Before the

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

&

NATIONAL SCIENCE FOUNDATION

In the Matter of	)	
	)	
National Broadband Research	)	Docket No. 160831803-6803-01
Agenda	)	
	)	
	)	

COMMENTS OF

TECHFREEDOM

October 11, 2016

I. Introduction & Summary

The debate about American broadband policy has, for too long, been an "economics-free zone."[1] Indeed, it has been unfortunately divorced from any kind of objective analysis of data about broadband deployment and adoption, as the FCC has had essentially free rein to manipulate the limited available data to suit its preconceived regulatory agenda. The FCC has, among other abuses of statistics, economics and basic common sense:

- Claimed that subjecting broadband to regulation designed for railroads in the 1880s will actually increase deployment;[2]
- Justified raising the speed threshold used to measure the adequacy of broadband deployment to 25 Mbps — in order to manufacture a continued negative finding about the state of broadband deployment to use as the basis for increased regulation — by using the most contorted of logic: ignoring real-world speed usage data (such as the fact that, even on Google Fiber's gigabit service, HD video from Netflix still streams at a mere 3.61 Mbps);[3] claiming that broadband deployment today (actually, ~18 months ago, given the lag in the FCC's data) should be measured based on the possibility that large numbers of Americans may, in the coming years, need more bandwidth in order to stream 4K video;
- Completely ignored inconveniently good news about broadband deployment: the massive upgrades of traditional DSL infrastructure (<6 Mbps) to next-generation VDSL2 (25–100 Mbps), most notably by AT&T, to over half the homes in the country;[4]
- Dismissed a proposal by AT&T, as a voluntary condition of its merger with DirecTV to deploy 15–20 Mbps fixed wireless broadband to 13 million rural homes and businesses,[5] half of which lacked any comparable option, instead insisting that AT&T focus on deploying 1,000 Mbps fiber-to-the-home in cities instead — with no explanation as to the

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[1] L. Gordon Crovitz, *"Economics-Free" Obamanet*, WALL ST. J. (Jan. 31, 2016), *available at* http://goo.gl/PxJh7g.

[2] *See* Protecting and Promoting the Open Internet, *Report and Order on Remand, Declaratory Ruling, and Order*, GN Docket No. 14-28, 30 FCC Rcd. 5601, ¶¶ 37–40 (Feb. 26, 2015), *available at* https://goo.gl/dlx07R.

[3] *See* Netflix, *ISP Leaderboard — September 2016* (last visited Oct. 11, 2016), *available at* https://goo.gl/ol3Hdk.

[4] *See* Berin Szóka, Tom Struble, *Comments of TechFreedom in Response to Oppositions to Petition in the Matter of Applications of Comcast Corp. and Time Warner Cable, Inc.,* MB Docket No. 14-57 (December 23, 2014) *available at* http://docs.techfreedom.org/TF_Reply_to_ComcastTWC_Petitions.pdf

[5] Applications of AT&T Inc. and DIRECTV for Consent to Assign or Transfer Control of Licenses and Authorizations, *Memorandum Opinion and Order*, MB Docket No. 14-90, at ¶¶ 346–75 (July 24, 2015), *available at* https://goo.gl/180KIH.

relative advantages of each nominally "voluntary" condition in connecting unserved Americans;[6] and

- Insisted that the only way to increase broadband competition, improve speeds, and lower prices is to interpose itself between states and localities and preempt laws regarding municipal broadband[7] (something the Supreme Court had already said the FCC could *not* do under a far clearer provision of the Act).[8]

The FCC cannot continue to operate in this manner and still claim the mantle of "expert agency" — as it has, time and time again, in asserting that courts should defer to its interpretations, however outlandish, of its statutory authority. So impoverished is the current FCC Chairman's understanding of cost-benefit analysis that he has insisted that the FCC always does cost-benefit analysis simply by virtue of taking public comment[9] — as if providing outside parties an opportunity to provide their own cost-benefit analyses, and then cherry-picking among studies that suit the FCC's own agenda, was a substitute for the FCC conducting its own, neutral assessment of the likely costs and benefits of proposed action, and of potentially less costly alternatives. The point is not mere legal formalism, but to ensure that the FCC is actually making consumers better off — indeed, that it is using its legal authority and institutional resources to serve consumers in the best possible way.

We commend the National Telecommunications and Information Administration (NTIA) and National Science Foundation (NSF) for stepping into this analytical vacuum. Before suggesting specific research topics, we offer the following general suggestions.

The problem is not data collection, but analysis. Simply collecting more or even significantly higher-quality data will do little to ensure that American broadband policy actually serves consumers. The FCC — under both Democratic and Republican Chairmen — has become so accustomed to manipulating data to suit a preconceived outcome that it will be difficult to break the agency of this habit. The NSF simply cannot assume that the research it supports will speak for itself or that the FCC can be relied upon to do additional research based on NTIA's underlying research. Instead, any research funded under this grant should be framed in economic terms. To ensure that happens, we make two general suggestions. First, any broadband research team should include at *least* one economist. Second, all research should be framed — as all good eco-

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[6] *Id.* ¶¶ 376–77.

[7] City of Wilson, North Carolina Petition for Preemption of North Carolina General Statutes Sections 160A-340 *et seq.*; The Electric Power Board of Chattanooga, Tennessee Petition for Preemption of a Portion of Tennessee Code Annotated Section 7-52-601, *Memorandum Opinion and Order*, WC Docket No. 14-115 (Feb. 26, 2015), *available at* https://goo.gl/YkdbHC.

[8] Nixon v. Mo. Mun. League, 541 U.S. 125 (U.S. 2004).

[9] Senate Committee on Commerce, Science, and Transportation, *Hearing on Oversight of the Federal Communications Commission*, at 2:57:19 (Sept. 15, 2016), *available at* https://goo.gl/16GPuE.

nomic analysis is — by asking questions on the margin instead of in aggregate terms, and by analyzing tradeoffs across a range of options instead of thinking in terms of simplistic binaries.

II. Broadband Technology

Analyze the Full Range of Fixed Broadband Technologies & Iterative Upgrade Paths

Many people champion gigabit fiber-to-the-premises as the gold standard for broadband deployment, believing it to be the most cost-effective and future-proof way to deliver high-speed broadband to users. Indeed, the public policy debate over broadband has become so fixated on this idea that it could be paraphrased in terms of Mike Meyer's 1993 classic oeuvre *So I Married an Axe Murderer*: "If it's not gigabit—it's crap!"[10]

In fact, FTTP is just one end of a range of deployment models. If an ISP were deploying in a true "greenfield" — say, to a newly constructed suburb — it might well be cost-effective to deploy FTTP. But even then, most FTTP services do not actually provide gigabit speeds, because while fiber is *capable* of carrying synchronous gigabit speeds (and faster), it is not yet cost-effective to invest in the equipment needed to carry such speeds — because consumers do not yet demand them and there are more effective iterative upgrade paths that allow gradual speed upgrades over time. Most notably, Verizon began building began deploying FTTP networks a decade ago, but still generally does not offer gigabit speeds.

Just as there is an iterative path to upgrading FTTP networks, there are a variety of iterative paths that incumbents can choose to upgrade legacy infrastructure (copper wiring or coaxial cable) to provide hugely faster speeds to the premises. This involves pushing fiber closer to the premises, but using cable technologies like DOCSIS 3.0 and 3.1 or telco technologies like VDSL2 or G.fast to get greater speeds out of a shrinking loop between the home and the fiber network.

To date, there has not been a comprehensive study of the various upgrade paths available and their relative cost-effectiveness over time and in a variety of different economic circumstances — such as neighborhood density, kinds of construction, and demand levels. NTIA and NSF should analyze the full range of broadband technologies to assess the viability and capabilities of different technologies in different contexts (*e.g.*, at different speed tiers, in different topographies and population densities) over time. In particular, the concept of "future-proofing" deployment should be carefully scrutinized.

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[10] So I Married an Axe Murderer, MovieQuotes (last visited October 11, 2016), *avaliable at* http://www.moviequotes.com/repository.cgi?pg=3&tt=96674

Studying Wireless Deployment Models

While new entrants like Google Fiber have experimented with building all-new FTTP networks, it is far from clear that this will make economic sense in the future. 5G wireless technologies promise to be able to deliver gigabit speeds to fixed wireless connections. If so, at least in sufficiently dense areas to merit deploying the dense mesh of small cells required to support 5G networks, 5G may prove to be more cost-effective than wiring existing buildings — and yet quite capable of delivering higher speeds, and more monthly data, than consumers actually demand. And in low density areas, at least for the near-to-medium term, 4G and other existing wireless technologies may prove to be significantly more cost-effective than wireline deployment.

NTIA and NSF should study the cost-effectiveness and practicality of wireless technologies as part of the mix of deployment models.

Quantify the Benefits of FTTP

Those who champion fiber-optics as the broadband technology of the future also regularly claim that we need to deploy fiber connections to every home and office building in America. However, while access to high-speed broadband tends to promote economic growth and societal welfare, it is unclear to what extent FTTP deployment promotes better outcomes than high-speed broadband delivered over other technologies (*e.g.*, coaxial cable).

What quantifiable benefits does FTTP yield? How do those benefits compare with other high-speed broadband connections? How do the costs of deploying FTTP compare with the costs of deploying other broadband technologies?

Studying Public-Private Partnerships

In its rhetoric and its attempt to preempt state laws governing muni broadband networks, the FCC has created a binary debate as between the status quo and government-owned broadband networks. In fact, there are a wide range of options in between by which policymakers can stimulate both upgrades to existing networks and new entry to the broadband market — both by cutting red tape and lowering fees and by making public infrastructure more readily available to broadband providers, such as through Dig Once conduits or fiber-ready poles.[11] Yet there is scant economic data about this range of options and the costs involved.

What are the costs to providers of government policies, such as the time and expense involved in permitting tower or pole deployment or gaining access to government-owned land or buildings? How much of a difference would fiber-ready infrastructure make? How can it be con-

[11] Letter from TechFreedom to Hon. Fred Upton and Hon. Greg Walden on Promoting Broadband Infrastructure Investment 3 (July 22, 2015), *available at* http://docs.techfreedom.org/techfreedom_letter_on_broadband_deployment_-_july_2015.pdf

structed at a minimum of expense to taxpayers? What models are available to balance the need for taxpayers to recoup their investment with the desire to encourage investment and new entry? What else can governments do to help lower the costs of deployment? What can we learn in quantitative terms from the experience of municipalities that have experimented with public-private partnerships?

III. Access & Adoption

Compare Broadband Investment Levels in the U.S. & Europe

Debates around domestic broadband policy are rife with cross-country comparisons, but, depending on who you ask, the U.S. is either a world leader in broadband or it is falling behind to other developed nations. To the extent possible, NTIA and NSF should support research to assess broadband investment levels in the U.S. and abroad, and, where possible, draw comparisons between countries in terms of investment levels, available speeds, and adoption. Further, where there are significant differences between countries, studies should assess to what extent those differences are attributable to differences in regulatory policy. For example, does a lighter regulatory climate beget more infrastructure investment?

Project Future Deployment Needs

In deciding which broadband technology to deploy, one must consider a number of different factors, including what levels of service will be needed or desired by users. It is universally accepted that the speeds and capacity demanded by users will continue to increase going forward, as applications become richer and more data-intensive (*e.g.*, streaming 4K UHD video requires greater throughput than streaming HD video), and there are robust trend lines to predict the overall growth in Internet traffic going forward. However, there is precious little data available to project future needs by individuals. How much Internet data do users on average consume today? What does the distribution of Internet data usage look like today, in terms of skew, standard deviation, etc.? Looking at usage over the past two decades, can we project the service needs of users going forward, and thereby plan broadband deployments to meet those needs?

Assess Viability of Gigabit Opportunity Zones

How important is broadband access in the home, compared to broadband access in a nearby city-center? In the same way that individuals in developing countries often must travel to a city-center to get any connectivity, if Americans must travel to a city-center to get next-gen gigabit connectivity, what impact would that have on economic growth? Compared to the costs and benefits of deploying gigabit connectivity to every home in the near-term, would deploying such connectivity first to so-called Gigabit Opportunity Zones be a more cost-effective driver of economic growth?

IV. Socioeconomic Impacts

Assessing the Effects of Broadband on Economic Growth

It is commonly accepted that access to high-speed broadband is a key driver of economic progress and social welfare, but the precise relationship between broadband access and these socioeconomic impacts remains unclear. Does access to broadband truly drive economic progress, or is it the other way around, and broadband access is actually a symptom of growth, rather than a cause? Do higher speeds correlate with stronger economic growth? If so, how strong is that correlation? Is it linear, or do higher speeds have diminishing returns for economic growth as speeds increase?

Assessing the Effects of Broadband on Inequality

Economic inequality is a major concern, both within and between countries. Many people tout broadband as a great equalizer, in that it will likely reduce socioeconomic disparities over time. NTIA and NSF should fund studies to assess the effects of broadband on inequality. To what extent does broadband access reduce inequalities within a country? To what extent does broadband access reduce inequalities between countries? How important are factors like speed, capacity, and affordability to the effect of broadband on inequality?

Maximizing Benefits of High-Speed Broadband Deployment for Businesses

In a perfect world, broadband would be ubiquitous, and available in every home and business at high speeds for low prices. However, in the real world, ISPs often must make trade-offs during deployment, and service certain areas before others or deliver higher speeds to certain areas than to others. For example, an ISP may choose to deploy and service a business park or other commercial area before a residential area, because the enterprise connections are more lucrative for the service provider. NTIA and NSF should fund studies to assess the benefits of serving broadband to businesses compared to the benefits of serving broadband to residential users. These studies should focus both on the benefits to ISPs (*e.g.*, a higher rate-of-return that could potentially be used to cross-subsidize residential connections) and to the greater economy (*e.g.*, higher productivity).

V. Opportunities for Federal Leadership in Data Collection & Research

Assessing the FCC's Cost-Benefit Analyses Regarding Broadband

Under Executive Orders 12866 (1993) and 13563 (2011), Executive Branch agencies must perform cost-benefit analysis of all major proposed rules and regulations. However, since the FCC is an independent agency, it is not subject to this requirement. Chairman Wheeler often pays lip service to cost-benefit analysis — even going so far as to say that the FCC's notice-and-comment procedures for informal rulemaking function as an effective cost-benefit analysis:

> **Sen. Johnson:** Commissioner Wheeler, is there any plan to do a cost benefit analysis [on the Commission's proposed set-top box regulations]?
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> **Wheeler:** …. I think that the whole notice and comment process itself is one huge cost-benefit analysis, because we are constantly having folks come in and talk to us about "here's where the cost is" or somebody else coming and saying "here's what the benefits are." I liken the notice and comment process as kind of the administrative law equivalent of the scientific method. Somebody proposes something, somebody rebuts it, they change it, it goes here. This is what the whole process goes through, so I think that there is a fullsome[sic] cost-benefit that gets done.
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> **Johnson:** That's kind of haphazard as opposed to a very formalized cost-benefit. I'm an accountant, so I kind of like to actually see the figures, so wouldn't a more formalized cost-benefit analysis be helpful?
>
> **Wheeler:** How can you collect as much information as possible and then the challenge, of course, in a cost-benefit judgment comes back to that old Harry Truman quote, where he said, "I want a one-handed economist because they always say 'on one hand, on the other'" and it becomes less math and more judgment. As we're going through this entire long-running administrative process. I think there percolates up to all the members of the Commission just what the costs and benefits are as put forward by various parties. The cable folks on the set top box issue, they went out and hired a former chief economist to the FCC to give a quantification to their numbers. Others have quantified it other ways.[12]

In other words, the FCC refuses

— but there are no objective studies available to assess the quality of economic analysis within the FCC's notice-and-comment procedures.

NTIA and NSF should fund studies to assess the quality of economic analysis undergirding several of the FCC's recent actions regarding broadband (*e.g.*, 2015 Open Internet Order, Business Data Services, Broadband Progress Reports). Where possible, economic analysis by the FCC should be compared to economic analysis done by other regulatory agencies.

Compiling Infrastructure Databases

One major hurdle to broadband deployment is the lack of available data on existing infrastructure (*e.g.,* utility poles, conduits) and public assets (*e.g.*, government-owned property). At all levels of government, compiling infrastructure databases in easily usable GIS formats could go a long way towards reducing transaction costs and facilitating broadband deployment. But just what these databases should look like remains a subject where further research is required. How much would it cost to compile these databases and keep them reasonably up to date? How much

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[12] Senate Committee on Commerce, Science, and Transportation Hearing *supra* note 9 at 2:58.

value would such databases offer to ISPs? NTIA and NSF should fund research into these questions, and perhaps consider establishing best practices for model infrastructure databases.

Respectfully Submitted,

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