



## TESTIMONY

### COLORADO BROADBAND POLICY SHOULD FOCUS ON COMPETITION AND DEPLOYMENT

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*House State, Veterans, and Military Affairs Committee*

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Good afternoon. My name is Brent Skorup and I am a senior research fellow at the Mercatus Center at George Mason University. I also serve on the Broadband Deployment Advisory Committee of the Federal Communications Commission (FCC).

It is commendable that state legislatures, governors, and cities around the country, including in Colorado, are prioritizing broadband deployment. The focus should remain on the pressing broadband issues of competition and deployment. The political battles in Washington, DC, about net neutrality, which I have observed over the past decade, have alarmingly spread to statehouses in recent months, and they will distract from far more important issues.

Lawmakers should enter the debate with their eyes wide open about the stakes and the unintended effects of internet regulation. By imposing network management rules on certain providers, SB 19-078 conflicts with federal policy, codified in the Telecommunications Act, that internet access should be “unfettered by Federal or State regulation.”<sup>1</sup>

First, net neutrality laws and regulations do not accomplish what they purportedly accomplish. As the FCC revealed when it defended its net neutrality regulations in federal court in 2016, any no-blocking rule is mostly unenforceable.<sup>2</sup> As a tech journalist put it, internet service providers (ISPs) can “exempt [themselves] from the net neutrality rules”—the rules are “essentially voluntary.”<sup>3</sup> The same problem arises with state net neutrality laws.

Second, state internet regulations are unlikely to survive judicial review. Internet access is inherently interstate: simply streaming a YouTube video or sending an email often transmits data across state

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<sup>1</sup> Telecommunications Act of 1996, 47 U.S.C. § 230(b) (2018).

<sup>2</sup> Net neutrality advocate organizations such as the Electronic Frontier Foundation and the American Civil Liberties Union acknowledge in FCC filings that internet service providers (ISPs) are permitted to block content they dislike online. See In the Matter of Restoring Internet Freedom, before the Federal Communications Commission WC Docket No. 17-108 (2017) (Joint Reply Comments of the American Civil Liberties Union and the Electronic Frontier Foundation on Notice of Proposed Rulemaking). The comments state that ISPs “that go beyond this role of neutral conduit are not subject to Title II classification, precisely because they curate expressively and clearly communicate their curatorial practice to their customers.”

<sup>3</sup> Devin Coldewey, “Kavanaugh’s Brutal Education in Net Neutrality,” *TechCrunch*, July 11, 2018.

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lines. State attempts to regulate treatment of internet access therefore likely violate federal law, which vests authority to regulate interstate communications with the FCC.<sup>4</sup>

Third, the bill penalizes small, rural carriers.<sup>5</sup> There's a saying in politics: "If you're not at the table, you're on the menu." It appears that Colorado's rural broadband providers are "on the menu." The bill applies internet regulations only to companies receiving state support (13 companies, each one serving rural areas).<sup>6</sup> With the exception of CenturyLink, these are very small telecommunications companies, and the smallest had 64 customers. It is a puzzle why the state would add regulations and compliance costs to rural ISPs at a time when the FCC and most states are doing everything possible to help deploy broadband in rural areas.

This is not a plea to "do nothing" in Colorado regarding broadband. The FCC's Broadband Deployment Advisory Committee has several recommendations for states and localities to improve broadband deployment.<sup>7</sup>

Further, the FCC and some states are considering making it easier for private property owners to install wireless antennas without local regulation and fees, much like how satellite dishes are installed.<sup>8</sup>

Finally, the legislature could also urge flexibility from the FCC regarding the federal high-cost fund, which disburses about \$60 million annually to carriers in Colorado.<sup>9</sup> My preliminary estimates using FCC data suggest that, under a new voucher program, every rural household in Colorado could receive \$15 to \$20 per month to reduce their monthly broadband bill.<sup>10</sup>

Thank you for the invitation to testify. I look forward to answering any questions.

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<sup>4</sup> Communications Act of 1934, 47 U.S.C. § 151 (2018).

<sup>5</sup> S.B. 19-078, 72nd Gen. Assemb., 1st Reg. Sess. (Colo. 2019).

<sup>6</sup> Colorado Public Utilities Commission, *2018 Annual Report of the Colorado High Cost Support Mechanism*, December 1, 2018.

<sup>7</sup> Federal Communications Commission, "Broadband Deployment Advisory Committee," accessed March 25, 2019, <https://www.fcc.gov/broadband-deployment-advisory-committee>.

<sup>8</sup> *FCC Fact Sheet: Updating the Commission's Rule for Over-the-Air-Reception Devices* (Washington, DC: Federal Communications Commission, 2019).

<sup>9</sup> *Universal Service Monitoring Report* (Washington, DC: Federal Communications Commission, 2017). This report details rural subsidies per state in 2016.

<sup>10</sup> Brent Skorup, "Tech Vouchers": Putting Consumers in Control of the FCC's \$4.5 Billion Rural Telecom Fund," *Technology Liberation Front*, August 27, 2018. This post contains a link to a spreadsheet with voucher estimates per household per state using FCC data and US Census data.

## **Don't Balkanize the Internet**

*Brent Skorup, Senior Research Fellow.*

*September 19, 2018*

Government officials from twenty-two states have filed a brief in the case of *Mozilla v. FCC*, seeking to restore the so-called net neutrality rules from 2015 and to vacate the Restoring Internet Freedom Order (RIFO) from 2017. Their legal reasoning, however, suffers from multiple and serious flaws. The states' brief misses key facts and contains misunderstandings about the internet and 2015 Open Internet Order (OIO). Further, if they are successful, these state officials would balkanize the internet.

The states' brief alleges that the FCC failed to “address the impact of the Order on public safety.” The brief points to the electrical grid as an example and claims that the repeal of 2015 rules jeopardizes the ability of state officials to react when the electrical grid is stressed. Even a cursory read of the 2015 Open Internet Order reveals that this is false: the OIO expressly exempted networks like those used to support the electrical grid—the 2017 RIFO changed nothing regarding the electrical grid. The state officials seem, at some level to understand the weakness of the claim; the brief spends two sentences asserting this inflammatory argument and then moves on.

The brief subsequently says: “There is no evidence that it is possible to isolate and preferentially prioritize communications important to public health and safety.” Again, this is a provably false claim. Telecom companies have been “isolating and prioritizing” important communications services for years. Millions of Americans rely on technologies like VoIP and VoLTE that prioritize voice and emergency services on broadband networks. Not only is it possible to prioritize public safety communications, the federal government has spent billions of dollars premised on this fact. For example, prioritizing public safety communications is central to FirstNet, the independent government

authority created in 2012 to equip first responders with wireless broadband for their communication and information needs.

The brief also attacks RIFO's preemption of state laws because these state officials wish to allow states and cities to regulate the internet in the name of net neutrality. First, as a federal court of appeals recently held, state regulation of interstate internet services is preempted by federal law. Legal precedent aside, the states' and cities' desire to enact local internet laws is troubling for a pragmatic reason: it would fragment the global internet into dozens, or even hundreds, of intra-state networks. Each regulator could take a different approach to net neutrality, creating innumerable legal contradictions as to what is or is not allowed.

There are likely other errors that will be uncovered in litigation but a quick review suggests that this brief was rushed. The eagerness by some state officials and advocates to regulate the internet is a recent, unfortunate trend. The internet flourished in the US because of a twenty-year national policy that the internet and internet services should be "unfettered by Federal or State regulation." The 2017 RIFO restores that successful national policy but too many state officials wish to turn back the clock and regulate the internet.

*Find this article at: <https://www.mercatus.org/bridge/commentary/dont-balkanize-internet>.*

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## No, “83% of Americans” do not support the 2015 net neutrality regulations

By Brent Skorup, Senior Research Fellow | May 15, 2018

Lawmakers frequently hear impressive-sounding stats about net neutrality like “83% of voters support keeping FCC’s net neutrality rules.” This 83% number (and similar “75% of Republicans support the rules”) is based on a survey from the Program for Public Consultation released in December 2017, right before the FCC voted to repeal the 2015 Internet regulations.

These numbers should be treated with skepticism. This survey generates these high approval numbers by asking about net neutrality “rules” found nowhere in the 2015 Open Internet Order. The released survey does not ask about the substance of the Order, like the Title II classification, government price controls online, or the FCC’s newly-created authority to approve of and disapprove of new Internet services.

Here’s how the survey frames the issue:

*Under the current regulations, ISPs are required to:  
provide customers access to all websites on the internet.  
provide equal access to all websites without giving any websites faster or slower download speeds.*

The survey then essentially asks the participant if they favor these “regulations.” The nearly 400-page Order is long and complex and I’m guessing the survey creators lacked expertise in this area because this is a serious misinterpretation of the Order. This framing is how net neutrality advocates discuss the issue, but the Obama FCC’s interpretations of the 2015 Order look nothing like these survey questions. Exaggeration and misinformation is common when discussing net neutrality and unfortunately these pollsters contributed to it. (The Washington Post Fact Checker column recently assigned “Three Pinocchios” to similar net neutrality advocate claims.)

Let’s break down these rules ostensibly found in the 2015 Order.

“ISPs are required to provide customers access to all websites on the internet”

This is wrong. The Obama FCC was quite clear in the 2015 Order and during litigation that ISPs are free to filter the Internet and block websites. From the oral arguments:

FCC lawyer: “If [ISPs] want to curate the Internet...that would drop them out of the definition of Broadband Internet Access Service.”

Judge Williams: “They have that option under the Order?”

FCC lawyer: “Absolutely, your Honor. . . . If they filter the Internet and don’t provide access to all or substantially all endpoints, then . . . the rules don’t apply to them.”

As a result, the judges who upheld the Order said, “The Order . . . specifies that an ISP remains ‘free to offer ‘edited’ services’ without becoming subject to the rule’s requirements.”

Further, in the 1996 Telecom Act, Congress gave Internet access providers legal protection in order to encourage them to block lewd and “objectionable content.” Today, many ISPs offer family-friendly Internet access that blocks, say, pornographic and violent content. An FCC Order cannot and did not rewrite the Telecom Act and cannot require “access to all websites on the internet.”

“ISPs are required to provide equal access to all websites without giving any websites faster or slower download speeds”

Again, wrong. There is no “equal access to all websites” mandate (see above). Further, the 2015 Order allows ISPs to prioritize certain Internet traffic because preventing prioritization online would break Internet services.

This myth—that net neutrality rules require ISPs to be dumb pipes, treating all bits the same—has been circulated for years but is derided by networks experts. MIT computer scientist and early Internet developer David Clark colorfully dismissed this idea as “happy little bunny rabbit dreams.” He pointed out that prioritization has been built into Internet protocols for years and “[t]he network is not neutral and never has been.”

Other experts, such as tech entrepreneur and investor Mark Cuban and President Obama’s former chief technology officer Aneesh Chopra, have observed that the need for Internet “fast lanes” as Internet services grow more diverse. Further, the nature of interconnection agreements and content delivery networks mean that some websites pay for and receive better service than others.

This is not to say the Order is toothless. It authorizes government price controls and invents a vague “general conduct standard” that gives the agency broad authority to reject, favor, and restrict new Internet services. The survey, however, declined to ask members of the public about the substance of the 2015 rules and instead asked about support for net neutrality slogans that have only a tenuous relationship with the actual rules.

“Net neutrality” has always been about giving the FCC, the US media regulator, vast authority to regulate the Internet. In doing so, the 2015 Order rejects the 20-year policy of the United States, codified in law, that the Internet and Internet services should be “unfettered by Federal or State regulation.” The US tech and telecom sector thrived before 2015 and the 2017 repeal of the 2015 rules will reinstate, fortunately, that light-touch regulatory regime.

# 10 Things You Need to Know About Net Neutrality

*By Brent Skorup, Senior Research Fellow | June 11, 2018*

## **1. The definition of net neutrality has changed over time.**

Professor Tim Wu coined the term in 2003 to summarize non-discrimination rules for internet service providers (ISPs). Key parts of net neutrality include preventing ISPs from blocking specific content, allowing paid prioritization of some content, or ‘throttling’ (intentionally slowing down) content.

More recently, however, the term has become almost synonymous with the Federal Communication Commission’s 2015 “Open Internet Order.” This policy issue is perplexing because this 2015 “net neutrality” Order allows ISPs to block online content.

## **2. From 1996 to 2015, internet services and the digital economy flourished because of a national policy that the Internet should be “unfettered by Federal or State regulation.”**

In 1996, a Republican Congress and President Bill Clinton approved legislation largely shielding the Internet and Internet services from federal and state regulators. Over nearly 20 years, that standard has been a key reason why the US became the global leader in technology investment and the app economy.

## **3. The 2015 net neutrality regulations from the FCC wouldn’t make net neutrality supporters happy.**

The FCC’s 2015 Open Internet Order actually allowed ISPs to filter content and the Order regulated filtered Internet services less than conventional Internet services. This is ironic, because a fear that ISPs would unfairly or secretly filter content has been one of the driving fears of the net neutrality political movement.

## **4. There are times when Internet “fast lanes” make sense and benefit consumers.**

There are plenty of good reasons for some Internet services to be prioritized over others. For starters, the internet has never been completely neutral, and that’s a good thing. Sometimes, this means something as simple as a broadband provider prioritizing a phone call so it can continue uninterrupted even if many people are streaming high-bandwidth video on the same network. Other times, it’s something as important as making sure that a telemedicine video chat between a doctor and a patient goes smoothly. Importantly, allowing the creation of new fast lanes may even spur additional network infrastructure investment among industries hoping to use them.

**5. Net neutrality regulations won't solve ISP monopoly concerns (and they could make them worse).**

Net neutrality regulates Internet traffic management, not ISP competition. The FCC noted in its 2015 Open Internet Order that its net neutrality rules “are not designed to deal with the acquisition or maintenance of market power or its abuse.” Concentrated market power is a legitimate concern, especially in some areas, but anti-trust policies are a better way to address anti-competitive ISPs.

**6. Net neutrality is contentious, but there is bipartisan support for other internet issues that policymakers could explore.**

There is much more bipartisan support for the FCC to take steps to improve broadband deployment and to auction spectrum for wireless broadband uses. Focusing on concrete steps like relying on private broadband investment, making broadband deployment cheaper and faster, and creating technology vouchers for underserved users can improve broadband access.

**7. Some states have begun exploring their own version of net neutrality bills, but they likely violate the law.**

The net neutrality movement has shifted to the states and several are exploring ways to regulate the Internet. State regulation of a global, borderless network would balkanize the Internet and damage interstate commerce, which is why Internet regulation has remained a federal matter for twenty years. It's unlikely that state regulations, if passed, would survive judicial review.

**8. Everyone agrees that the internet should be free, open, and innovative, but people disagree on what those terms mean and how to get there.**

Supporters of the 2015 Open Internet Order believe that common carriage regulation is necessary to keep the Internet open and innovative. Supporters of the 2017 Restoring Internet Freedom Order believe that light-touch regulation should be restored and that common carriage regulations for the Internet will harm innovation and investment. It's important to remember that both sides are largely interested in the same outcomes, they just have different views on how to get there.

**9. While Internet deregulation is US policy, Internet companies and Internet service providers are subject to federal and state competition and consumer protection laws.**

Until 2015 when the FCC temporarily took over regulatory authority, the Federal Trade Commission reviewed ISP practices and enforced consumer protection, competition, and privacy laws online. In December 2017, the FCC voted to eliminate its 2015 regulations and restore regulatory and competitive oversight to the Federal Trade Commission. State attorneys general also have authority to enforce state competition and consumer protection laws against ISPs and tech companies.

**10. The FCC for years has been distracted from increasing broadband deployment by focusing on hypothetical harms and net neutrality regulations.**

Consumers want broadband competition, lower prices, and new Internet services. The decade-long debate about net neutrality has led to years of litigation and several policy reversals, which has been a significant distraction from the FCC's core competencies, like auctioning spectrum and improving broadband investment and deployment. In 2017, the FCC voted to rescind the 2015 net neutrality regulations and, in turn, created the Broadband Deployment Advisory Committee to advise the FCC on how to improve ISP competition and broadband deployment in rural and underserved areas.

## 5G Basics and Public Policy

*Brent Skorup*

February 2019

5G technology is frequently discussed in policy circles, including at the Federal Communications Commission (FCC), in Congress, and in state legislatures. As 5G is deployed in the United States, consumers and lawmakers will hear much more about it. 5G and related wireless technologies raise novel policy issues about tech competition, regulation, and national infrastructure. The following is a primer on 5G and its policy implications.

### **WHAT IS 5G?**

Wireless and computation technology advances quickly. As a result, about once a decade, cellular carriers, chipset makers, and technology companies come together to announce new wireless standards that take advantage of those innovations. 5G, as the name suggests, is the fifth generation of wireless standards. Most people in the United States with a smartphone are using 4G (also called Long Term Evolution or LTE) and 3G. As you might expect, 5G standards require operators to meet higher capabilities. 5G brings two big advancements over 4G technology.

### **WHAT TECHNOLOGY IMPROVEMENTS DOES 5G BRING?**

*More wireless capacity.* First, 5G standards are designed for higher-capacity wireless services. National governments around the world have freed spectrum from legacy users, including government agencies, and sold it to carriers (such as the FCC's \$20 billion sale of formerly government spectrum in 2015). More spectrum means carriers can offer customers more bandwidth in more places.

*More real-time services.* Second, 5G standards reduce latency, the speed at which devices connect to the network. In the next few years, cellular carriers should be able to reduce connection times

by 90 percent. 5G devices will be much more responsive than 4G, and this capability means 5G opens up opportunities for real-time services.

## **WHAT DOES 5G MEAN FOR USERS?**

5G is being deployed across the country today and will complement, not replace, existing 4G networks. Smartphone and device companies have started selling 5G-capable units, and many more will be developed and sold in the next few years.

*New consumer services.* 4G created a massive market for smartphone apps, the most popular of which include ridesharing, home sharing, mobile gaming, and video watching. The 5G improvements mean more consumers can enjoy real-time services and high-bandwidth services. The following are examples of services that will benefit:

- Aira makes “smart glasses” for blind people. These glasses require wireless reliability and real-time responsiveness. A camera in the glasses streams video via a wireless connection to a distant human assistant who verbally helps the customer navigate airports, restaurants, and other public places.
- 5G capacity also means some customers can “cut the cord” and get home broadband wirelessly. This means more competition in home broadband.
- Finally, 5G is made with the internet of things in mind, so that many more home appliances, wearable devices, cars, and parcel deliveries can connect to the internet for tracking, status updates, and diagnostics.

*New business services.* Whereas the previous four generations of wireless standards were created with consumers and cell phones in mind, carriers and chip companies designed 5G standards with enterprise and industry customers as a priority. Some enterprise services that might benefit from 5G include commercial drones (inspections, medicine delivery, Amazon deliveries, search-and-rescue, etc.), air taxis and flying cars, remote control of autonomous vehicles, and warehouse floor robots.

*Network densification and construction.* Cellular carriers are building hundreds of thousands of “small cells”—outdoor antennas and wireless infrastructure—to supplement their thousands of 4G and 3G cell phone towers. On average, there are about 1,000 users per 4G cell tower in the United States. Sharing a 4G tower with everyone in your neighborhood means that sometimes networks falter and YouTube videos, games, or video chats stutter. 5G will first be deployed in urban neighborhoods to relieve areas with the most intense network congestion. This upgrade of infrastructure means putting small cells on utility poles and street lights in neighborhoods for several years.

## WHAT POLICIES NEED TO CHANGE?

*Fewer local restrictions on infrastructure.* 5G and other wireless services need infrastructure, including fiber networks and roadside poles to install on. All infrastructure projects on public property require local permitting and fees. Current local regulations were typically made for a different world—a few cell towers in a town, not hundreds of wireless facilities dotting downtowns and roadways—and the permitting and fee process is excessive. The FCC recently identified one case where a small California city charged a company \$60,000 in application fees to install 16 small wireless sites, only to reject the application and charge the company for \$350,000 in attorney’s fees. In many towns and cities, it takes years to process an application. Though these are extreme cases, the FCC found that excessive delays and fees are common nationwide.

One way to build infrastructure quickly and put pricing pressure on city fees is to encourage the construction of 5G and other wireless infrastructure on private property, such as backyards, balconies, and grain silos. Localities could make new antenna installations on private property expensive because the law is unclear about what rights property owners have. The FCC and state governments have authority to prevent most municipal interference with and fees on antenna installations on private property, but the FCC could use additional congressional permission and encouragement.<sup>1</sup> State lawmakers can also protect homeowners from any unnecessary local regulations on antenna installation.

*More commercial spectrum.* Here and there the FCC is “de-zoning” spectrum so that it can be used for flexible uses (such as 5G) and not be limited to existing uses (such as broadcast or satellite). There’s another source of spectrum: federal agencies. Federal agencies possess about half of the most valuable spectrum in the United States.<sup>2</sup> However, agencies were gifted this spectrum decades ago and don’t always maximize its use. For 20 years, Congress has occasionally required agencies to give unneeded spectrum to the FCC to sell for commercial operation, but that’s getting harder. FCC Commissioner Rosenworcel has proposed allowing commercial operators to privately negotiate with and compensate agencies for use of federal spectrum. I explore that idea in a 2016 law journal article.<sup>3</sup> It’s a good idea that would help fund agencies, reduce government debt, and create commercial wireless services, but agencies need congressional permission to negotiate with private companies.

## ABOUT THE AUTHOR

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## NOTES

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## Put Rural Consumers in Charge of Their Telecom Fund with Tech Vouchers

By Brent Skorup, Senior Research Fellow. Originally Published in Tech Liberation Front. August 28, 2018

The US government has spent about \$100 billion on rural telecommunications in the last 20 years. (That figure doesn't include the billions of dollars in private investment and state subsidies.) It doesn't feel like it in many rural areas.

The lion's share of rural telecom subsidies come from the FCC's "high-cost" fund, which is part of the Universal Service Fund. The high-cost fund currently disburses about \$4.5 billion per year to rural carriers and large carriers serving rural areas.

### **Excess in the high-cost program**

Bill drafters in Congress and the CBO, after the passage of the 1996 Telecom Act creating the Fund, expected the USF program subsidies to decrease over time. That hasn't happened. The high-cost fund has increased from \$800 million in 1997 to \$4.5 billion today.

The GAO and independent scholars find evidence of waste in the rural fund, which traditionally funded rural telephone (voice) service. For instance, former FCC chief economist Prof. Tom Hazlett and Scott Wallsten estimate that "each additional household is added to voice networks at an annual USF cost of about \$25,000." There are at least seven high-cost programs and each has its own complex nomenclature and disbursement mechanisms.

These programs violate many best practices for public finance. Shelanski and Hausman point out, for instance, that a huge distortion for decades has been US regulators' choice to tax (demand-elastic) long-distance phone services to fund the (demand-inelastic) local phone services. The rural fund disbursement mechanisms also tempt providers to overinvest in goldplated services or, alternatively, inflate operational costs. Wallsten found that about 59 cent for every dollar of rural subsidy goes to carriers' overhead.

To that end, the high-cost program appears to be supporting fewer households despite the program's increasing costs. I found in Montana, for instance, that from 1999 to 2009 subsidies to carriers rose 40 percent even while the number of subsidized rural lines fell 30 percent. The FCC's administrative costs for the four USF programs also seem high. According to the FCC's most recent report, administrative costs are about \$172 million annually, which is more than what 45 states received in high-cost funds in 2016.

### **A proposal: give consumers tech vouchers**

A much more transparent and, I suspect, more effective way of satisfying Congress' requirement that rural customers have "reasonably comparable" rates to urban customers's rates for telecom services is to give "tech vouchers." Vouchers are used in housing, heating, and food purchases in the US, and the UK is using them for rural broadband.

My colleague Trace Mitchell and I are using Census and FCC data to calculate about how much rural households could receive if the program were voucher-ized. Assuming all high-cost funds disbursed to states in 2016 were converted into broadband vouchers, these are our estimates.

If vouchers were distributed equally among rural households today, every rural household in the US (about 20% of US households) would receive about \$15 per month to spend on the broadband provider and service of their choice. Low-income rural households could tack on the \$9.25 USF Lifeline subsidy and any state subsidies they're eligible for.

Perfect equality probably isn't the best way to subsidize rural broadband. The cost of rural service is driven primarily by the housing density, and providing telecom to a rural household in the American West and Great Plains is typically more expensive than providing telecom to a rural household in the denser Northeast, and this is borne out in the FCC's current high-cost disbursements. For instance, Vermont and Idaho have about the same number of rural households but rural carriers in Idaho receive about 2x as much as rural carriers in Vermont.

However, some disparities are hard to explain. For example, despite South Carolina's flatter geography than and similar rural population as North Carolina, North Carolina carriers receive, on a per-household basis, only about 40% what South Carolina carriers receive. Alabama and Mississippi have similar geographies and rural populations but Alabama carriers receive only about 20% of what Mississippi carriers receive.

A tiered system of telecom vouchers smooths the disparities, empowers consumers, and simplifies the program. We've sorted the states into six tiers based on how much the state received on a per-household basis in 2016. This ranking puts large, Western states in the top tier and denser, Northeastern states in the bottom tier.

In our plan, every rural household in five hardest-to-serve Tier 1 states (Alaska, Kansas, Montana, North Dakota, and South Dakota) would receive a \$45 monthly discount on the Internet service of their choice, whether DSL, cable, fixed wireless, LTE, or satellite. As they do in the UK, eligible rural households would enter a coupon code when they receive their telecom services bill and the carrier would reduce the price of service accordingly.

Similarly, every rural household in:

Tier 2 states (ten states) would receive a \$30 monthly discount.

Tier 3 states (ten states) would receive a \$19 monthly discount.

Tier 4 states (ten states) would receive a \$13 monthly discount.

Tier 5 states (ten states) would receive a \$6 monthly discount.

Tier 6 states (five states) would receive a \$3 monthly discount.

\$3 per month per rural household doesn't sound like much but, for each of these states (Connecticut, Delaware, Massachusetts, New Jersey, Rhode Island), this is more than the state currently receives in

rural funds. In Connecticut, for instance, the current high-cost funding amounts to about 25 cents per rural household per month.

Under this (tentative) scheme, the US government would actually save \$25 million per year from the current disbursements. And these are conservative numbers since they assume 100% participation from every rural household in the US. It's hard to know what participation would look like but consider Lifeline, which is essentially a phone and broadband voucher program for low-income households. At \$9.25 per month, 28% of those eligible for Lifeline participate. This is just a starting point and needs more analysis, but it seems conceivable that the FCC could increase the rural voucher amounts above, expect 50% participation, and still save the program money.

### **Conclusion**

As Jerry Hausman and Howard Shelanski have said, "It is well established that targeted subsidies paid from general income tax revenues are often the most efficient way to fund specific activities." Current law doesn't allow allow for tech vouchers from general income taxes, but the FCC could allow states to convert their current high-cost funds into tech vouchers for rural households. Vouchers would be more tech-neutral, less costly to administer, and, I suspect, more effective and popular.