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Attached please find a filing related to the Broadband Opportunity Council Request for Comments. Many thanks.

Blair Levin

**Before the
Department of Agriculture
Rural Utilities Service**

and

**Department of Commerce
National Telecommunications and Information Administration**

In the Matter of)	
)	
Broadband Opportunity Council)	Docket No. 1540414365-5365-01
Request for Comment)	

Comments of
Blair Levin

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June 10, 2015

Statement of Interest. I am Blair Levin, currently a Senior Non-Resident Fellow at the Metropolitan Policy Program of the Brookings Institution. I am filing this response to the Broadband Opportunity Council Notice and Request for Comment (RFC) in my personal capacity, reflecting on the experiences I have had as Chief of Staff to the Chairman of the Federal Communications Commission (1993-1997); a Wall Street Policy Analyst covering telecommunications, tech and media companies (2001-2008); Executive Director of the National Broadband Plan (2009-2010); and Executive Director of Gig.U, a consortium of research university communities seeking to accelerate the deployment of next generation broadband networks to support economic and educational development (2011-2015). In addition, I currently consult with or advise a number of non-profit and for-profit entities, as noted herein, where relevant to a specific recommendation.

Fundamental Approach. The mission of the Broadband Opportunities Council (BOC) is critical for the economic and social progress of this country. I believe it is consistent with the fundamental vision of the National Broadband Plan¹ (the Plan), which I would summarize as *ubiquitous, affordable, abundant bandwidth, with all Americans online, and using that platform to better deliver public goods and services*. The Plan set forth four strategies² to pursue that vision:

1. Drive Fiber deeper into the network;
2. Use Spectrum more efficiently;
3. Create the right incentives for adoption by all; and
4. Encourage the development of applications to improve the country's ability to make progress in certain national purposes, including health care, education, public safety, and energy, among others.

The Relationship Between Strategies. The BOC RFC focuses on deployment and adoption, but it is important that the relationship between those goals and all four strategies is understood. Simply put, improvements in each can drive improvements in the others; bottlenecks in any can stifle progress in all. That is, for example, more fiber can free-up more spectrum,³ making mobile applications more robust, encouraging adoption by increasing the value of being on-line, making applications that create public goods more valuable, and with those increasingly valuable applications driving greater value and adoption, the economics to improve the fixed and mobile network increase.

¹ The entire Plan can be found at <https://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf>

² The Plan also makes over 200 tactical recommendations for advancing those strategies. For my own overview of how the country has done to date, see <http://scholarship.law.edu/cgi/viewcontent.cgi?article=1556&context=commlaw>. For a broader overview, see the proceedings of a conference held by Georgetown on the Fifth Anniversary of the Plan, at <http://cbpp.georgetown.edu/2015/03/27/video-from-national-broadband-plan-event-now-available/>.

³ This can be done in a variety of ways but most notably, Wi-Fi offload.

My comments, will suggest a number of ways different federal government agencies can contribute to advancing those four strategies as they also therefore drive progress towards the two primary goals of the RFC.

The Fundamental Barrier to Progress. My work with Gig.U also deeply informs the framework for the recommendations I make here. That work is largely focused on the first strategy, driving fiber deeper into the network. The work began when a number of communities came together with a common vision of removing bandwidth as a constraint to innovation, economic growth, and social progress. This led us to examine a question that, while not explicitly stated this way, was at the heart of the Plan as well as the RFC: *why are current market forces not producing the affordable, abundant bandwidth that communities seek and that next generation networks can deliver?* In a way, the answer is simple. While the benefits to the community of constructing a gigabit or next generation network may be great, the benefits to private providers, who traditionally have financed, built and operated the networks, are generally less than the cost to them.

While the answer is simple in concept, overcoming the current problematic math is not simple in practice. Nonetheless, it can be done. The approach Gig.U took, and which has resulted in next generation efforts in over 75 communities⁴, is to improve that cost-benefit equation, much in the way that cities often negotiate with private real estate developers and potential economic development projects to make an otherwise difficult investment possible. At the heart of these negotiations, and indeed every business negotiation between partners, is a search for *asymmetric value creation*. That is, the opening question is what can party A do that costs relatively little but creates a larger benefit to party B, so that party B will act in a way to benefit both party A and party B.

In the Gig.U experience, both the city and a potential service provider want to improve the investment opportunity in next generation broadband networks. The question is what can the city do, at a minimal cost to the city, that provides a larger benefit to the partner, that in aggregate reverses that cost benefit equation by reducing the provider's capital expenditures, operating expenses and risk, while increasing revenues, system benefits and competition.⁵

Gig.U was not alone in developing that equation; indeed, that equation is at the heart of the negotiations between municipalities and all potential next-generation network providers, including Google Fiber, AT&T, CenturyLink and others. That equation has not been changed by one simple policy adjustment; rather, it has been changed by a long list of municipal reforms. So here, as the RFC implicitly recognizes, a number of agencies in the federal government have the capacity to contribute to changing the equation. If they do so, I believe we will see both a

⁴ A more detailed view of the Gig.U community projects will be available later this month in the Gigabit Community Handbook to be published jointly by Gig.U and the Benton Foundation.

⁵ For a more detailed view of the equation, see <http://www.gig-u.org/cms/assets/uploads/2012/12/Bowling-Together-Blair-Levin-.pdf> at pages 6-10.

broadening of communities where the economics of next generation deployments begin to work and an acceleration of next generation network deployments. What follows is a series of recommendation designed for that asymmetric value creation in which the costs to the federal agencies are small, if any, but the potential benefit to both the private parties and the public is large.

The Importance of the Right Conversations. I applaud the creation of the BOC not just for the policy changes it can drive but for the conversations it can engender. While I believe the Administration, the Congress, and the FCC can take pride in the positive outcomes resulting from the implementation of a number of Plan recommendations and post-plan initiatives, policy changes and government actions are not the only path to progress. Indeed, in both the deployment and the adoption areas, one could argue that the greatest successes of the Plan emerged not from a specific recommendation but from conversations Plan staff had with private sector players about specific problems and the subsequent brainstorming about creative solutions.⁶ While private sector creativity should never be used as an excuse for government action where government action is necessary⁷, not every piece of the puzzle is likely to be dependant on a policy answer and the BOC should be open to private sector options.

With that framework in mind, here are specific recommendations.

I. Lowering the Cost of Network Deployment.

A. Improving Access to Critical Information. One of the elements contributing to the cost of deployment is the expense, both in time and resources, of obtaining the necessary information to plan a project. The federal government can play a useful role in lower the costs by improving access to critical information. For example, the council, working with a number of parties including the FCC, FERC and state PUCs could establish a central inventory of utility pole and conduit information.⁸ For example, data could be collected systematically, as is done in Germany, which is mapping fiber, ducts and conduits and is planning to coordinate these data with information about public works and infrastructure projects.⁹

B. Improving Access to Critical Facilities. As the government has recognized on a number of occasions, the public interest requires that certain parties have access to certain critical facilities owned by others, such as utility poles.¹⁰ The Council should

⁶ In the deployment space, Google Fiber, which is the principal catalyst for the emerging “Game of Gigs,” came out of discussions with Plan staff. <http://www.cnet.com/news/google-exec-sees-google-fiber-as-a-moneymaker/>. In the adoption space, the nation’s largest adoption program, Comcast Internet Essentials, emerged from a cable industry discussion with Plan staff about adoption.

⁷ See comments on role of government in discussion of adoption, below.

⁸ For further details on what the FCC itself could do, see Recommendation 6.4 of the Plan.

⁹ Ibid, at footnote 29.

¹⁰ Section 224 of the Communications Act of 1934 regulates access to poles for this purpose. See also, for example, the Pole Attachment Act of 1978, which was required to enable the then fledgling cable industry to build out networks in a way that would allow its services to be affordable.

improve that access in three dimensions. First, it should do so in terms of time. For example, the government could establish a comprehensive timetable for what constitutes a reasonable time for each step of the pole attachment process and establish a process for resolving disputes regarding infrastructure access.¹¹ Second, the government should do so in terms of lowering the cost of the pole attachment make ready work. Reform of the make ready work process presents significant opportunities for lowering the cost of deploying new networks. For example, allowing prospective attachers to use independent, utility approved could save significant costs and certified contractors to perform all engineering and communications make-ready work.¹² Third, the government should do so in terms of establishing rental rates for pole attachments that are as low and close to uniform as possible, consistent with Section 224 of the Communications Act.¹³

C. Improving Access to Rights of Ways and government Facilities. Because local, state, Tribal and federal governments control access to important rights-of-way and facilities, a comprehensive broadband infrastructure policy necessarily requires a coordinated effort among all levels of government. During the process of writing the Plan, many parties disagreed on the facts involving the cost and speed of access to rights of way. However, nearly all agreed that there can be, and should be, better coordination across all jurisdictions on access to rights of ways and facilities. Such coordination could, for example, establish common application information that would lower administrative costs for industry and government agencies alike. As broadband network construction often involves multiple jurisdictions, such practices would help all improve the opportunities for network providers to reach critical scale without having to re-invent the wheel multiple times in the same region.¹⁴

D. Improving the Simulative Affect of Federally Funded Projects. The Federal government engages in billions of dollars of construction projects every year. All such projects should facilitate laying conduit or dark fiber, which can then be used to lower the cost of connectivity both to the facility and to the surrounding community. The Plan, for example, recommended that the Department of Transportation make federal financing of highway, road and bridge projects contingent on states and localities allowing joint deployment of conduits by qualified parties. The same could be done with other federally funded projects along rights of ways, including sewers and power transmission lines.¹⁵ To a significant extent, President addressed the coordination issues with his Executive Order in June of 2012, but the Council should evaluate the impact of those efforts and what other efforts the federal government can do to use its assets to stimulate deployment.

¹¹ For further details on what could be done, see Recommendation 6.3 of the Plan.

¹² For further details on what could be done, see Recommendation 6.2 of the Plan.

¹³ For further details on what could be done, see Recommendation 6.1 of the Plan.

¹⁴ For further details on what could be done, including what such a council should see as its mandate, see Recommendation 6.6 of the Plan.

¹⁵ For further details on what can be done, see Recommendations 6.7 and 6.8 of the Plan.

E. Improving Access to Spectrum, particularly Government Spectrum. As suggested in the Plan, the government should seek to use market forces to help repurpose spectrum so that it reflects consumer preferences for what is the highest and best use. Congress recognized the wisdom of that approach in passing legislation authorizing the upcoming incentive auction.¹⁶ Providing current spectrum licensees greater flexibility in using that spectrum is another important way to accomplish that goal.

It is unlikely, however, that such efforts will be sufficient to meet long-term spectrum needs. As the demand for spectrum grows, we must also look to spectrum utilized by government entities to meet spectrum needs. One way, which holds great promise, is the sharing regime the FCC recently established in the 3.5 band.¹⁷ That may work for other bands as well.

We also need to consider how to move some government spectrum to licensed bands. Some have suggested using the incentive auction technique for government spectrum.¹⁸ While I am optimistic about the incentive auction for private spectrum, I am skeptical that it will work in a government setting. We studied the idea of letting government agencies keep some of the proceeds while we were doing the Plan, but our analysis suggested that the incentives would not be sufficient to free up any material amount of spectrum, as government officials would be unlikely to have the same financial incentives as private actors and would understandably fear that any gain in one year with auction proceeds would be offset with congressional budget cuts in subsequent years.

I believe, however, that the government should explore other ideas for freeing up government spectrum. One way would be to give private sector actors incentives to free up government spectrum by giving the private actors the right to use and sell the spectrum if they can provide the government agency with an equivalent service. This could be accomplished by auctioning to private enterprises the right to negotiate with a particular government agency. While such an auction would not likely raise much money, it could give private sector actors incentives to develop creative ways to more efficiently use equipment and other technological developments to free up spectrum.

Another approach is to treat spectrum the way the federal government treats most of its real estate needs, by centralizing the spectrum management function. Instead of each agency handling its own real estate, the Government Services Administration controls the overall portfolio. Similarly, the federal government could put all government-used spectrum under the control of a single administrator. That agency, particularly if it is part of the Office of Management and Budget, will

¹⁶ <http://docs.house.gov/billsthisweek/20120213/CRPT-112hrpt-HR3630.pdf>

¹⁷ <https://www.fcc.gov/document/proposes-creation-new-citizens-broadband-radio-service-35-ghz>

¹⁸ <http://www.markey.senate.gov/imo/media/doc/2015-03-26-Federal%20Spectrum%20Incentive%20Act-billtext.pdf>

ensure that the spectrum is used efficiently and would be able to balance the needs of the government agencies for spectrum and the possibility of raising revenues by leasing spectrum to private parties.

In addition, it would be useful to have each government agency that utilizes spectrum to be charged, in the budget, some amount that reflects a broad measure of opportunity costs, thus creating a market sensibility among government users and others in the government, such as Congress, about the cost of spectrum.¹⁹

F. Improving the Economics of Wireless Deployment. One of the challenges in deploying wireless networks is the time and cost of deploying towers. To help address both of these challenges, the Council should develop one or more master contracts to expedite the placement of wireless towers on federal government property and buildings. The goal of these master contracts should be to lower real estate acquisition costs and streamline local zoning and permitting for network infrastructure.²⁰

G. Improving the Economics of Deployment through Forward Commitments and a “Buy Once” Policy. One of the techniques Gig.U communities have used to improve the economics of next generation network deployments is to aggregate demand among a number of institutional users. Google and others use a similar technique of getting advanced commitments of a neighborhood prior to actually deploying. These techniques both reduce the risk of stranded investment and improve the construction economics. The federal government could participate in such a process by offering to buy next generation network services in any community where it has facilities and where the community is attempting to stimulate an upgrade. To take it one step further, the federal government, in an open procurement process, could invite all public institutions in a community to join in a buying cooperative for next generation services. This would be analogous to the “dig-once” policy²¹ that requires a coordinated construction effort to accelerate broadband deployment on federal lands, which the President has already adopted by executive order.²² Here, however, the principle would be “buy once and buy together” for schools, libraries, hospitals and governments at all levels. Another version of this idea, and one that I recommend, would be to expand the number of public enterprises that are allowed to buy off the GSA master contracts.

H. Organizing Multiple Government Jurisdictions to Improve the Economics of Deployment. One of the lessons from the Gig.U experience was that increasing the scale of a project improved the economics. To do that requires some level of standardization among multiple governments. In North Carolina, the North Carolina

¹⁹ England is doing this. See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/287992/PSSRP_update_5_March_2014_Final.pdf

²⁰ For more details see Recommendation 6.10 of the Plan.

²¹ For a further discussion of “dig once” policies, see Recommendation 6.8 of the Plan.

²² <http://www.gpo.gov/fdsys/pkg/FR-2012-06-20/pdf/2012-15183.pdf> (June 14, 2012)

Next Generation Network Project (NC NGN), an outgrowth of Gig.U, handled the coordination that led to the standardization that is enabling multiple new next generation network deployments. In Connecticut, the State Office of Consumer Council has performed a similar function, leading to an effort that currently involves over 40 Connecticut communities, representing about half the population of the state. The BOC should study those efforts and determine where the federal government could help provide the coordination. For example, in areas where the federal government has a significant presence, such as with military installations or research facilities, it can itself serve as an anchor for such efforts. But it can also act as a convener in other areas where deployment is particularly valuable from a federal perspective.

I. Providing Incentives to Improve the Economics of Deployment and Adoption.

One obvious tool the federal government has to accelerate next generation broadband deployment is to provide Economic Development Agency Planning grants for communities to undertake the kind of planning efforts that a number of Gig.U communities undertook. Such grants can require a match to assure the community has a sufficient commitment to the project.

The federal government could, and in my opinion should, take that a step farther and create a well funded program “race to the top” kind of program that would encourage cities to organize to advance infrastructure innovation²³ while at the same time encouraging other activities, such as using that infrastructure to build applications on top of open data, provide next generation citizen services, demonstrate improvement in K-8 learning outcomes, and reduce the incidence of one or more chronic diseases, among other kinds of activities to be funded. I would also urge such a program to provide an incentive to consider how improved networks could help address some of the public safety and policing concerns that have recently been in the news.

J. Promote Broadband Ready Buildings. The Federal Government can encourage the real estate industry to improve the economics of deployment of next generation networks in at least three ways. First, it can do so in the requirements of its own buildings. For example, the GSA and HUD could require next generation capable conduit and Wi-Fi access points in any facilities they help fund. Second, it can do so in its policies. For example, the FCC could update its inside wiring rules, which have not been done since 1985, to encourage the necessary inside wiring to connect to external next generation networks. Third, it can do so through the information it provides. For example, the Department of Energy currently maintains a High Performance Building Database on energy efficiency that provides a road map for the construction industry to use. NTIA could create a similar database for the construction industry and broadband. Another use of information resembles the Department of Transportation’s database on flight delays that encouraged more

²³ This builds on an idea suggested by Thomas Friedman at <http://www.nytimes.com/2012/11/21/opinion/friedman-obamas-moment.html>

accurate information and more on time flights. Similarly, the Department of Transportation could have a database on airport and train station Wi-Fi, which both provides valuable information and encourages Wi-Fi upgrades. The Department of Commerce could maintain a database that allows a designation, similar to the LEED designation that encouraged ‘green buildings,’ to encourage world-class broadband in buildings. This could be broadened into a larger database, in which cities and states could contribute, that provides broader connectivity ratings, thus encouraging market forces to drive network upgrades.

K. Tax Policies to Encourage Deployment. There are a variety of tax policies that could also be used to encourage deployment. Of course, these are unlikely to be done outside the context of a broader tax reform effort. If that is done, the Congress will likely address the issue of whether, and if so, how, to allow the repatriation of funds held overseas. While that issue goes beyond the scope of this filing, I agree with those who argue that repatriated funds could be used to accelerate next generation infrastructure, including next generation broadband networks.²⁴

II. Increasing Adoption and Use. With the third strategy, getting everyone online, the Plan proposed a number of actions. As noted earlier, the conversations we had may have been as important than the answers we gave, particularly with the cable industry. One outgrowth was the Comcast Internet Essentials program, the largest national adoption program.²⁵

But while there are some successes, as I noted on the first anniversary of the Plan, adoption was my greatest shortfall in terms of the Plan.²⁶ We understood adoption was critical but needed more creativity in addressing it. I do not want to take anything away from private efforts, but I fear that some in government believed this is a problem acts of charity alone could address.²⁷ It isn’t. Fortunately, it is now back on the government agenda, with Commissioner Clyburn setting out a framework for Lifeline reform.²⁸ I believe that framework is fundamentally correct²⁹ and applaud the FCC for moving forward with an NPRM.

²⁴ For example, see http://www.washingtonpost.com/opinions/rebuild-american-infrastructure-companies-offshore-profits-can-help/2011/06/15/AGIYAqXH_story.html

²⁵ http://corporate.comcast.com/images/Final_IE_Research_Full_Paper.pdf

²⁶ <http://www.knightcomm.org/wp-content/uploads/2011/03/delivery-joint-center-final.pdf>

²⁷ Chairman Genachowski focused his efforts on creating a new non-profit to address the issue. If he had done so as a private individual, it would have been admirable. Doing so as Chairman of the FCC was problematic on many levels, ranging from creating a false sense that private charitable efforts will be sufficient to solve what is a problem government must take responsibility for, to the optics of obtaining funding for the non-profit from the owner of a company benefitting from the program designed to assist low-income individuals. <http://www.utsandiego.com/news/2012/may/31/carlos-slim-fcc-chief-tout-pilot-project-erase-dig/>.

²⁸ <https://www.fcc.gov/document/commissioner-clyburn-remarks-american-enterprise-institute>

²⁹ While I am writing in my personal capacity, I serve, on a pro bono basis, as a Senior Advisor to Common Sense Media, which is participating in the Lifeline proceeding, seeing reform of the program as essential to its agenda of helping America’s youngest generation become ready for the challenges of the decades ahead.

That it is critical step, but not the only necessary one. Like the other strategies, policy makers need to consider a number of changes in the landscape when considering solutions.³⁰ Too often the debate about the “digital divide” focuses on issues that were relevant a decade ago when getting basic broadband networks everywhere was far more important. The more current analysis suggests that improving all users’ digital skills is crucial to encouraging full use of information and communications technologies. That is a very different problem than access to devices or services. Therefore, an ongoing focus on access alone might obscure attention to digital skills, whose solution requires fresh approaches.

A. Competition as a Driver of Adoption. In addition to the changes in the landscape noted above, there have been market changes that the BOC should study to determine if it provides new insight into how best to get everyone online. While most have focused on the impact of Google’s entry on the high end of faster speeds, it also has created a new model for servicing low-income persons. For example, while it is still early, it would be interesting to compare the results of the Comcast Internet Essentials program with Google Fiber’s low cost service. Both reflect low cost entry programs but they differ in price and qualifying process. As various federal agencies consider what they can do to help their constituents get online, the experience of these programs may provide valuable lessons. Further, as the “game of gigs” accelerates in the next several years, it may shift the landscape for how we think about how competition itself can drive adoption.

B. Improving Lifeline to Drive Adoption. As noted above, the FCC will vote this month on an NPRM to modernize the Lifeline program. Many of the proposals build on, and in my opinion, improve on, recommendations in the Plan.³¹ Of particular note are two proposals: first, that eligibility be determined not by the service provider but through government agencies, particularly in programs funded by the federal government and that enrollment be streamlined through use of existing program mechanisms; and second, that the payment switch to a voucher system in which the customer can determine how best to use the subsidy to purchase the communications services that best suit his or her needs. The BOC should consider current practices and how the agencies can facilitate these needed improvements.

C. The Opportunity for Other Federal Agencies to Build on Top of Lifeline to Save Money and Improve Service. As part of the analysis the BOC does, every federal agency ought to study how it could both improve its service and lower its operating costs if it were to assume that all the parties it interacted with were online and digitally ready. This would provide a baseline understanding of the economics of the transition of the agencies from having to operate on two platforms—the analog platform of paper and the digital platform of IP—to one platform. That could lead to a number of policy changes. It might, for example, make sense for the Veterans Administration to provide a further subsidy to the broadband voucher offered

³⁰ http://jbhorrigan.weebly.com/uploads/3/0/8/0/30809311/digital_readiness.horrigan.june2014.pdf

³¹ For further details on the Plan’s approach to Lifeline reform, see Recommendation 9.1.

under lifeline, where such an additional subsidy would create an opportunity improve service and save the agency operating funds. Indeed, one of the advantages of the voucher approach is that it enables a number of creative ways for multiple entities with an interest in getting individuals on line, from a local church, to the local government to a federal agency, to provide assistance.³²

III. Accelerating Applications that Create Public Goods. As noted above, having applications that create public benefits can help drive adoption and that in turn can improve the deployment of next generation networks. Some of the areas where the BOC should investigate how to do so include the following.

A. Improving Child Welfare and other Social Service Programs. A number of federal agencies, including but not limited to HHS, HUD and OVA, together with states fund numerous critical social service programs, such as SNAP (formerly Food Stamps), family income assistance, and child protective services. Such programs are critical to helping the families and children most in need. Many of these programs have been slow to adopt 21st Century tools and analytics for a variety of reasons, including barriers to adoption in government procurement policies.³³ If modern technology tools (such as web-based software) were adopted by these agencies, they would be able to fit technology more seamlessly into agency workflows, providing real-time data in order to support better decision making and allocation of scarce resources to help American children and families succeed. One immediate step that could be done, for example, would be for the Department of Health and Human Services to amend regulations regarding proprietary software, so that states do not require a waiver to procure proprietary, commercial-off-the-shelf solutions and cloud-based, Software as a Service solutions.³⁴

These investments would not only bring greater efficiencies to the programs directly, it might drive adoption by program constituents who are some of the hardest to reach and potentially have the most to benefit from on-line access to information available from the service providers. The BOC should consider how to provide a “surge” of a technology upgrade to such programs by using future savings to pay for the upgrade in technology.

B. Improving Applications to Provide Remote Health Care, Education, and Job Training through Use in Military Bases and Federal Prisons. One of the most important uses of next generation networks will be two way video interactions in

³² This idea is discussed further here: <http://www.knightcomm.org/wp-content/uploads/2011/03/delivery-joint-center-final.pdf>

³³ I have seen this first hand through my membership on the board of a non-profit, Case Commons (<http://casecommons.org/about/>), funded by the Annie E. Casey Foundation. While Case Commons might benefit from improvements in how the federal government provides incentives to upgrade technology in the social services area, I have no financial stake in the issue.

³⁴ Indeed, based on my experience with Case Commons, I would argue that federal regulations on State Automated Child Welfare Information Systems (SACWIS), adopted to incent state technological development, have not been updated to reflect changes in technology and such an update is overdue.

the areas of health care (such as in in-home care for the elderly), education (such as in providing children in non-dense areas the ability to take advanced courses not available in their schools), and job training (such as providing courses for people of limited means the opportunity to learn skills without the expense of travel and lodging.)³⁵ While these exist today, abundant bandwidth networks offer the hope that the experiences will eventually more closely resemble the superior person-to-person contact that remains the most effective method for such interactions.

The federal government will be a significant beneficiary of such advances in at least two areas. With military personnel, such advances can both improve services for military personnel and veterans, and can lower the cost of the government providing the services. Similarly with federal prisons, providing offsite medical care, education and job training can be expensive, due to the cost of securing the travel outside the prison. If some of the travel can be avoided through network upgrades and improved applications, both the quality of the service provided and the cost to the federal taxpayers can be improved. The BOC should consider various ways in the agencies could seed the development of such tools to improve the delivery of services to remote locations.

C. Improving Communications between the Public and First Responders. There is a broad consensus that the current 911 system can be vastly improved by moving the system from its roots in the TDM telephone system to the IP platform, as that would allow far faster, more accurate, and more robust information exchange between the public and first responders.³⁶ For example, as FCC Chairman Wheeler wisely observed earlier this year, we have “a 911 readiness gap. First responders are less able to rapidly and accurately locate a significant percentage of calls for help than they could in previous years...We need to update our wireless 911 rules to solve this problem...We all know how commercial location-based services like Uber can find their users reliably and consistently. If we can have an app that gets a car service to the right door, we certainly should be able to get 911 to the right door consistently and reliably.”³⁷ The FCC has taken a number of steps to improve the system and the BOC should support those efforts. Further, a number of federal agencies, including but not limited to DHS, HHS, DOJ, FEMA, among others, have a stake in improving the first responder communications. The BOC should evaluate how the agencies can help accelerate the transformation of the system.

D. A Broadband Research Road Map. One reason why the United States leads in many areas of broadband is the early leadership arising from the development of many aspects of the Internet through the support of National Science Foundation (NSF). As the broadband ecosystem evolves, such support still can have a significant impact. I believe the government could develop a broadband research road map

³⁵ The background for the opportunity and some of the potential applications are discussed in Chapters 10, 11 and 13 of the Plan.

³⁶ For background and proposals on this issue, see Section 16.1 of the Plan. Further, I should note that I serve as an advisor to RapidSOS (<http://rapidsos.com/>), a start up that is seeking to facilitate such improvements to 911.

³⁷ <https://www.fcc.gov/article/doc-331757a2>

and the BOC should provide input into the topics that such a research agenda could provide.³⁸

IV. Implementation and Accountability. When one surveys the countries that have succeeded in both creating and implementing a national broadband strategy, one is struck by the importance of a long-term commitment and coordination across multiple institutions. For example, South Korea, Japan, and the United Kingdom have all successfully used government entities to implement and course correct the nation's strategy.³⁹ The BOC process should result in a similar entity that has a long-term commitment to, authority for, and accountability for the implementation of the BOC recommendations.⁴⁰ Further, that group should not be limited to federal agencies. It should also include representatives of other government jurisdictions, such as mayors, and other key groups, such as the kind of technologists that serve on the President's Council of Advisors on Science and Technology.

This is not to suggest that the implementation of any set of recommendations should be done without reference to new information. For example, we always saw the Plan as a work in progress. The single most important sentence in its 400 pages is "This plan is in Beta and always will be."⁴¹ But the key to the success of any plan is not in its vision, though vision is important, nor in its strategy, though strategy is important, but in its implementation. Good implementation can correct for any errors in the Plan. A great plan with lousy implementation will ultimately fail.

Unfortunately, too many in government and the media only focus on the aspiration elements of a plan and not enough on a plan's execution.⁴² In that light, the BOC should not only make recommendations but it should establish some form of annual review and have some form of public recognition of achieving objectives and public accountability for the failure to do so.⁴³ The BOC should also consider engaging with an outside firm that can perform such an evaluation.

³⁸ For further details on such a research agenda, see Recommendation 7.4 of the Plan.

³⁹ For further details on the implementation, see Chapter 17 of the Plan.

⁴⁰ For further details on what such an entity could do, see Recommendation 17.1 of the Plan.

⁴¹ It's a tech talk take on the timeless Talmudic wisdom, "Man plans. God laughs," for which the most insightful modern formulation was provided by Mike Tyson--"Everyone has a plan until they get punched in the face."

⁴² As we completed the Plan, we feared the shortsighted nature of policy makers who thought the only point of the Plan was to articulate aspirations, rather than figure out a path to achieve them. In a subtle effort to encourage a focus on implementation, in the Chapter on goals we added a footnote, referring to a scene from Shakespeare in which one character says "I can call the ghosts from the vasty deep." Another responds, "Why so can I or any man. But if you call them, will they come?" I now believe we were too subtle.

⁴³ I proposed to the then Chairman of the FCC that there be an annual review of the plan. While he agreed it was a good idea, the Chairman's public relations advisor later told me that such a review would invite criticism. I said I thought criticism was healthy. I was not persuasive and no such review ever occurred.

V. The Next Challenge: The Civic Internet of Things.

It did not take a genius to understand that in 2009, the United States would benefit from having a National Broadband Plan.⁴⁴ I hope that the BOC considers the likely evolution of the broadband platform and determines whether a similar planning effort reflecting the needs of the next five to ten years could produce similar benefits for the country. From the perspective of seeing both the development and follow up to the plan, and watching where technological and market forces are trending, the next logical step, in my view, would be to develop a plan for America to lead with the Internet of Things.⁴⁵ Developing a national strategy for the Internet of Things is not a novel thought. Indeed, Republican House member Leonard Lance has already introduced a House Resolution⁴⁶ calling for a national strategy and consensus to accelerate the deployment and use of the Internet of Things in the United States. I agree with the direction of the Resolution, except that I think it would be better to more specifically call for a plan⁴⁷ and that it focus not on the entirety of the Internet of Things but on that which affects the delivery of public goods and services. While there are many issues to be debated, there is no doubt that have an internet of things network in common spaces can drive significant improvements in our transportation, energy, water and other critical public networks. For both economic and social reasons, our country and the world would be well served if our country steps up to chart a path for how such networks can be deployed and utilized.

Conclusion. This Administration has a right to be proud of many accomplishments in the area of broadband. But above all, I think it should be proud that by the BOC effort, it recognizes that there is still much to be done. The broadband platform can in many ways improve our economy and society but government must play a role, as it has done throughout the development and adoption of that platform, in assuring that the platform is ubiquitous, constantly improving, and used to improve the commons.

⁴⁴ At that time, at least 20 countries had already done one, some to great affect. Now over 100 countries have done such a plan.

⁴⁵ It will have to deal in much greater detail on issues such as privacy and security than the Plan did. We lacked the time, the expertise and the mandate to do so.

⁴⁶ <https://www.congress.gov/bill/114th-congress/house-resolution/195/text>

⁴⁷ It would be better done in an executive agency than an independent agency, as the mantle of Presidential ownership is critical to implementation, a lesson I learned too late for the Plan.