	0.7%
T-Mobile	16.5%	14.6%	14.7%	12.6%	15.5%	13.6%	-1.9%
US Cellular	18.8%	14.3%	13.3%	11.3%	16.6%	12.3%	-4.2%
<b>TOTAL (for companies shown)</b>	<b>15.6%</b>	<b>15.3%</b>	<b>15.2%</b>	<b>14.3%</b>	<b>15.5%</b>	<b>14.8%</b>	<b>-0.7%</b>

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).

Figure A9: AT&T and Verizon Wireless Profits and Revenues (2011–2016)

AT&T & Verizon - Key Wireless Segment Financials	2011	2012	2013	2014	2015	2016	Compound Annual Growth Rate (2011–2016)	Compound Annual Growth Rate (2013–2014)	Compound Annual Growth Rate (2015–2016)
AT&T Mobility EBITDA	\$21,631	\$23,467	\$25,391	\$25,068	\$27,915	\$28,935	6.0%	-0.3%	0.7%
AT&T Mobility Operating Income	\$15,307	\$16,594	\$17,923	\$17,127	\$19,802	\$20,643	6.2%	-0.9%	0.8%
AT&T Mobility Revenues	\$63,212	\$66,763	\$69,899	\$73,992	\$73,705	\$72,821	2.9%	1.1%	-0.2%
AT&T Mobility Service Revenues	\$56,726	\$59,186	\$61,552	\$61,032	\$59,837	\$59,586	0.9%	-0.2%	-0.2%
AT&T Mobility EBITDA Margin	34.2%	35.1%	36.3%	33.9%	37.9%	39.7%	3.0%	-1.4%	1.0%
AT&T Mobility EBITDA Ser. Margin	38.1%	39.6%	41.3%	41.1%	46.7%	48.7%	5.0%	-0.1%	0.9%
AT&T Mobility Op. Inc. Margin	24.2%	24.9%	25.6%	23.1%	26.9%	28.3%	3.2%	-2.0%	1.1%
VZ Mobility EBITDA	\$26,489	\$29,728	\$34,199	\$35,219	\$38,953	\$39,036	8.1%	0.6%	0.0%
VZ Mobility Operating Income	\$18,527	\$21,768	\$25,997	\$26,760	\$29,973	\$29,853	10.0%	0.6%	-0.1%
VZ Mobility Revenues	\$70,154	\$75,868	\$81,023	\$87,646	\$91,680	\$89,186	4.9%	1.6%	-0.6%
VZ Mobility Service Revenues	\$59,157	\$63,733	\$69,033	\$72,630	\$70,396	\$66,580	2.4%	1.0%	-1.1%
VZ Mobility EBITDA Margin	37.8%	39.2%	42.2%	40.2%	42.5%	43.8%	3.0%	-1.0%	0.6%
VZ Mobility EBITDA Ser. Margin	44.8%	46.6%	49.5%	48.5%	55.3%	58.6%	5.5%	-0.4%	1.2%
VZ Mobility Op. Inc. Margin	26.4%	28.7%	32.1%	30.5%	32.7%	33.5%	4.9%	-1.0%	0.5%

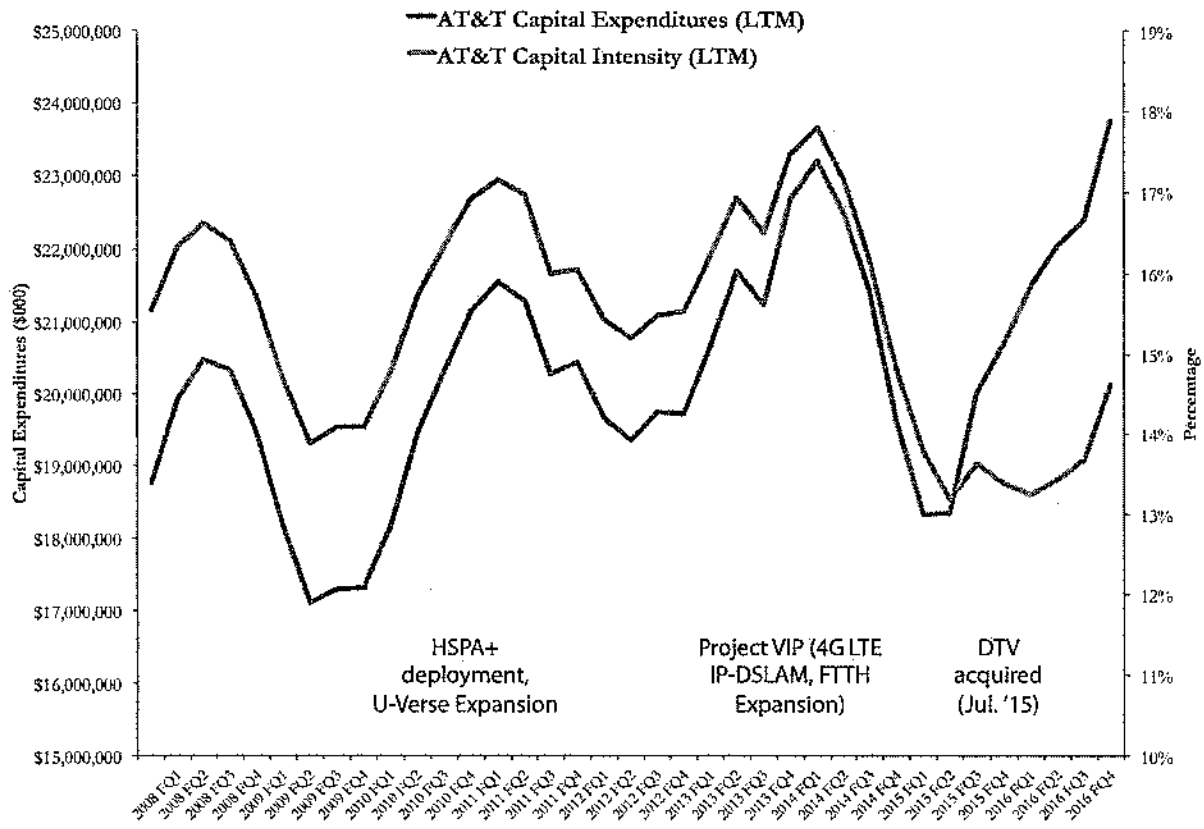
Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).

Figure A10: AT&T Capital Expenditures Post-DTV Acquisition

AT&T Capital Expenditures Following DTV Acquisition	3Q 2015	4Q 2015	1Q 2016	2Q 2016	3Q 2016	4Q 2016	Q1 2017
Reported Capital Expenditures	\$5,255,000	\$6,093,000	\$4,669,000	\$5,470,000	\$5,813,000	\$6,456,000	\$6,015,000
Year-over-Year Change					\$558,000	\$363,000	\$1,346,000
Year-over-Year Change (%)					10.6%	6.0%	28.8%

Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).

Figure A11: AT&T Capital Expenditures and Capital Intensity (12-Month Trailing, 2008–Q1 2017)



Source: Company SEC filings (10-Ks; 8-Ks; Financial Supplements).

**Figure A12: U.S. Census Bureau – Telecommunications Industry Capital Expenditures, Revenues and Capital Intensities (2008–2015)**

Aggregated Industry Data (For Listed NAICS Codes, from US Census Annual Capital Expenditures and Services Annual Surveys)			Capital Expenditures, Revenues, & Capital Intensity (Employer Firms)							
2012 NAICS Code	2012 NAICS Desc.		2008	2009	2010	2011	2012	2013	2014	2015
Capital Expenditures (\$ mil., nominal)	5171	Wired telecommunications carriers, cable and other program distribution, broadband internet services providers	\$51,892	\$43,851	\$42,971	\$44,508	\$43,661	\$49,848	\$48,496	\$51,178
	5172	Wireless telecommunications carriers (except satellite)	\$25,272	\$20,651	\$23,052	\$25,283	\$32,949	\$34,140	\$35,046	\$32,794
	5174, 5179	Telecommunications resellers, satellite, and other telecommunications	\$3,487	\$2,760	\$4,200	\$3,740	\$4,428	\$3,352	\$3,089	\$3,212
	517	Telecommunications	\$80,651	\$67,262	\$70,223	\$73,531	\$81,038	\$87,240	\$86,631	\$87,184
Revenues (\$ mil., nominal)	5171	Wired telecommunications carriers, cable and other program distribution, broadband internet services providers	\$293,473	\$282,508	\$281,149	\$284,810	\$285,663	\$288,617	\$296,792	\$306,384
	5172	Wireless telecommunications carriers (except satellite)	\$182,581	\$188,042	\$199,235	\$214,361	\$225,397	\$233,123	\$251,766	\$254,406
	5174, 5179	Telecommunications resellers, satellite, and other telecommunications	\$30,228	\$30,141	\$30,115	\$31,319	\$34,534	\$37,165	\$39,614	\$41,180
	517	Telecommunications	\$506,282	\$500,691	\$510,499	\$530,490	\$545,594	\$558,935	\$588,172	\$601,970
Capital Intensity (capital expenditures as a percent of revenue)	5171	Wired telecommunications carriers, cable and other program distribution, broadband internet services providers	17.7%	15.5%	15.3%	15.6%	15.3%	17.3%	16.3%	16.7%
	5172	Wireless telecommunications carriers (except satellite)	13.8%	11.0%	11.6%	11.8%	14.6%	14.6%	13.9%	12.9%
	5174, 5179	Telecommunications resellers, satellite, and other telecommunications	11.5%	9.2%	13.9%	11.9%	12.8%	9.0%	7.8%	7.8%
	517	Telecommunications	15.9%	13.4%	13.8%	13.9%	14.9%	15.6%	14.7%	14.5%

Source: U.S. Census Bureau, Annual Capital Expenditures Survey, Services Annual Survey.

