Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
A National Broadband Plan for our Future	)	GN Docket No. 09-51
	)	
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337

JOINT COMMENTS
of the
NATIONAL EXCHANGE CARRIER ASSOCIATION, Inc.;
NATIONAL TELECOMMUNICATIONS COOPERATIVE ASSOCIATION;
ORGANIZATION FOR THE PROMOTION AND ADVANCEMENT OF SMALL TELECOMMUNICATIONS COMPANIES;
WESTERN TELECOMMUNICATIONS ALLIANCE; and
THE RURAL ALLIANCE

CONCURRING ASSOCIATIONS*

California Independent Telephone Companies
Carolina-Virginias Telephone Membership Association
Colorado Telecommunications Association[2]
Eastern Rural Telecom Association
Idaho Telecom Alliance
Illinois Independent Telephone Association
INDATELgroup™
Iowa Telecommunications Association[3]
Kansas Fiber Network
Kansas Telecommunications Industry Association
Louisiana Telecommunications Association[2]
Minnesota Independent Coalition
Minnesota Telecom Alliance[2]
Missouri Small Telephone Company Group
Montana Independent Telecommunications Systems
Montana Telecommunications Association[2,3]
National Tribal Telecommunications Association
Nevada Telecommunications Association
New Hampshire Telephone Association
North Carolina Telephone Cooperative Coalition, Inc.
North Dakota Association of Telecom Cooperatives
NYSTA Smaller Rural ILEC Members[4]
Oklahoma Rural Telephone Coalition
Oklahoma Telephone Association[1]
Oregon Telecommunications Association[2]
Rural Arkansas Telephone Systems
Rural Iowa Independent Telephone Association
Rural Telephone Management Council
South Dakota Telecommunications Association
State Independent Telephone Association of Kansas
Telecommunications Association of Michigan[1,2]
Telecommunications Association of the Southeast[2,4]
Telephone Association of Maine
Telephone Association of New England
Telephone Association of Vermont
Tennessee Telecommunications Association
Utah Rural Telecom Association
Wisconsin State Telecommunications Association

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Summary

The Associations and other organizations participating in these comments (the "Associations") represent more than 1,100 rural rate of return (RoR)-regulated incumbent local exchange carriers (RLECs) operating in the United States. Our members support the overall goals of the Commission's National Broadband Plan (NBP or Plan), and are eager to do their part in meeting what the NBP terms "the great infrastructure challenge of the early 21st century" – deploying and providing high quality broadband services throughout rural America.

Serving as "carriers of last resort" (COLRs), RLECs provide reliable voice, data, and broadband communications services in some of the most sparsely-populated, highest-cost rural areas of the country. Their service territories encompass more than one-third of the nation's land mass. Their networks are vital to meeting the communications needs of rural consumers and businesses. Myriad local health, safety, civic, educational institutions, energy utilities and even other telecommunications service providers (including wireless carriers) all depend, in one way or another, on RLEC networks. Thus, the success of the Commission's NBP in rural areas will depend to a significant degree on the ability of RLECs to continue providing advanced services in rural areas.

In fact, RLECs have already made significant progress towards accomplishing the NBP's goals, with networks capable of providing broadband service on average to over 90 percent of RLEC customers, albeit at varying speeds. These gains have been made possible, in part, through existing high-cost universal service fund (USF) mechanisms, which have worked well to support the deployment of multi-use networks capable of providing both traditional voice and advanced broadband services.

The Associations fully recognize the need to refocus the high-cost universal service program to explicitly support advanced broadband networks and services.

However, we remain deeply concerned with the specific universal service reform proposals for RLECs described in the NBP. While the exact details of mechanisms described in the Plan remain unknown, it is clear that high-cost support under almost any Plan scenario will be insufficient to support the incremental build-out and maintenance of broadband networks and services in RLEC territories. The Plan's approach will instead likely incent providers to deploy networks that will be obsolete nearly as soon as they are built, which will only widen the existing urban/rural "digital divide." Moreover, such a result would clearly contravene the Congressional objective of "reasonably comparable" advanced services in rural and urban areas, as set forth in the Telecommunications Act of 1996 (1996 Act or Act).

The Associations are also concerned about the Plan's reliance on unproven and unpredictable economic models, as well as "market-based" support distribution mechanisms such as reverse or procurement auctions. These approaches repeatedly have been shown to be inappropriate for RLEC service areas and should therefore be abandoned. Instead, support for RLECs should remain based on their actual costs, which has proven highly effective in enabling these carriers to offer affordable broadband services in their territories.

With regard to the specific implementation steps proposed in the instant Notice of Inquiry (NOI) and Notice of Proposed Rulemaking (NPRM), the Associations show in these comments the Commission should not impose an overall cap or freeze on existing high-cost funding for ILECs or any new caps or freezes on RLEC-specific mechanisms such as Interstate Common Line Support (ICLS). If implemented on a per-line basis as proposed, freezes on ICLS or total USF support will likely cause many RLECs to start experiencing free cash flow shortages in only a few years, and will cause nearly all RLEC free cash flows to go negative by 2020, requiring carriers to raise rates and/or discontinue service in high-cost areas. The prospect of these actions has already raised concerns about RLECs' ability to finance new investments in broadband, dampening prospects for further improvements in broadband deployment and adoption.

The Commission should likewise abandon its proposal to require RLECs to shift to incentive regulation. Existing interstate RoR regulation has played a key role in efficiently achieving today's levels of broadband deployment in RLEC service areas, and can continue to do so in a competitive broadband environment. In contrast, incentive regulation methods such as price caps have been demonstrably ineffective in encouraging carriers to extend service to high-cost areas with low profitability.

The NOI requests comment on various details of the Broadband Assessment Model described in OBI Technical Paper No. 1 (the "BAM" or "Model"). However, the Model itself and its associated data have not been made available to the public for testing, leading to numerous questions about its mechanics and applicability. Nevertheless, the Associations' preliminary analyses show the Model contains significant flaws, which are explained in detail in these comments and accompanying appendices. The Associations urge the Commission not to continue development of such models for application to RLEC service territories.

The Associations welcome the opportunity to continue working with the Commission to develop alternative broadband funding mechanisms for RLECs that will be consistent with the 1996 Act's call for "specific, predictable, and sufficient" support, and that are also practicable to implement. It would be far more reasonable, for example, to adapt existing actual cost-based support mechanisms for broadband, rather than rely on unproven and likely unworkable models and auctions. Several examples of such approaches were suggested to the Commission in the context of developing the NBP.

The Associations look forward to working with the Commission in the coming months to identify and develop possible alternatives for prompt implementation.

The Commission should also consider ways to improve broadband adoption rates in RLEC areas. These tend to be low among customers in RLEC territories due in part to the cost of obtaining middle mile transport to the Internet backbone, and the extraordinarily high cost of obtaining video content.

Finally, the Associations recommend that the Commission turn its immediate attention to the urgent need to reform the USF contribution methodology. Most importantly, the contribution base should be expanded to include, at a minimum, all broadband Internet access providers. Likewise, the Commission should also proceed expeditiously to address certain discrete intercarrier compensation (ICC) issues, including strengthening the call signaling rules to mitigate phantom traffic and confirming that providers of voice over Internet protocol (VoIP) services are subject to access charges. Continued failure to address these issues will further undermine prospects for accomplishing the goals of the NBP.

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The Associations and other organizations listed above (herein, the "Associations") collectively represent all of the more than 1100 rural rate of return-regulated (RoR) incumbent local exchange carriers (RLECs) operating in the United States.[1] Serving as "carriers of last resort" (COLRs), these companies provide reliable voice, data, and broadband communications services in some of the most sparsely-populated, highest-cost rural areas of the country. Their service territories encompass more than one-third (37 percent) of the nation's land mass. Their networks are vital to meeting the communications service needs of rural consumers and businesses. Myriad local health, safety, civic, educational institutions, energy utilities, and other telecommunications service providers (including wireless carriers) all depend, in one way or another, on multi-use RLEC networks.

RLECs will therefore play a critical role in realizing the success of the Commission's National Broadband Plan (NBP).[2] Indeed, RLECs are eager to do their part in meeting what the NBP terms "the great infrastructure challenge of the early 21st

[1] The National Exchange Carrier Association, Inc. (NECA) is responsible for preparation of interstate access tariffs and administration of related revenue pools, collection of certain high-cost loop data, and administering the interstate Telecommunications Relay Services (TRS) fund. *See generally,* 47 C.F.R. §§ 69.600 *et seq.*; *MTS and WATS Market Structure*, CC Docket No.78-72, Phase I, Third Report and Order, 93 FCC 2d 241 (1983). The National Telecommunications Cooperative Association (NTCA) is a national trade association representing more than 580 rural rate-of-return regulated telecommunications providers. The Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO) is a national trade association representing approximately 470 small incumbent local exchange carriers (ILECs) serving rural areas of the United States. The Western Telecommunications Alliance (WTA) is a trade association that represents over 250 small rural telecommunications companies operating in the 24 states west of the Mississippi River. The Rural Alliance is a group sponsored by over 300 rural telephone companies organized to advocate for effective Universal Service and Intercarrier Compensation reform that will benefit rural consumers and the companies that serve them. The 38 associations listed as concurring in this filing also represent RLECs in their respective states, tribal areas or regions. As noted on the cover page of these comments, concurrences by some state associations does not include the participation or concurrence of one or more member companies as indicated by numeric code.

[2] Connecting America: The National Broadband Plan, FCC (rel. Mar. 16, 2010) (*NBP*).

century" – deploying and providing high-quality broadband services throughout rural America.[3]

They have already made significant progress towards accomplishing these goals. Broadband service is now available to over 90 percent of customers, on average, in RLEC territories, albeit at varying speeds.[4] Substantial portions of RLEC networks have been converted to state-of-the-art, IP-based technologies, designed to handle traditional voice services as well as the data, video, and other broadband services and applications described in the NBP.

These gains have been made possible through a combination of existing mechanisms, including high-cost universal service fund (USF) support. Indeed, as the Federal-State Joint Board on Universal Service (Joint Board) noted in 2007, RLECs have done a "commendable job" of making broadband available to most of their customers under the current support system for rural carriers.[5]

The Associations agree, however, it is time to refocus the High Cost program to explicitly support advanced broadband networks and services. These comments offer constructive suggestions as to how to accomplish this result, while responding specifically to the proposals set forth in the instant Notice of Inquiry (NOI) and Notice of Proposed Rulemaking (NPRM).[6]

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[3] *Id.* at 3.

[4] *See, e.g.,* NECA Comments, GN Docket No. 09-29 (Mar. 25, 2009) at 2; WTA Comments, GN Docket No. 09-47 (Dec. 7, 2009) at 1, 8-9; ITTA Comments, GN Docket No. 09-47 (Dec. 7, 2009) at 3-4.

[5] *High-Cost Universal Service Support,* WC Docket No. 05-337, *Federal-State Joint Board on Universal Service,* CC Docket No. 96-45, Recommended Decision, 22 FCC Rcd 20477 (2007) at ¶ 30 (*2007 Joint Board Recommended Decision*).

[6] *See, Connect America Fund*, WC Docket No. 10-90, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, *High-Cost Universal Service Support*, WC Docket No. 05-337, Notice of Inquiry and Notice of Proposed Rulemaking, 25 FCC Rcd 6657 (2010) (*NOI and NPRM*).

I. THE ASSOCIATIONS SUPPORT THE COMMISSION'S EFFORTS TO DEVELOP BROADBAND-FOCUSED UNIVERSAL SERVICE FUNDING MECHANISMS.

Throughout the proceedings leading up to the publication of the NBP, and indeed in numerous proceedings over the past decade, the Associations have consistently and repeatedly emphasized the need for comprehensive reform of the federal High Cost universal service program. As recently as December of last year, for example, each of the Associations submitted comments in response to NBP Public Notice #19[7] supporting the need to move from today's voice-centric High Cost program to new mechanisms designed explicitly to support broadband.[8]

In recent months the Associations and member company representatives have been pleased to meet with Commission staff to discuss the universal service reform recommendations in the Plan.[9] Through these meetings, the Associations have come to understand better the staff's concerns regarding existing high-cost support mechanisms and their objectives for a reformed High Cost program. The Associations greatly hope it will be possible through continued discussions to arrive at reasonable alternative approaches to supporting broadband networks and services in high-cost RLEC territories

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[7] *Comment Sought on the Role of the Universal Service Fund and Intercarrier Compensation in the National Broadband Plan,* Public Notice, GN Docket Nos. 09-47, 09-51 and 09-137, 24 FCC Rcd 13757 (2009) (*NBP Public Notice # 19*).

[8] *See, e.g.,* NECA Comments, NTCA Comments, OPASTCO Comments, and WTA Comments, all separately filed in GN Docket No. 09-47 on Dec. 7, 2009.

[9] *E.g.,* Letter from Gerald Duffy, Blooston, Mordkofsky, Dickens, Duffy and Prendergast, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed June 23, 2010); Letter from Karlen Reed, NTCA, to Marlene H. Dortch, FCC, GN Docket No. 09-51, WC Docket Nos. 10-90, 05-337, CC Docket No. 80-286 (filed June 17, 2010); Letter from Joseph A. Douglas, NECA, to Marlene H. Dortch, FCC, GN Docket No. 09-51 (filed June 4, 2010); Letter from Gerald Duffy, Blooston, Mordkofsky, Dickens, Duffy and Prendergast (on behalf of WTA and OPASTCO), WC Docket Nos. 05-337 and 10-90, GN Docket No. 09-51 (filed May 19, 2010).

– alternatives that will permit the goals of the NBP to be realized quickly and efficiently without disrupting service to rural consumers.[10]

Nevertheless, RLECs have serious concerns regarding the NBP's recommendations for high-cost universal service reform. While the exact details of proposed new mechanisms for high-cost support remain unknown, it appears the Plan, as currently formulated, will fail to meet the Plan's overall objectives for improving broadband deployment and adoption in RLEC areas. In these comments, therefore, the Associations first focus on concerns relating to the Plan's overall approach to broadband high-cost funding reform. As shown in Section II below, these concerns are pervasive and require thorough reconsideration before the Commission takes steps to implement any of the specific universal service reform recommendations contained in the Plan.

In subsequent sections the Associations show the Commission should not impose any new caps or freezes on overall high-cost funding, or on RLEC-specific mechanisms such as Interstate Common Line Support (ICLS) as proposed in the NPRM.[11] If implemented on a per-line basis as proposed, freezes on ICLS or total USF support will likely cause many RLECs to start experiencing free cash flow shortages in only a few years, and will cause nearly all RLEC free cash flows to go negative by 2020, requiring carriers to raise rates and/or discontinue service in high-cost areas. The prospect of these

[10] In responding recently to questions posed by Senator Rockefeller, Chairman Genachowski made clear the Commission also recognizes the importance of these cooperative efforts. *See* Response of Chairman Julius Genachowski, FCC, to John D. Rockefeller, Chairman, Committee on Commerce, Science and Transportation, U.S. Senate (June 15, 2010) at 9 ("The Commission staff [has] had a variety of meetings with the leadership and staff at RUS, as well as meetings with NECA and representatives of rural carriers, including OPASTCO, WTA and NTCA to receive input on the development of the Plan. We will continue to meet with RUS, NECA and other interested stakeholders throughout the rulemaking process to solicit input and factual information that will enable the Commission to craft workable policies that will ensure that all Americans have access to broadband.")

[11] *NOI and NPRM* at ¶ 56.

actions has already raised concerns about RLECs' ability to finance new investments in broadband, dampening prospects for further improvements in broadband deployment and adoption.[12]

While it may seem "fair" to cap remaining RLEC support mechanisms, insofar as the NPRM also proposes to phase-out or eliminate funding for other groups of companies, this proposal fails to recognize that RLECs serve as COLRs in the lowest-density, highest-cost areas of the country. Since COLRs bear unique and significant cost burdens, it is reasonable to maintain existing RLEC funding mechanisms without new caps or freezes, until predictable and sufficient broadband-focused cost recovery mechanisms can be put in place.[13]

The Commission should likewise abandon any attempt to require RLECs to shift to incentive regulation. RoR regulation has played a key role in efficiently achieving today's levels of broadband deployment in RLEC service areas. In contrast, incentive regulation methods such as price caps have proven ineffective in encouraging carriers to extend broadband services to areas where per-subscriber costs are high and a strong business case cannot be made for such deployments. And contrary to claims, RoR regulation remains fully viable in a competitive broadband environment.[14]

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[12] *See infra* pp.14-15.

[13] *See id.,* pp. 28-33.

[14] The Associations recognize the Commission's concerns regarding changes in circumstances since RoR methods were developed (*e.g.,* expansion of competition in portions of RLEC serving territories and increased reliance on revenues from non-regulated sources). *See NOI and NRPM* at ¶¶ 54-56. But as discussed below, *see infra* pp. 52-53, these issues can be addressed in far less drastic fashion than requiring all RLECs to convert to incentive regulation.

The NOI requests comment on various details of the Broadband Assessment Model described in OBI Technical Paper No. 1 (the "BAM" or "Model").[15] While the Model itself and its associated data have not been made available to the public for testing, it appears the Model contains significant flaws. In fact, the Associations' preliminary analyses, detailed in Appendix A, show that support available under the Model will not be sufficient to achieve robust, affordable broadband services throughout RLEC service areas. For example, if the BAM were to be used to entirely replace existing support mechanisms, and funding is limited to the $23.5 billion the Model estimates is necessary to fill the broadband availability gap, RLEC funding would be slashed by as much as 90 percent compared to current levels. Yet, approximately 70 percent of RLEC service territories are currently "unserved" based on the NBP's proposed 4 Mbps downstream and 1 Mbps upstream (4/1 Mbps) broadband availability target.[16]

Rather than continuing to pursue the development of complex and error-prone forward-looking economic cost (FLEC) models, and unworkable reverse auction mechanisms for use in RLEC service areas, the Associations urge the Commission to focus on developing actual cost-based, broadband-oriented support mechanisms for RLEC areas that are "specific, predictable, and sufficient,"[17] consistent with the Telecommunications Act of 1996 (1996 Act or Act). Specific examples of alternative approaches to funding broadband networks and services in RLEC areas were provided to

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[15] Broadband Assessment Model, Model Documentation, FCC (Mar. 2010) (*BAM*); *The Broadband Availability Gap*, OBI Technical Paper No. 1 (Apr. 2010) (*OBI Technical Paper*).

[16] While it does not appear likely the FCC plans to use "gap" funding calculated by the Model to determine all broadband universal service support, under any scenario it appears funding cuts for rural study areas contemplated by the Model would make it impossible for RLECs to sustain existing broadband service levels. *See infra* pp. 55-56.

[17] 47 U.S.C. § 254(b)(5).

the Commission in the context of the NBP development proceeding.[18] Through constructive dialog between the Associations and Commission staff, the Associations believe a variety of reform alternatives could be developed that would encourage RLECs and other providers to meet Commission-established broadband deployment and adoption targets efficiently and effectively. Moreover, the Associations believe such alternative mechanisms could be implemented quickly – perhaps well in advance of the 10-year transition approach contemplated in the NBP. The Associations look forward to working with the Commission in the coming months to develop these concepts for implementation.

Along with alternative approaches to supporting broadband networks and services, the Commission should consider ways to improve broadband adoption rates in RLEC areas. Adoption rates can sometimes be lower in RLEC territories due in part to the high cost of obtaining middle mile transport to the Internet backbone, as well as video content, which makes it difficult for rural providers to offer attractive "triple play" packages. These are the real challenges faced by RLECs in their efforts to increase broadband subscribership – challenges that will only be exacerbated if the Commission moves forward with the proposals for universal service and intercarrier compensation (ICC) reform laid out in the NBP.[19]

Finally, the Associations recommend in these comments that the Commission turn its immediate attention to reforming the USF contribution methodology. Specifically, it is critical that the contribution base be expanded to include, at a minimum, all broadband

[18] *See infra* pp. 60-66.

[19] Additionally, the Associations agree the Commission should give special consideration to improving broadband deployment and adoption levels in Tribal lands, including areas such as the Hawaiian Homelands. Tribal lands are typically located in geographically-isolated areas, where small pockets of Native American groups are served. The costs associated with delivering broadband services to these consumers are very high even when compared to other rural areas.

Internet access providers. This would permit the growth in the High-cost program that is necessary to sufficiently support affordable and "reasonably comparable" broadband services in high-cost rural areas. In addition, the Commission should move quickly to address certain stand-alone ICC issues prior to pursuing more comprehensive reform. This includes the adoption of measures to mitigate phantom traffic as well as confirming that interconnected Voice over Internet Protocol (VoIP) service providers are required to pay access charges. As discussed below, continued failure to address these issues will further undermine prospects for accomplishing the goals of the NBP.

II. THE BROADBAND FUNDING APPROACHES DESCRIBED IN THE NATIONAL BROADBAND PLAN ARE FUNDAMENTALLY FLAWED AND SHOULD NOT BE PURSUED BY THE COMMISSION.

The NOI and NPRM request comment on specific "implementation steps" recommended in the NBP, including, for example, proposals to impose new caps or freezes on existing high-cost funding mechanisms, and proposals to require RLECs to convert to incentive regulation.[20] But these proposals rest on a shaky foundation. As discussed in the following section, many of the basic policy concepts underlying the specific USF reform proposals described in the NOI and NPRM are fundamentally flawed and should be reconsidered rather than implemented.[21]

A. The Plan Fails to Provide Sufficient Funding to Support the Build-out and Maintenance of Universal Broadband Services in Rural America, as Called for in the 1996 Act.

The NBP represents a historic milestone in the Commission's history. It exhaustively documents the importance of broadband technology for our nation's

[20] *NOI and NPRM* at ¶ 2.

[21] It bears noting that the Plan was not intended to be self-actualizing, and indeed, was never formally adopted by the Commission. As such, the policies underlying its recommendations must be fully evaluated and affirmed in the course of subsequent rulemaking proceedings – the Commission cannot simply assume their validity for implementation purposes.

future.[22] It identifies the critical role broadband will play in enabling economic growth, job creation, global competitiveness, and improvements in the quality of life for all Americans.[23] It makes abundantly clear the potential benefits of broadband for education, health care, energy, public safety, civic engagement, and other national purposes.[24]

Unfortunately, the benefits envisioned by the Plan will not be fully realized, and the Plan itself is at risk of failure, because of the Commission's perplexing insistence that nationwide broadband deployment can be accomplished without the size of the USF growing in real terms.

In this respect, the Plan is contrary to the 1996 Act, which governs its implementation and must be considered prior to taking any implementation steps including proposals to cap, cut, or freeze existing high-cost support mechanisms. Section 254(b) of the Act declares, *inter alia*, there should be "specific, predictable, and sufficient" federal and state mechanisms to preserve and advance universal service.[25] Section 254(e) of the Act reemphasizes the critical importance of sufficient support by stating that the federal universal service support should be explicit and sufficient to achieve the purposes of section 254.[26]

Hence, once the Commission defines the broadband networks and services that will be supported by federal universal service support mechanisms, it is directed by sections 254(b)(5) and 254(e) to provide specific, predictable, and sufficient federal universal service support for such services and the infrastructure needed to provide them.

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[22] *See NBP* at 3-5, 9.

[23] *Id*. at 3, 9.

[24] *Id.* at 3, 10-11.

[25] 47 U.S.C. §254(b)(5).

[26] 47 U.S.C. §254(e).

In addition, section 254(b)(5) states that support mechanisms should not only be sufficient to preserve universal service, but *advance* it as well. Indeed, it appears that advancing universal service is consistent with one of the express goals of the NBP, which is for *every* American to have *affordable* access to *robust* broadband service.[27] However, this goal cannot be achieved absent specific, predictable, and sufficient high-cost support mechanisms.

Moreover, maximizing the advancement of the various "national purposes" enumerated in the American Recovery and Reinvestment Act of 2009 will require not only robust broadband connections to rural community anchor institutions, but to all homes and businesses as well.[28] For example, the widespread availability of high-speed connections throughout a rural area creates economic opportunity by attracting new businesses to the area, retaining existing ones, allowing residents to "telework," and enabling interactive job training from home. In addition, robust residential broadband connections are necessary for health care applications such as remote patient monitoring. They are also necessary to advance the nation's educational goals by allowing students of all ages to engage in online learning from the convenience of their home.

In May 2009, Commissioner Copps issued a Report on a Rural Broadband Strategy, which wisely advised that rural networks should be able to "evolve over time to keep pace with the growing array of transformational applications and services that are increasingly available to consumers and businesses in other parts of the country."[29] The

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[27] *NBP* at 26 (emphasis added).

[28] American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, §6001(k)(2)(D), 123 Stat. 115, 516 (2009) (Recovery Act).

[29] Acting Chairman Michael J. Copps, Federal Communications Commission, *Bringing Broadband to Rural America: Report on a Rural Broadband Strategy*, GN Docket No. 09-29, 24 FCC Rcd 12791 (2009) at ¶ 11 (2009) (*Report on a Rural Broadband Strategy*).

Report recognized that the requirements for Internet access are growing,[30] and stated that "networks deployed in rural areas should not merely be adequate for current bandwidth demands. Instead, they should also be readily upgradeable to meet bandwidth demands of the future."[31]

It is inconceivable how sufficient support can be made available for the deployment, operation, and maintenance of scalable broadband networks, capable of meeting the long-term bandwidth needs of consumers throughout rural America, if the total size of the USF is kept at roughly its current level (in 2010 dollars). Furthermore, funding shortfalls will grow even worse over time if the Commission phases out existing "legacy" support mechanisms and per-minute ICC charges, as recommended by the NBP, without simultaneously phasing in sufficient replacement funding for broadband.

But RLECs have no assurance these critical funding sources will be replaced to any significant extent by new broadband mechanisms. The NBP proposes, for example, to redistribute substantial support amounts to fund the deployment of broadband in "unserved" areas of the largest price cap carriers (estimated 50 percent of "unserved" households[32]) and of mid-sized price cap companies (estimated 15 percent of "unserved" households[33]). Instead of recognizing that mobile and fixed broadband services are complementary, as suggested by the Associations in comments and by the Joint Board in its 2007 Recommended Decision, the Plan proposes to make both services eligible for support under the Connect America Fund (CAF).[34] Since, as discussed below and in

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[30] *Id.* at ¶ 80.

[31] *Id.* at ¶ 82.

[32] *NBP* at 141.

[33] *Id.*

[34] The NBP also proposes to create a "Mobility Fund," which is intended to assist in the initial deployment of 3G wireless technology to areas lacking such facilities. It thus

Appendix B, mobile wireless providers do not have the technical capacity to serve as long-term broadband "providers of last resort" in rural areas, the NBP's proposal to make these carriers eligible for CAF funding – particularly when a separate Mobility Fund has been proposed exclusively for mobile providers – is a recipe for failure.

Preliminary analysis of the BAM, which was utilized by Commission staff to estimate the funding necessary to close the broadband availability gap, only heightens these concerns. Review of available information makes clear the Model is unreliable, inapplicable to small rural high-cost areas, and cannot be used to determine broadband support amounts in areas served by RLECs. As explained below and in Appendix A, substantial flaws in the data used to create the Model, and the ways that data is used, cause the Model to significantly underestimate costs of providing broadband services in rural areas and to overestimate potential net revenues available from broadband services. This, in turn, leads to a gross understatement of required "gap" funding as estimated by the Model.

RLECs depend significantly on high-cost USF support and ICC cost recovery mechanisms to provide service in high-cost rural areas.[35] If these funding sources are abandoned without sufficient replacement mechanisms, evolution of the existing network will halt, and the considerable progress and success of RLECs in deploying broadband services to their rural customers during the past decade will come undone. In addition, broadband adoption rates in RLEC service territories would likely plummet, as cuts in high-cost support will force broadband end-user rates to rise to unaffordable levels.

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appears wireless network providers could be funded under both new USF Funds. *NBP* at 144, 146.

[35] The NBP proposes to reduce and eliminate per minute switched access revenues over 7-10 years. As noted below, rural RoR companies rely heavily on these revenues to maintain networks and services in rural high-cost areas of the country.

Already, the uncertainty created by the Commission's universal service proposals has been causing a re-evaluation of RLEC infrastructure investment plans and a pronounced reluctance by potential RLEC investors and lenders to participate in the funding of such projects. In 2008, for example, the U.S. Department of Agriculture Rural Utilities Service (RUS) filed reply comments before the Commission expressing significant concern that the USF and ICC reform proposals then under discussion may adversely affect borrowers' ability to repay existing RUS loans.[36] RUS' filing also expressed particular concern that various proposals to freeze high-cost support – which continue to be advanced in the present NPRM – would prevent further advancement of loans for broadband infrastructure improvements. According to RUS:

> A recent analysis of borrowers receiving loans shows that 53% of those loans would not be feasible with frozen USF. If toll revenues are frozen (interstate and intrastate access revenues, interstate and any intrastate USF, and end-user SLC charges), *two-thirds of the loans are not feasible*. Our main objective is, of course, to ensure that rural residents and businesses continue to receive the same quality of services as their urban and suburban counterparts, at affordable rates. The agency is concerned there is a possibility that certain proposed actions would cause delay or preclude broadband deployment to rural communities at a time when that investment is needed the most.[37]

The Associations recognize the funding available for supporting rural broadband networks and services is not unlimited, and the Commission must balance many competing goals in considering the best use of available funds. However, maintaining

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[36] *See,* U.S. Department of Agriculture Rural Utilities Service Reply Comments, WC Docket No. 05-337 (Dec. 22, 2008) (emphasis added).

[37] *Id.* at 2. Concerns about RLECs' continued ability to obtain financing for network investments have been raised by other lenders as well. *See, e.g.,* Comments of CoBank, WC Docket No. 05-337 (Apr. 17, 2008) at 4 ("Rural ILECs rely heavily on debt capital to maintain and improve this rural infrastructure. The repayment of those loans depends on access to universal service support and existing cost recovery mechanisms. . . . Lenders require a high degree of certainty regarding a borrower's capacity to repay debt. There is a direct correlation between the ability of a borrower to repay debt capital and the amount of capital a lender is willing to make available to a borrower."). *See also*, Comments of the Rural Telephone Finance Cooperative, WC Docket No. 05-337 (filed Apr. 15, 2008).

high-cost support at current levels will not provide sufficient funding to accomplish the nation's broadband goals, notwithstanding overly-optimistic model predictions to the contrary. The Plan must be revised to face this simple reality.

B. The Plan Fails to Ensure Reasonably Comparable Advanced Services for All Americans, as Called for in the 1996 Act.

The NBP proposes that the new CAF should initially support networks capable of providing actual broadband speeds of 4/1 Mbps in areas where there is "no private sector business case to provide broadband and high-quality voice-grade service."[38] These speeds stand in stark contrast to the Plan's goal of having at least 100 million U.S. homes with affordable access to actual speeds of at least 100/50 Mbps by 2020.[39]

In addition, the NBP notes that typical advertised speeds that consumers purchase have grown approximately 20 percent each year and that it is likely that 90 percent of the country will have access to advertised peak download speeds of more than 50 Mbps by 2013.[40] The NBP also points out that actual download speeds are approximately 40 – 50 percent of the advertised "up to" speeds.[41] This means that 90 percent of the country will likely have access to actual download speeds of at least 20 mbps (50 times 40%) within three years time. This is *five times faster* than the 4 Mbps download target speed initially supported by the CAF under the NBP. Even worse, this differential will exist only one year following the implementation of the CAF in 2012, and will become far greater prior to the first review and resetting of the broadband availability target.

RLECs alone provide service to over 5 million lines spanning 37 percent of the nation's geographic area. Most, if not all, of these carriers are reliant on some level of

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[38] *NOI and NPRM* at ¶¶ 2, 10.

[39] *NBP* at XIV.

[40] *Id.* at 20-21.

[41] *Id.* at 21.

high-cost universal service support to offer high-quality services to all of the consumers in their territories. Thus, because the CAF would be used initially to support only for 4/1 Mbps-capable broadband service in "unserved" areas, the proposed broadband availability target, if adopted, would create a rural/urban digital divide for millions of Americans, in violation of the reasonable comparability and sufficiency principles contained in section 254(b) of the Act.[42]

Section 254 of the Act calls for specific, predictable, and sufficient support mechanisms that are capable of not only preserving universal service, but simultaneously advancing it as well. Section 254 also envisions comparable and affordable services to all Americans, not some Americans.[43] Congress, through section 254, specifically rejected the notion that one service level is sufficient for part of America while a lesser service is sufficient for a different part of America. The NBP, however, suggests that substandard broadband is acceptable for Americans served by carriers reliant on high-cost universal service support.

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[42] 47 U.S.C. § 254(b)(3), (5). The OBI Broadband Task Force appears to have settled on the 4/1 Mbps threshold speed based on two factors. First, the Task Force stated that a typical median user's actual broadband speed was less than 3.1 Mbps during the first half of 2009. *OBI Technical Paper* at 43. Second, the Task Force asserted that advanced applications and advanced broadband capability require at least a 4 Mbps connection. The OBI Task Force further claims that demand for broadband speeds has increased by twenty percent annually since 1997. The Task Force then concluded that taken "together, the median actual speed subscribed (3.1 Mbps, approaching 4 Mbps by year end [2010]) and the applications usage (1 Mbps but doubling every three-to-four years) suggest that a download speed of 4 Mbps will provide an adequate target with headroom for growth for utilization purposes." *Id.* As discussed in detail below, however, these speed estimates are inadequate to meet real-world demand for data throughput. *See infra* pp. 18-21.

[43] The United State Court of Appeals for the Tenth Circuit has twice interpreted the USF sufficiency principle as incorporating the goal of comparability. In 2001, the court concluded that the FCC had failed to show how federal USF support to non-rural carriers was sufficient to achieve reasonably comparable rates. *Qwest Corp. v. FCC,* 258 F.3d 1191, 1201 (10th Cir. 2001). In 2005, the court reviewed the FCC's action after the 2001 decision and concluded that the FCC had ignored the principle of preserving and advancing universal service with specific, predictable, and sufficient USF mechanisms. *Qwest Communications Int'l, Inc. v. FCC*, 398 F.2d 1222, 1236 (10th Cir. 2005) (*Qwest II*).

The FCC should not base its broadband availability threshold on download and upload speeds that will be outdated before the Plan is adopted. It is now widely understood that consumers and businesses will need faster speeds and greater capacity to meet their growing needs well before the first review period targeted around the year 2016. For example:

- A March 2009 report from the Information Technology and Innovation Foundation stated that broadband capabilities of 20 - 50 Mbps downstream and 10 Mbps upstream are needed to "enable the emergence of a whole host of online applications and services, many of which we can barely imagine today."[44] The report provided specific examples of broadband applications and the corresponding bandwidths they require, such as high resolution video conferencing (5 Mbps upstream and downstream), video home security services (10 Mbps upstream), and very high resolution video conferencing known as "telepresence" (15 Mbps upstream and downstream).[45]

- Similarly, a February 2008 report from the Congressional Research Service listed broadband applications and the range of speeds they require. For example, accommodating important and beneficial applications such as telemedicine, educational services, telecommuting with high quality video, high quality telepresence conferencing, and intelligent building control, among others, can only function well at speeds of 10 - 100 Mbps. Furthermore, applications that are now envisioned, such as high definition telemedicine, multiple educational services, and remote server services for telecommuting will require speeds of 100 Mbps - 1 Gbps.[46]

- A May 2009 article published by the New American Media explained that 21 states now use the Internet for job training, which may include interactive video links with instructors.[47] However, trainees need access to a robust broadband connection in order to reap the benefits of this type of application.

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[44] Stephen Ezell, Robert Atkinson, Daniel Castro, and George Ou, *The Need for Speed: The Importance of Next-Generation Broadband Networks*, The Information Technology & Innovation Foundation (Mar. 2009) at 1 (*The Need for Speed*).

[45] *Id.* at 5, Table 1.

[46] Patricia Moloney Figliola, Angele A. Gilroy, and Lennard G. Kruger, *The Evolving Broadband Infrastructure: Expansion, Applications, and Regulation*, Congressional Research Service, R40230 (Feb. 19, 2009) at 3, Table 1.

[47] Khalil Abdullah, *U.S. Lags in Broadband Impede Economy*, New America Media (May 26, 2009).

Of course, high bandwidth connections also allow providers to offer high-definition video programming. This can occur as part of a traditional channel subscription service or through newer "over the top" web-based services. Either way, while entertainment may not bring the vital benefits that other applications produce, it is a major driver of broadband adoption which encourages and enables RLECs to make further investments in deployments and upgrades.[48]

The NBP should envision the need to strive for comparable service for all Americans. Without this vision, the Plan will be obsolete upon its adoption and will maintain and likely widen an urban/rural digital divide that will violate the comparability, sufficiency, and preservation and advancement principles contained in section 254 of the Act. To avoid such an outcome, the FCC must summon the courage to adopt a realistic and prospective plan that will address the needs of rural consumers and businesses, and allow for sufficient USF support to achieve congressional universal service objectives.

C. **The Plan Relies on Unsound Engineering Assumptions That Do Not Reflect "Real World" Network Design Principles.**

Even assuming it is permissible under section 254(b)(3) of the Act for the Commission to establish a broadband availability target that is far below the speeds that most Americans will shortly have access to and that will be necessary to utilize a host of critical applications, the Plan's approach to rural network build-outs appears to be unsound and does not reflect "real world" network engineering practices.

Attached as Appendix B to these comments is a Report prepared by the Association of Communications Engineers (ACE) regarding deployment of broadband

[48] *See The Packet Train Needs to Stop at Every Door*, NECA (June 2006) https://www.neca.org/cms400min/NECA_Templates/ResourceInterior.aspx?id=105&terms=packet+trains (Executive Summary) (*NECA Packet Train Study*).

networks in rural areas.[49] ACE member firms provide extensive engineering services to RLECs and are thoroughly familiar with the challenges faced by rural carriers in deploying both wireline and wireless networks in high-cost areas.[50]

In preparing their Report, the ACE engineers took into consideration high-level engineering principles applicable to deploying broadband telecommunications systems.[51] The Report outlines a number of concerns regarding the engineering assumptions underlying the NBP, both with respect to wireline and wireless deployments.

One key issue identified in the ACE Report is the Plan's apparent focus on short-term network deployments. The Report emphasizes how network designs "must take into consideration current and projected network reliability and capacity requirements to meet consumer demand over the useful life of the construction project." After examining current and projected trends in data usage, however, the ACE Report concludes the 4/1 Mbps speed targets proposed by the NBP "fall short of reasonable network design criteria and do not align with responsible long term planning."[52] As discussed above, consumers and businesses in rural areas will require much faster speeds and greater capacity to meet their growing needs well before the first review period occurs.[53] Network engineers must build such anticipated requirements into their *current* deployment plans. Waiting four

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[49] Appendix B, *Good Engineering Practices Relative to Broadband Deployment in Rural Areas*, The Association of Communications Engineers (ACE) (*ACE Report).*

[50] ACE's membership comprises individual firms employing professional engineers "dedicated to the improvement and advancement of telecommunications technologies throughout the United States." *Id.* at 1. ACE member firms provide services related to telecommunications and other advanced technologies including planning, design, project management, economic analysis and construction management. *Id.*

[51] *Id.*

[52] *Id.* at 4.

[53] *Supra* pp. 17- 18.

years to address predicted growth will only result in wasteful spending, as networks built to standards known to be inadequate from the start will soon need to be upgraded.[54]

Another area of concern identified in the ACE Report is the NBP's over-optimistic reliance on wireless technology for the provision of broadband services in rural areas. As noted above, the ACE firms have experience in designing and building wireless as well as wired networks in rural areas, and their Report duly recognizes the benefits of wireless distribution systems, particularly in terms of mobility and portability. According to the Report, however, good engineering practices require consideration of the ultimate capacity of a wireless system in a real-world environment.

The Report extensively documents various constraints affecting wireless systems in rural areas, including signal strength limitations, terrain problems, interference issues, lack of "real world" testing, and lack of available spectrum. All of these issues negatively affect promised delivery speeds. According to the Report: Estimates of usable [wireless] bandwidths at speeds of 10, 20 or even 80 Mbps have not been supported in real-world deployments. Practical download speeds with wireless systems appear to be in the 8-10 Mbps range for close proximity to the cell site. A system designed for a throughput of 4 Mbps at the edge of the cell will have limited ability to meet the expanding demands of the typical consumer. A single stream of standard definition video will strain the network and a single high-definition video stream will exhaust this 4 Mbps capacity. As the speed requirements for many existing and new applications continue to increase, key data components of the wireless network would require great leaps in technology.

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[54] The *ACE Report* provides several practical examples of situations faced by rural network designers that run counter to the assumptions built into the Plan. *See, e.g.*, Appendix B at 9-11.

While wireless "might be an attractive choice compared to fiber or fiber/copper if capacity or consumer use in a local area is not expected to scale quickly or increase by any significant amount over time,"[55] the Report (and common sense) make clear network planners currently face the exact opposite situation. Increasing data traffic is already causing wireless networks in urban areas to slow to a crawl.[56] The same problems plague rural areas too, and will not be solved by networks built to the 4/1 Mbps standard envisioned by the Plan.

The ACE Report makes clear that application of good engineering practices "will result in the best long-term use of available capital, provide the operator with the maximum opportunity to accomplish the intended goals, and target the available technologies to the specific needs of the customer base and/or general public."[57] Unfortunately, the ACE Report concludes that as a whole, "the National Broadband Plan overlooks the realities and complexities of creating sound designs and sustainable, usable broadband systems."[58]

D. By Relying on "Market-Based" Funding Mechanisms Such as Reverse or Procurement Auctions, the Plan Would Cause Broadband Funding to Become Inherently Unstable and Unpredictable, a Result Inconsistent with the 1996 Act.

Over the past 10 years or more the Commission has accumulated a voluminous record showing various proposals to use reverse auctions for determining federal high-cost universal service support would be highly detrimental to consumers living in RLEC

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[55] *ACE Report* at 6.

[56] *See, e.g.,* Roben Farzad, *AT&T's iPhone Mess*, Bloomberg Business Week (Feb. 3, 2010), available at http://www.businessweek.com/magazine/content/10_07/b4166034389519.htm.

[57] *ACE Report* at 12.

[58] *Id.*

service areas.[59] Commenters have cited numerous reasons why reverse auctions will not work, and the record makes clear administration of reverse auctions would be time and labor intensive, prohibitively expensive, and technically burdensome.[60] Proponents of reverse auctions have been unable to offer any relevant real world examples of successful application in circumstances similar to the way they would be utilized to provide universal broadband service support in the United States.

Despite substantial evidence on the record to the contrary, the NBP again proposes the use of market-based mechanisms to determine recipients of, and funding levels for, universal broadband support. The instant NOI specifically asks for comment on a proposal to conduct one form of reverse auctions (i.e., procurement auctions) put forward by a group calling themselves "71 Concerned Economists."[61] Following are the key reasons why basing universal broadband support for RLEC service areas on any type

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[59] *E.g., Federal-State Joint Board on Universal Service Seeks Comment on the Merits of Using Auctions to Determine High-Cost Universal Service Support*, WC Docket No. 05-337, CC Docket No. 96-45, Public Notice, 21 FCC Rcd 9292 (2006); *Federal State Joint Board on Universal Service Seeks Comment on Long Term, Comprehensive High-Cost Universal Service Reform*, CC Docket No. 96-45, WC Docket 05-337, Public Notice, 22 FCC Rcd 9023 (2007); *Federal-State Joint Board on Universal Service*, WC Docket No. 05-337, CC Docket No. 96-45, Notice of Proposed Rulemaking, 23 FCC Rcd 1495 (2008).

[60] In addition to the hundreds of pages of comments filed in several proceedings over the past few years, economist Dale Lehman authored a series of technical reports highlighting numerous reasons why reverse auctions simply will not work as a means of distributing universal service support in areas with pre-existing infrastructure. Dale Lehman, *The Use of Reverse Auctions for Provision of Universal Service* (filed Oct. 10, 2006), with NTCA's Initial Comments in the Universal Service Federal-State Joint Board's Reverse Auction Proceeding, WC Docket No. 05-337; *Reply to Reverse Auction Comments*, (filed Nov. 8, 2006), with NTCA's Reply Comments in the same proceeding; *Diversions and Essential Reforms* (filed July 2, 2007).

[61] The *NOI and NPRM* attaches as an Appendix a document entitled "Comments of 61 Concerned Economists, Using Procurement Auctions to Allocate Broadband Stimulus Grants" (Apr. 13, 2009), regarding a proposal for procurement auctions. *See NOI and NPRM*, Appendix B. Erratum (rel. Apr. 30, 2010 (replacing "Appendix B: Comments of 61 Economists" with Appendix B: Comments of 71 Economists." (herein, the "71 Concerned Economists' Proposal").

of reverse auction mechanism – including the proposed "procurement auction" approach – will not work and will cause the NBP to fail if adopted.

1. *Reverse auctions will encourage a "race to the bottom" that could result in serious service quality problems, contrary to section 254 of the Act.*

While controlling overall funding levels is an important consideration in the provision of universal service support, it is hardly the only consideration. Maximizing coverage and quality of service—particularly in rural and underserved areas—must also play an important role in any future funding mechanism. Reverse auctions, however, reward bidders who offer to provide service at the lowest cost. Unfortunately, overzealous (or unscrupulous) bidders will be motivated to submit bids that are far lower than what is actually needed to provide sustainable, affordable services, just so they can win the auction and receive some high-cost support, rather than none at all. The net result will be, at best, a deterioration in the quality of service provided; at worst, an inability to provide service altogether, at which point there may be no "provider of last resort" to catch the ball as it drops.[62]

2. *Reverse auctions will generate significant unpredictability for both carriers and lenders, which will inhibit network investment.*

Telecommunications networks require large investments in long-lived infrastructure and without a reasonable expectation that these costs can be recovered, needed upgrades will not be made. This is particularly true for RLECs, who lack the highly profitable metropolitan regions and significant capital reserves large, urban-based carriers benefit from.

[62] This phenomenon has already been noted in universal service reverse auctions held in other countries. In Peru, for example, "some winning firms did not meet their rollout obligations. Assuming corruption was not a factor, a 'winner's curse' might have left firms unable to provide service profitably. That is, the winning firms may have underestimated the costs of meeting the obligations and bid too little." Wallsten, Scott, *Reverse Auctions and Universal Telecommunications Service: Lessons from Global Experience*, *Federal Communications Law Journal*, Vol. 61, No. 2, at 392. Available at www.law.indiana.edu/fclj/pubs/v61/no2/9-WALLSTENFINAL.pdf .

If an auction term is too short, or is approaching completion, it is doubtful a rural carrier will make any type of substantial network investment, for fear it may not win the next auction and will be unable to recover the costs. Longer auction terms would also be problematic, because winning bids would be unable to account for changes in technology and customer expectations that are certain to occur over time. Thus, regardless of the length of time between auctions, there is a high likelihood the level of services offered in RLEC service areas will not remain reasonably comparable to those offered in urban areas.

In addition, reverse auctions threaten the outlook lending institutions have of the stability and predictability of RLECs' core cash flows. Investors would certainly be troubled by the possibility of stranded investment that could result from an auction mechanism. This would make the capital markets more reluctant to make new loans to RLECs. At the very least, it would result in a higher cost of capital, making it more difficult for rural carriers to secure affordable financing for network improvements, thereby increasing requirements for broadband support funding.

3. *It will be challenging for the FCC to enforce quality standards under an auction mechanism.*

Following the conclusion of a reverse auction for CAF funds, the Commission would be compelled to monitor the winning bidders to verify they are complying with the terms of their bid.[63] It would need to monitor not only the geographic coverage of the service provided, but also confirm speed levels and the quality of services provided meet or exceed minimum contract requirements, while assuring end user rates remain at promised levels. This would need to be done for every single reverse auction conducted

[63] Possibly the Commission could delegate this function to state regulatory agencies, but it is unclear how such supervisory activities would be funded or how states would enforce the terms of federal broadband contracts.

throughout the country. In addition to monitoring, the Commission would also be required to handle enforcement—compelling non-compliant providers to make the necessary adjustments in order to adhere to the terms of their winning bid. Such monitoring and enforcement would be an inefficient use of FCC resources, and would siphon critical funding and manpower away from the Commission's myriad other important activities.

4. *Reverse auctions may leave a rural area without a suitable COLR if the auction winner fails to meet its universal service obligations*.

Another significant risk of reverse auctions is that a backup carrier may not exist to take over the role of COLR should an auction winner fail to fulfill the universal service obligations established by the FCC or should the winner subsequently declare bankruptcy. By the time it is determined the winning bidder is not performing satisfactorily, the previous COLR – *i.e.*, the RLEC – may be irreparably harmed by the loss of high-cost support and therefore unable to step back in to provide service to the highest-cost customers. In some cases, the RLEC, absent sufficient support, may no longer be a viable entity and may seek to exit the market entirely.[64] Certainly, it would be unreasonable for regulators to continue to impose COLR obligations for voice or broadband services on RLECs that are not auction winners.

The Procurement Auction approach suggested by the "71 Concerned Economists" proposal[65] will not solve any of these problems and will likely raise new concerns. This proposal was previously offered to the National Telecommunications Information

[64] This possibility suggests that in administering any reverse or procurement auction approach the Commission must take into careful consideration the extent to which bidders intend to rely on existing networks when considering bids from alternative providers for the provision of broadband services in rural areas. As support to incumbent providers is withdrawn or phased out, these networks likely will not be available for backhaul or other functions necessary to support alternative network services.

[65] *71 Concerned Economists' Proposal,* Appendix B.

Administration (NTIA) and RUS as a means of allocating the more than $7 billion in broadband stimulus grant funds the agencies were allotted as part of the Recovery Act. The 71 Concerned Economists' proposal differs from previous reverse auction proposals in one significant, and fatal, way—rather than having participants bid on a clearly defined geographic area to serve, they would instead be allowed to bid on geographic areas of their own choosing. As the NOI/NPRM states, "[u]nder the economists' proposal, bidders would be allowed to propose arbitrary geographic units based on their own business models."[66]

In other words, the 71 Concerned Economists' proposal requires numerous "apples to oranges" comparisons to be made in the evaluation of bids and the ultimate selection of a winning bidder. Some bidders would be seeking support for relatively small areas, while others may incorporate these same small areas with other areas. While the 71 Concerned Economists' proposal suggests bids could be ranked for different-sized service areas,[67] the criteria described —subsidy requested per household connected or number of households to which broadband service will be made available—are aggregates for the entire area bid upon, and will not capture variations <u>within</u> that area. Moreover, such criteria inherently sway the award to areas with higher household densities, thereby leaving the lowest-density, highest-cost areas with less support funding. The Proposal also fails to account for the possibility one bidder may do a better, more efficient job of serving a smaller portion of another bidder's larger proposed service area, and may be investing for a long-term presence in that area rather than "parachute in" to provide service on an opportunistic, uncommitted basis.

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[66] *NOI and NPRM* at n.104.

[67] *71 Concerned Economists' Proposal,* Appendix B at 4.

Allowing for bidder-defined service areas raises numerous additional concerns. For example, what should be done in the instance of a winning bidder, chosen to receive support to serve a relatively large service area, who provides satisfactory service to one portion of the area, but not to another? A provider could find its support award is sufficient to serve the more populous part of the service area, but not the more remote, higher-cost portion. This leaves the Commission with a difficult decision—does it rescind all support from the provider, in effect punishing the residents of the service area that had been receiving satisfactory service? Does it attempt to rescind only that portion of the support corresponding to the unserved or underserved part of the service area? At that point, does it turn to the second place bidder in the original auction (assuming it is still in business), or hold an entirely new auction? The answers to these questions hold dramatic implications for those residents of the affected areas.

Ultimately, however, the most telling critique of the 71 Concerned Economists' proposal may be the fact that NTIA and RUS ultimately chose not to implement it. Instead, NTIA and RUS both chose to evaluate proposals based on quantitative and qualitative factors, rather than automatically going with the lowest cost proposal.[68] NTIA and RUS were undoubtedly facing many of the same concerns the 71 Concerned Economists claimed a reverse auction was well-suited to address—timeliness, ease of operation, and a desire to maximize the benefits derived from the funding level allotted.[69] The fact that NTIA and RUS apparently found the 71 Concerned Economists' procurement auction approach unsuitable for the distribution of $7.2 billion—a

[68] "The scoring criteria used to review and analyze BIP and BTOP applications are grouped into four categories: 1. Project Purpose; 2. Project Benefits; 3. Project Viability; and 4. Project Budget and Sustainability. Each application will be scored against [specified] objective criteria, and not against other applications." 74 Fed. Reg. 33104, 33118 (2009).

[69] *71 Concerned Economists' Proposal,* Appendix B at 2-4.

significantly smaller sum than the funding that will ultimately be dispersed as part of the CAF—merely adds to the already voluminous evidence that reverse auctions are not a satisfactory answer to questions of how to determine recipients of high-cost support or funding levels.

E. The Plan Fails to Recognize the Critical Role RLECs Play as "Carriers of Last Resort" in Rural Areas.

The Plan professes to be "agnostic" with respect to the types of carriers and technologies funded to provide broadband service. It anticipates future support payments under the CAF mechanism could go to whichever technology or provider can meet – or at least promise to meet – minimum established service standards. The problem with this approach is it essentially ignores the importance of in-place networks and the role of RLECs as COLRs within their respective service territories.[70]

Since the early 20th Century, many of the industry's largest telecommunications and cable providers chose not to invest in facilities to provide basic telephone service in the geographic areas of the United States that are the most economically challenging to serve. These areas consist of the most rural, insular, and sparsely populated areas of the Nation, such as the Northern Plains, Appalachian and Rocky Mountains, Southwestern Deserts, Central and Mid-Western farmlands, Native American reservations, Hawaii, and the frozen tundra of Alaska.

Conversely, RLECs have invested in and built the networks that serve communities that provide food, energy and raw materials to urban America and the world. They are already familiar with local terrain and the needs of residential and

[70] It also tends to ignore the critical role wireline networks play for wireless services, including backhaul services and last-mile wireline broadband infrastructure that serves as the basis for wireless femtocells, which take much of the burden off scarce spectrum. *See* Appendix B, *ACE Report* at 9.

business customers. Decisions about their networks and services are made drawing on years of experience with the particular areas involved. These companies, and their ability to continue providing "reasonably comparable" communications services to rural Americans, are vital to our Nation's economic development, national security and public health and safety.

RLEC investments in these areas have been possible due to a time-tested cost recovery structure consisting of RoR regulation, actual cost-based USF support, ICC, and NECA pooling. As a result of these combined mechanisms, rural consumers have access to services at rates that are affordable and comparable to those in urban areas, as sought by Congress in the 1996 Act.

Reduction or redistribution of substantial portions of the high-cost support presently received by RLECs will disrupt and eventually destroy the long-established and very successful regulatory compact under which these carriers operate. Specifically, RLECs have provided high quality and affordable service to their rural customers in accordance with the service and rate mandates of state commissions as well as this Commission, in return for reasonable compensation for the investments and expenses incurred to comply with such mandates. This arrangement has provided the financial stability that allows such companies to obtain financing from outside sources to invest in networks and services that otherwise would not provide a positive Net Present Value (NPV) business case.

The regulatory compact described above has largely been implemented via state COLR requirements.[71] COLR requirements ensure a readily identifiable entity will provide a specified minimum of telecommunications services within a defined service

[71] Some states (for example, Texas) use the term "Provider of Last Resort" rather than COLR.

area to all residential and business customers (including other telecommunications carriers) who request and pay for such services. Although the ETC provisions of Section 214(e) of the Act and Part 54, Subpart C of the Commission's rules contain some provisions similar to COLR requirements, the predominant source of COLR mandates are state statutes, state certificates of authority to provide local exchange service (for example, certificates of public convenience and necessity), and state commission regulations.[72] The other major source of COLR obligations is the service covenant in the loan agreements of the RUS and its predecessor the Rural Electrification Administration.[73]

Attached as Appendix C to this filing is a comprehensive list of COLR requirements imposed on Association members under federal and state regulations. In general, however, COLR responsibilities generally include the following five elements:

1. ***Duty to serve:*** A COLR must extend the specified retail telecommunications services to all potential customers within its defined service area at the request of each such customer, subject to reasonable conditions and service quality standards specified by the appropriate regulatory authority. As the public switched telephone network (PSTN) evolves into the National Broadband Network, the specified retail services will likely expand to include broadband and other advanced services.

2. ***Line extensions:*** A COLR must extend its distribution network throughout its defined service area (including unserved and newly settled areas) at the request of new applicants for service.

3. ***Exit barriers:*** A COLR must continue providing service to its customers within its defined service area unless and until the relevant regulatory authority grants permission for it to exit (for example, by approving a new owner in the event of a

[72] Also, the bylaws of some rural telephone cooperatives contain service and rate provisions for all members that are substantially similar to COLR requirements.

[73] The success of RUS loan programs in providing capital for the execution of this policy should not be overlooked. In order to qualify for RUS financing, RLECs are required to accept the core responsibility to serve every citizen that meet basic requirements for service (*e.g.,* credit worthiness, technical feasibility, etc.) *See, e.g.*, 7 C.F.R. § 1735.11 (area coverage requirements for RUS borrowers). These commitments are essential to achieving the goals contained in the 1996 Act as well as the NBP.

voluntary assignment or transfer of control, or by locating and designating one or more successor COLRs in the event of a bankruptcy or insolvency).

4. ***Other retail obligations:*** A COLR may be subject to state-mandated rate designs for residential, single-line business and multiple-line business customers, as well as state-mandated discounts for low-income and disabled customers. It may also be required to maintain "soft dial-tone" or "warm line" services that prevent a COLR from removing its lines and permit people in premises where service has been disconnected or terminated (including termination for non-payment), to make calls to emergency services and to the COLR's business office.

5. ***Carrier-to-carrier obligations:*** A COLR may be required to furnish certain interconnection and wholesale services needed by other carriers, including special access circuits that provide connections and backhaul for wireless towers.

COLR functions render substantial and necessary public benefits, but do so by imposing significant and continuing cost burdens upon individual COLRs. First and foremost, COLRs are subject to expensive obligations far in excess of those of other carriers to invest in, construct, operate and maintain network facilities to serve all of the customers located within their defined service areas who request service. Whereas virtually all carriers will rush voluntarily to serve profitable customers, the essence of COLR status is the requirement to disregard normal business and economic considerations and to construct facilities and provide services to customers whose remote locations, high cost and/or limited profit potential would not normally induce a profit-maximizing entity that was not a COLR to offer them service at readily affordable rates.

The necessity for and benefits of COLRs did not disappear with the introduction of competition into the local exchange business,[74] or with the already substantial progress

[74] For example, in many states, RLECs must maintain disconnected lines and reinstate service to a customer within a specified timeframe. Some are also required to provide "soft dial tone," which allows a disconnected customer to make calls to 911 emergency services and to the RLEC's business office. These types of obligations further narrow the difference between maintaining a live or "lost" line, and impose additional costs on ILECs relative to other broadband providers.

toward the evolution of the public switched network into a national broadband network.[75] Likewise, they are not likely to diminish with the completion of this transition to a broadband network. No matter how many carriers are willing to serve the more densely populated and lower cost portions of a particular service area, universal service requires the presence of a clearly identified carrier in each service area that is ready, willing and able to serve the most expensive, least profitable or otherwise less desirable consumers therein. As explained above, it is unlikely providers selected according to unpredictable and unmanageable reverse or procurement auctions will satisfy these requirements.

All of the approximately 1,100 RLECs represented by the Associations have been COLRs for most or all of their existence. The Commission can readily determine from state commissions that the RLEC industry has an excellent record over the decades of meeting its COLR obligations, notwithstanding the high costs of such obligations and the limited size and financial resources of most RLECs. If significant portions of these major and critical revenue streams are redistributed to other entities or otherwise reduced, many RLECs will likely be unable to continue providing affordable, high-quality services – voice or broadband – to customers residing in the high-cost portions of their service areas.

In many sparsely populated rural service areas, the existing RLEC is often the sole entity that has ever shown a perceptible and sustained interest in serving the area. And where neighboring RLECs may have been potential successors in the past, they are likely to be subject to comparable decreases in high-cost support and ICC that will undermine their own existing operations and COLR obligations, preventing them from undertaking new COLR responsibilities in nearby areas. There is certainly no evidence

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[75] *See,* Carriers of Last Resort: Updating a Traditional Doctrine, NRRI (July 2009), at http://www.nrri.org/pubs/telecommunications/COLR_july09-10.pdf (2009 *NRRI Study*).

or reliable assurance the price cap carriers that have been trying to sell their rural exchanges, or the cable operators and wireless carriers that have previously limited their rural operations to population centers and heavily travelled corridors, will seek to replace RLECs as COLRs in rural areas. Yet the Plan appears to assume "some other" entity will be the best choice for building out broadband to remaining unserved customers in RLEC service areas. This is wishful thinking. If there were an economically feasible way the most remote customers could be provided broadband via any method other than satellite, rural carriers would already be serving them.

Instead of recognizing the contributions of RLECs and the success of existing regulatory mechanisms, the Commission appears to dismiss them as relics of an earlier, outdated "legacy" era, which the Commission now apparently blames for holding back broadband deployment and adoption.[76]   Nothing could be further from the truth. RLEC multi-use networks – and the regulatory mechanisms supporting them – are responsible for much of the country's broadband success story to date.   The NBP's failure to recognize the importance of these existing networks, and its apparent determination to abandon the successful regulatory structures that built them, is one of its most serious shortcomings. These networks should not be abandoned, but instead should be leveraged to achieve the NBP's goals. As discussed below, the simplest and most direct way of accomplishing this goal is to adapt existing regulatory methods and support mechanisms to the new broadband environment.

[76] *See, e.g., Genachowski Asks Congress for Help in Reclaiming Broadcast Spectrum*, Broadcasting and Cable (June 9, 2010), available at http://www.broadcastingcable.com/article/453558-Genachowski_Asks_Congress_for_Help_in_Reclaiming_Broadcast_Spectrum.php.

III. THE COMMISSION SHOULD NOT IMPOSE ADDITIONAL CAPS OR FREEZES ON RLEC HIGH-COST SUPPORT.

The NBP proposes the Commission "take steps to manage the universal service fund so its total size remains close to its current level (in 2010 dollars) to minimize the burden of increasing universal service contributions on consumers."[77] Specifically, the Commission seeks to cap "legacy high-cost support provided to incumbent telephone companies at 2010 levels, which would have the effect of creating an overall ceiling for the legacy high-cost program."[78]

As a threshold matter, the Associations note this recommendation is not the result of any Congressional mandate; there is no mention of capping the USF in either the 1996 Act or the Recovery Act, which directed the FCC to prepare the NBP. Yet, by making the prevention of Fund growth one of its foremost universal service policy objectives, the Commission is forced to propose in the NPRM additional caps and/or freezes on the support received by RLECs,[79] which contravene one of the key universal service objectives of Congress: to provide rural and high-cost areas with access to advanced services that are reasonably comparable in quality and price to those offered in urban areas.[80]

Possibly these cap and freeze proposals are seen as "fair" by the Commission, inasmuch as the NPRM also proposes to phase out or eliminate current support for

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[77] *NOI and NPRM* at ¶ 51, *citing NBP* at 149.

[78] *Id.*

[79] Specifically, these proposals include: imposing an overall cap on existing high-cost support for ILECs at 2010 levels; imposing a cap on each individual high-cost mechanism (to the extent each is not already capped) at 2010 levels; freezing or capping per-line support to each ILEC at 2010 levels; and freezing the total amount of support an ILEC receives in a particular study area at 2010 levels. *NOI and NPRM* at ¶¶ 51-52. Also proposed is shifting RoR ILECs to incentive regulation, in part, by converting each carrier's ICLS to a frozen amount per line. *Id.* at ¶¶ 55-56.

[80] 47 U.S.C. § 254(b)(3).

competitive eligible telecommunications carriers (CETCs) under the "identical support" rule, as well as eliminating the Interstate Access Support (IAS) mechanism for price cap carriers.[81] But the Commission may not cut, freeze or cap needed universal service support for RLECs simply on the basis that other programs (which do not have the same public interest justifications) are being cut. As discussed above, RLECs bear unique and significant cost burdens as rural COLRs that must be considered before revising or further limiting support programs.

The Commission also appears to believe rural consumers will continue to have access to "reasonably comparable" broadband services and prices throughout the transition to the CAF, even though it proposes to cap and then phase out existing support mechanisms during that time. What the Commission fails to recognize is that RLEC networks, which provide the foundation for broadband service in rural areas, require ongoing support to remain viable. Without ongoing support for these foundational networks, the incremental broadband build-outs envisaged by the NOI will be impossible.

This approach also fails to recognize the data speeds being offered by the majority of RLECs today are below what is generally available in urban areas.[82] In order to achieve and maintain reasonable comparability with their urban counterparts, rural carriers need stable and sufficient sources of revenue. RLECs must continue to invest in high-bandwidth capacity infrastructure and operate and maintain their networks while, at

[81] *NOI and NPRM* at ¶ 57.

[82] Seventeen percent of the RLECs that offer DSL service under NECA's tariff are not able to provide service exceeding 768 Kbps, the FCC's current minimum definition of broadband. The most commonly-offered services provide speeds of 768 Kbps, or speeds ranging from 1 – 3 Mbps (which is still lower than the NBP's 4/1 Mbps target). Thirty eight percent offer service with speeds ranging between 3Mbps and 10Mbps. Only 8 percent of the surveyed companies offered products with speeds above 10 Mbps.

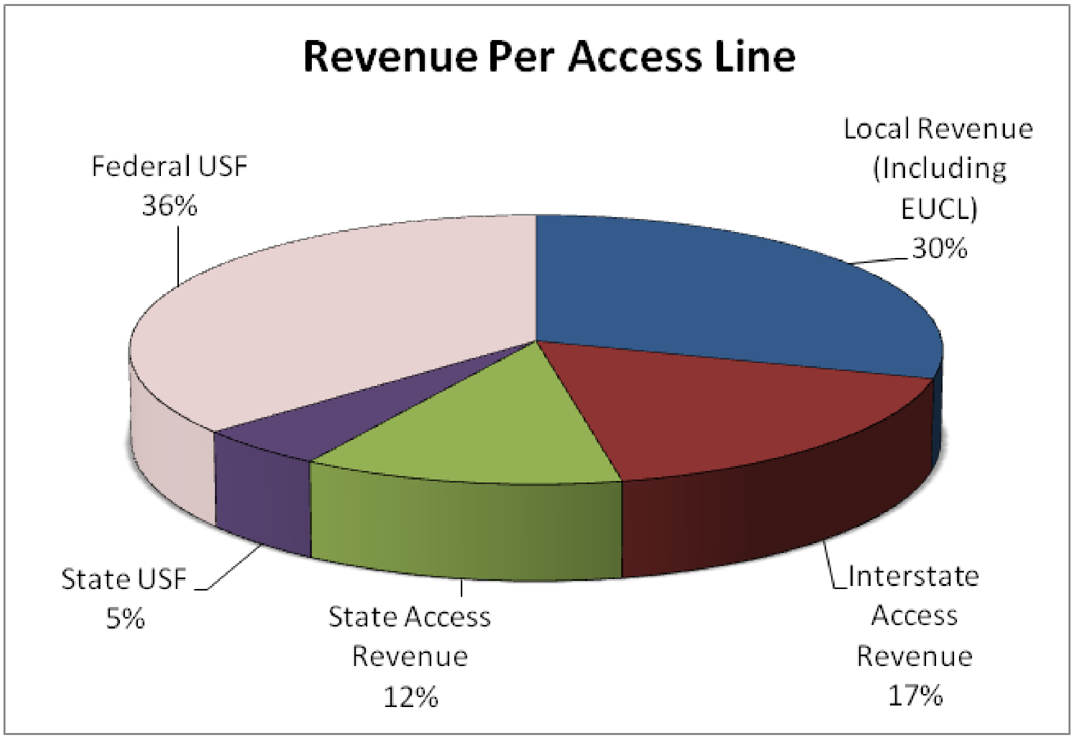
the same time, offering broadband services at affordable rates. This will not occur if additional caps and/or freezes of any kind are placed on RLEC support.[83]

In order to assess the potential impacts of NBP proposals to cap and/or phase out existing cost recovery mechanisms on RLECs, NECA recently asked member companies to provide information on the extent to which they currently rely on federal and state universal service funding, as well as state and interstate access and end user charges, to recover network costs (2010 NECA Survey).[84] Based on information obtained from a representative sample of 761 RLECs, it becomes clear these revenue streams are vitally important to the provision of telecommunications services in rural areas served by RLECs: [85]

[83] Overall rural high-cost support has been very stable since 2005. Specifically, aggregate High Cost Loop Support (HCLS), Local Switching Support (LSS) and ICLS for rural carriers was $2.310 billion in 2005, $2.317 billion in 2006, $2.323 billion in 2007 and $2.279 billion in 2008. It is expected to be $2.344 billion in 2009 and $2.300 billion in 2010. Of this amount, support for RoR RLECs in NECA's CL Pool in 2010 is approximately $1.9 billion. As RLECs are required to maintain their existing multi-use networks and repay their outstanding infrastructure loans, while making the additional investments necessary to upgrade these networks to meet the Commission's broadband availability target, the amount of aggregate high-cost support necessary to satisfy the "sufficiency" requirement is likely to significantly exceed current levels. This problem will be exacerbated if revenues that are lost from ICC reform are required to be recovered from universal service mechanisms.

[84] The 2010 NECA Survey remains ongoing as companies continue to provide responses and new data is checked for accuracy and consistency. Available data are sufficiently precise to provide reasonable estimates of NBP impacts at this point, but are subject to refinement as further data analyses are performed. NECA sent two data requests to its members in June 2010, one asking for revenue, demand and costs, and the other asking for middle mile speeds, rates and capabilities. (*2010 NECA Survey*).

[85] *Id.*



As can readily be seen from the above chart, USF and access revenues (switched and special) account for the majority (70 percent) of the typical RLEC's income streams.[86] Any entity that potentially faces the loss of such revenues, whether suddenly or gradually, will need to make substantial adjustments to its investments, expenditures and end-user rates. The typical RLEC with limited financial resources will have trouble making the remaining payments on its outstanding loans, meeting current payrolls and maintaining its existing network. It simply will not have the resources to continue meeting expensive COLR responsibilities or to build-out the broadband network.

For this reason proposals that would freeze or cap current support amounts on a per-line basis represent an especially poor policy choice. The high-cost support RLECs receive as COLRs is not designed to support individual lines – it is intended to encourage investment in high-quality *networks* capable of delivering universal service throughout

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[86] While not addressing intercarrier compensation reform specifically in this NPRM, USF and ICC reform are intertwined to such an extent that both must be considered in evaluating policy impacts.

high-cost areas.[87] Major components of RLEC network costs are fixed and, within a reasonable range of output, do not go up or down significantly as consumers subscribe to or discontinue local exchange service. This occurs in part because RLECs, as COLRs, must stand ready to serve any customer who requests service throughout the service area. The Commission itself has recognized that "an incumbent carrier's loss of subscriber lines…is unlikely to be offset by a corresponding reduction in its total embedded cost of service."[88] As a result, the Commission has previously declined to freeze per-line support, finding it may have the unintended consequence of discouraging investment in rural infrastructure.[89] The same conclusion should be reached in this proceeding.

With regard to the proposed per-line freeze on ICLS, this critical funding mechanism helps to support the cost of broadband-capable loop distribution plant in high-cost areas. These facilities compose a significant part of the costs of providing broadband. Therefore, a per-line freeze on ICLS would jeopardize the ongoing provision of existing broadband services at affordable rates in many RLEC territories, let alone the expansion and improvement of such services. When the FCC created the ICLS mechanism, along with reforms to the access charge regime for RLECs, it considered and properly rejected imposing a cap on this support. The Commission recognized RoR

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[87] Indeed, "per-line" support is a construct created to fund other carriers on the basis of the ILEC's costs, a system which has proven disastrous in its application. *See, e.g., High-Cost Universal Service Support*, WC Docket No. 05-337, *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, *Alltel Communications, Inc., et al. Petitions for Designation as Eligible Telecommunications Carriers RCC Minnesota, Inc. and RCC Atlantic, Inc. New Hampshire ETC Designation Amendment,* Order, 23 FCC Rcd 8834 (2008).

[88] *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Fourteenth Report and Order, Twenty-Second Order on Reconsideration, and Further Notice of Proposed Rulemaking, *Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers*, CC Docket No. 00-256, Report and Order, 16 FCC Rcd 11244 (2001) at ¶125 (*RTF Order*).

[89] *Id.* at ¶ 129.

carriers are "particularly sensitive to disruptions in their interstate revenue streams,"[90] and determined:

> A reduction in common line revenues might undermine our universal service goals by creating pressures for certain rate-of-return carriers to reduce service quality, increase local rates, or limit service offerings. Consistent with our policy of promoting investment in telecommunications services for rural America, the absence of a cap will ensure that the rate structure modifications we adopt do not affect the overall recovery of interstate loop costs by rate-of-return carriers.[91]

The Commission's 2001 analysis continues to be relevant in today's marketplace, as the same loops supported by ICLS are increasingly used to carry broadband Internet access services. RLECs face significant challenges in their efforts to expand and improve upon the broadband services they offer consumers, and provide those services at affordable rates. Reducing interstate USF revenues at this juncture will likely result in a reduction in available services and/or an increase in prices.

NECA analyzed data from its 2010 Survey on the potential effects of freezing per-line ICLS or total high-cost fund (HCF) support on the free cash flow RLECs generate from regulated services.[92] This analysis shows that freezing ICLS on a per line basis will cause free cash flow for the average company to turn negative by the year

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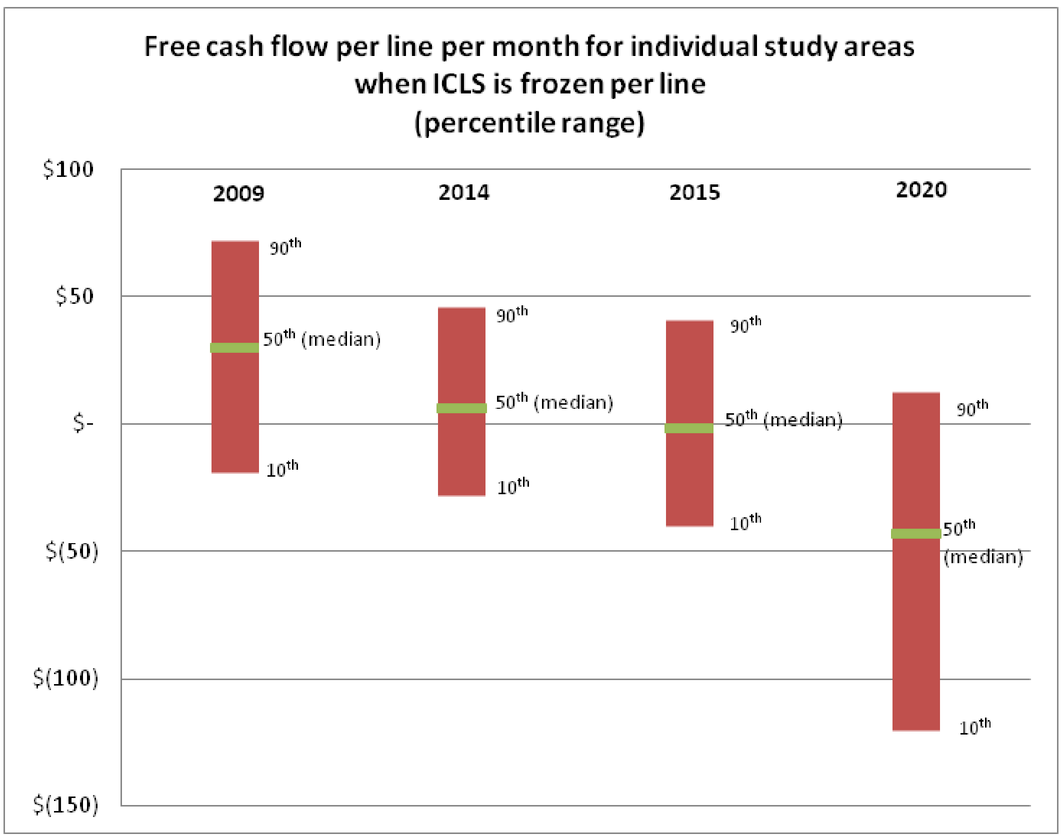
[90] *Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers*, CC Docket No. 00-256, Second Report and Order and Further Notice of Proposed Rulemaking, *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Fifteenth Report and Order, *Access Charge Reform for Incumbent Local Exchange Carriers Subject to Rate-of-Return Regulation*, CC Docket No. 98-77, Report and Order, *Prescribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers*, CC Docket No. 98-166, Report and Order, 16 FCC Rcd 19613 (2001) at ¶ 134 (*MAG Order*).

[91] *Id.* at ¶ 132.

[92] This analysis uses the definition of "free cash flow" described in the Commission's NBP documentation. *See, e.g., NBP Public Notice #19,* 24 FCC Rcd 13757 (Free Cash flow equals EBITDA [Earnings Before Interest, Taxes, Depreciation and Amortization] minus CapEx.)

2015.[93] By 2020, the average free cash flow under this proposal will sink to negative $49 per line per month. To understand better the impacts of these average results on individual companies, however, the following chart orders study areas in the sample by percentile, where the lowest percentile represents the study area with the lowest free cash flow and the highest percentile represents the study area with the highest free cash flow. This display shows that under the Commission's proposal to impose a per-line freeze on ICLS half of all study areas will have negative regulated cash flows in 2015, and fully 86 percent of study areas will have a negative regulated free cash flow by 2020.[94]



Notes: Study area free cash flow ordered from lowest (10th percentile) to highest (90th percentile). Study areas are weighted by access lines.

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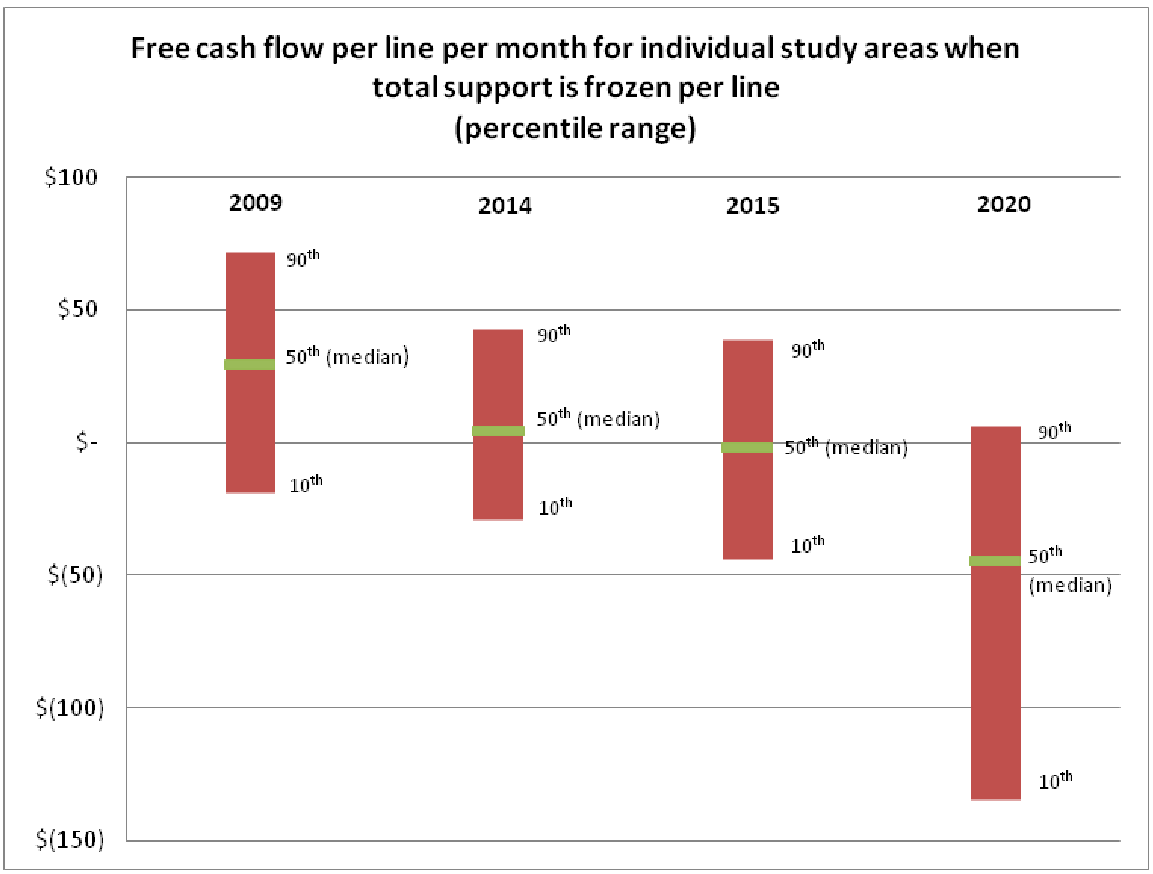
[93] Projections underlying the free cash flow estimates described herein assume continuation of current demand and investment trends. *See, e.g.,* NECA Access Service Tariff FCC No. 5, Transmittal No. 1278 (filed June 16, 2010).

[94] As is apparent from the chart, some RLECs currently have negative free cash flow. This can occur on a temporary basis as a result of current borrowing and investment cycles, but is not typically expected to last long-term. *See, e.g.,* http://www.investorwords.com/2084/free_cash_flow.html.

This situation is even worse under the Commission's alternative proposal to freeze total high-cost support on a per line basis. On average, companies will experience a negative cash flow of $54 per line per month by the year 2020 should the Commission take this approach. Again ordering study areas by percentile, the following chart shows that by 2015, 57 percent of companies in the survey will have negative free cash flow under this proposal, and by 2020, 88 percent of companies will have negative free cash flow.



Notes: Study area free cash flow ordered from lowest (10th percentile) to highest (90th percentile). Study areas are weighted by access lines.

As noted above, these analyses are based on the definition of free cash flow appearing in NBP Public Notice #19.[95] This approach determines free cash flow by

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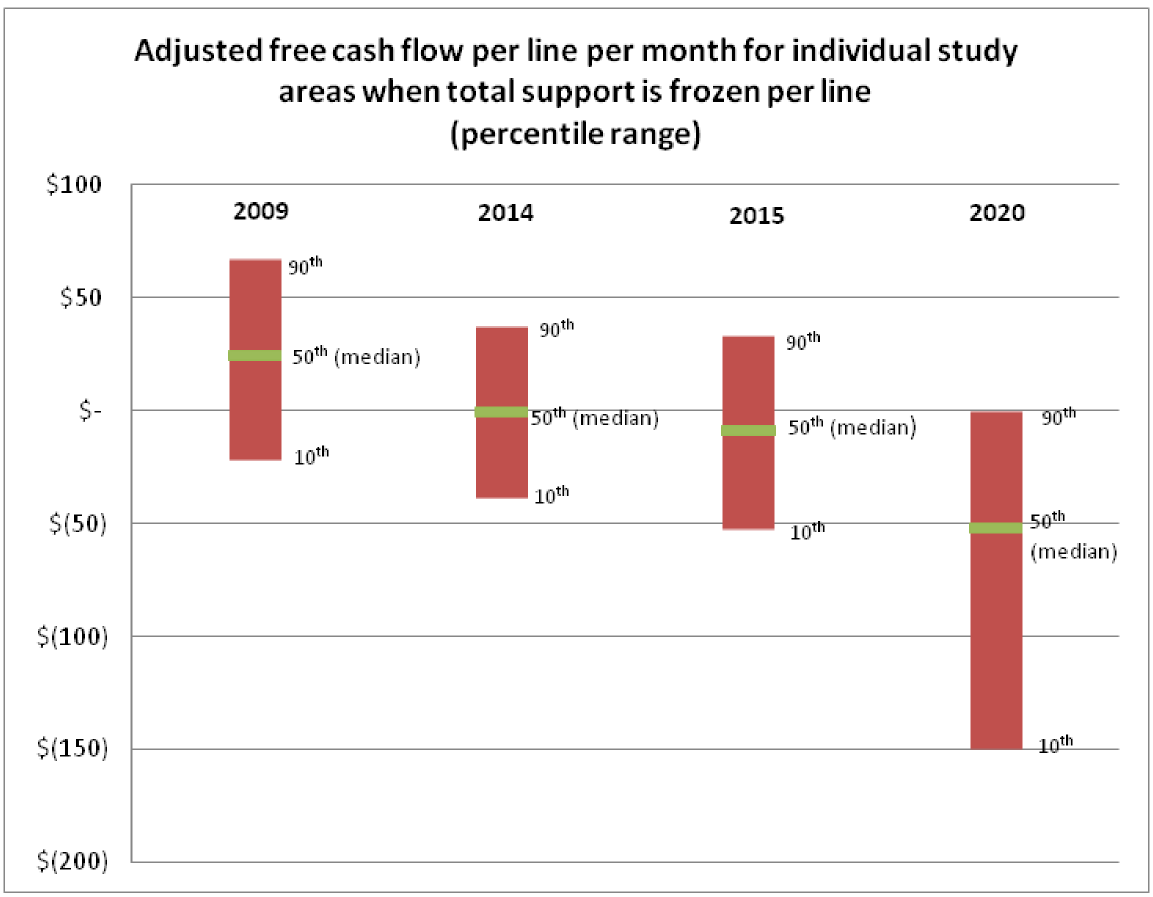
[95] *Supra n.* 92.

subtracting capital expenditures (CapEx) from EBITDA.[96] Since companies are actually required to pay interest expenses on long-term debt as well as income taxes on earnings, however, a more realistic assessment of "free" cash flow for purposes of this analysis would reflect such payments in the analysis. That is, "free cash flow" would be considered as the amount of cash a company has left over after it has paid all of its expenses, including capital expenditures.

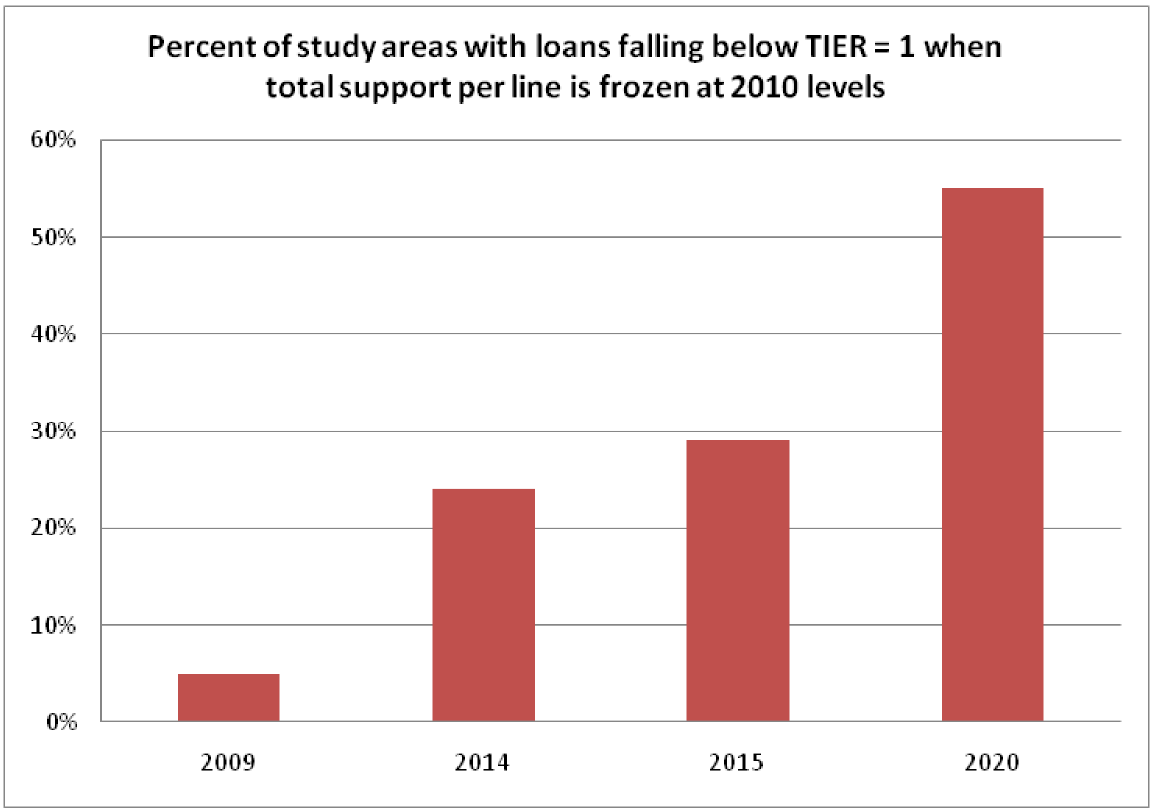
As shown below, imposing a per-line freeze on total USF support would cause the average company's adjusted free cash flow to sink to negative $63 per line per month by 2020. By 2020, 89 percent of the companies in the 2010 NECA Survey will face negative adjusted free cash flow. The table below shows the percentile spreads:



Notes: Study area free cash flow ordered from lowest (10th percentile) to highest (90th percentile). Study areas are weighted by access lines.

96 *NBP Public Notice #19* at 4.

These shortfalls must be recovered either through rate increases, cutting back on service, or eliminating new investments. New investments would be unlikely in any event, however, since companies facing such cash flow shortages would be in no position to qualify for loan financing. For example, RUS regulations require borrowers to maintain a Times Interest Earned Ratio (TIER) of at least 1.0 to assure sufficient cash flow to service the debt for RUS loans.[97] Based on its 2010 Survey Data, NECA found that while only 5 percent of study areas with loans had TIERs below the RUS standard in 2009, over half of the study areas would no longer qualify for RUS loans by 2020.[98]



[97] *See, e.g.,* 7 C.F.R. § 1735.22(g). TIER is defined as the ratio of a borrower's net income (after taxes) plus interest expense, all divided by interest expense. NTIA and RUS's July 2009 Notice of Funds Availability (NOFA) contained similar requirements. *See* 74 Fed. Reg. 33104 (2009). Broadband projects to be funded by ARRA loans or loan/grant combinations would be considered financially feasible when the applicant is able to generate sufficient cash flow to service its debts and obligations and meet the minimum TIER requirement of one by the end of the forecast period as determined by RUS.

[98] This estimate is consistent with the estimates provided by RUS in 2008. *See supra* n. 36 and accompanying text.

The above analyses focus on the effects of freezing ICLS or total USF support on a per-line basis. In addition, however, the Commission should consider that RLECs are presently losing significant amounts of support under the cap that already exists on the high-cost loop support (HCLS) mechanism. While current rules apply an annual "rural growth factor" to the HCLS, which equals the sum of the annual percentage change in inflation (GDP-CPI) plus the percentage change in the total number of rural ILEC working loops,[99] the percentage decline in rural ILEC working loops has been larger than the percentage increase in inflation in recent years. This means the total amount of HCLS available to RLECs has been decreasing. Further, NECA projects that if current trends continue, HCLS collectively received by RLEC participants in the Common Line pool will decrease by 34 percent between 2010 and 2020, from $816.50 million to $556.30 million.[100]

RLECs have also been losing significant amounts of revenue from ICC due to several factors, including: (1) the arbitrage of disparate access rates; (2) unidentifiable and unbillable "phantom traffic;" (3) the refusal of many interconnected VoIP service providers to pay access charges; and (4) the legitimate decline of traffic traversing the public switched network. The interstate switched access minutes-of-use for the RLEC participants in NECA's Traffic Sensitive pool has declined on average by approximately 9.5 percent a year over the past three years. Moreover, the NBP proposes phasing out of per-minute ICC rates by 2020,[101] with no identified replacement for this critical revenue stream for rural carriers. Without a replacement mechanism for these switched per-

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[99] 47 C.F.R. § 36.604.

[100] Projections based on USAC 1Q10 filing (appendix HC-01) and assuming an annual rural growth factor of -4.27 percent. This is derived using a projected -6.77 percent annual change in the number of rural ILEC working loops and a projected 2.5 percent annual change in inflation (GDP-CPI).

[101] *NBP* at 149-150.

minute ICC revenues, local service rates or the interstate Subscriber Line Charge (SLC) would need to be increased between $1.46 and $64.65 per line per month by 2020, depending upon the carrier. These switched ICC revenues will not be easily replaced in the broadband environment as rural providers pay other providers to interconnect to the Internet, yet it is uncertain what revenues they will receive (other than end-user revenues) for the Internet traffic that subsequently flows over their local networks.[102]

In light of the revenue losses RLECs are already incurring in HCLS support and ICC, it should be apparent any further caps or freezes on the high-cost support received by these carriers would devastate their ability to provide an evolving level of broadband services at affordable rates to their customers.

IV. THE COMMISSION SHOULD NOT ATTEMPT TO REQUIRE RLECS TO SHIFT TO INCENTIVE REGULATION.

The NPRM seeks comment on whether current RoR companies should be required to "convert to some form of incentive regulation."[103] In support of this proposal, the NPRM mentions a recommendation set forth in the NBP[104] and describes several instances involving RoR carriers that have voluntarily converted to price cap regulation.[105] The NBP points out that RoR regulation was implemented at a time when

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[102] For example, comments submitted with respect to the Commission's 2009 *Notice of Proposed Rulemaking* in GN Docket 09-191 outline significant concerns raised by RLECs with respect to the potential imposition of strict prohibitions against all forms of price and service discrimination in the provision of Internet Access services. *See, Preserving the Open Internet*, GN Docket No. 09-191, *Broadband Industry Practices*, WC Docket No. 07-52, Notice of Proposed Rulemaking, 24 FCC Rcd 13064 (2009). As explained in NECA's comments, for example, these rules could foreclose development of the value-added services needed to make broadband economically viable in rural areas. NECA Comments, GN Docket No. 09-191 (filed Jan. 14, 2010) at 2, 12; *See also,* NTCA Comments, GN Docket No. 09-191 (filed Jan. 14, 2010) at 5-8; OPASTCO Comments, GN Docket No. 09-191 (filed Jan. 14, 2010) at 2-6.

[103] *NOI and NPRM* at ¶ 55.

[104] *Id.,* citing *NBP* at 147.

[105] *Id.* at ¶ 55, n. 123.

there was a single provider of voice service in a given geographic area that had a legal obligation to serve all of the customers in the area and when the network only provided voice service.[106] In today's competitive, multi-service environment, the NPRM asks whether the current RoR framework has become "less appropriate" for RLECs.[107]

The Associations strongly oppose any proposal to force RLECs to move to incentive regulation. Interstate RoR regulation has a proven track record of success in enabling deployment and provision of broadband services to rural areas.[108] Incentive regulation, in contrast, has proven to be substantially less successful in encouraging deployment of broadband to uneconomic-to-serve areas.

The Plan correctly recognizes that much of the rural portions of territories served by companies operating under price caps do not have access to broadband services.[109] Given these findings, a rational "data driven" plan would presumably propose making improvements to existing successful support programs and regulatory regimes, and to change or abandon those that have failed. Instead, the NBP proposes to cap and then abandon successful existing high-cost support mechanisms along with RoR regulation, and replace them with price caps or some other form of incentive regulation.[110]

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[106] *NBP* at 147.

[107] *NOI and NPRM* at ¶ 55.

[108] In developing the NBP, the OBI Broadband Task Force was provided with overwhelming evidence that stable and sufficient USF mechanisms and rate-of-return regulation enabled RLECs to achieve high levels of broadband deployment in their serving areas. *See, e.g.*, Comments filed by NECA, NTCA, OPASTCO and WTA*,* GN Docket No. 09-51. *See also,* NTCA 2009 Broadband/Internet Availability Survey Report, November 2009, available at: http://www.ntca.org/images/stories/Documents/Advocacy/SurveyReports/2009ntcabroadbandsurveyreport.pdf.

[109] *NBP* at 141.

[110] It bears noting the NBP's otherwise exhaustive record provides no factual or legal basis in support of its recommendation to eliminate RoR regulation for RLECs. At no point in proceedings leading up to the NBP, for example, did the Commission request comment on proposals to require RLECs to convert to incentive regulation, no workshops

While competitive and marketplace circumstances facing RLECs have changed to some degree since RoR regulation was initially developed, the NPRM does not explain why these changes necessarily require mandatory conversion to incentive regulation, nor does it attempt to address whether RoR regulation can be adapted to respond to such changes. After all, in most RLEC service areas, only a portion of the territory experiences any significant competition.[111] This has been the case for years, yet there is no evidence RoR regulation has impeded competitive entry or suddenly become outmoded due to partial competition.

It is also true broadband technologies have opened up new markets and revenue sources for RLECs. But there is nothing new about this either – carriers have generated revenues from non-regulated services for years, subject to FCC cost allocation rules designed to isolate non-regulated costs and revenues from regulated accounts.[112] The

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were held on the topic, and, as far as the Associations can determine, no significant discussion of this issue occurred in any of the tens of thousands of comments submitted on related topics. Nor does the NBP or NPRM explain what *legal* basis the Commission might have for imposing mandatory incentive regulation on RLECs. Clearly, the fact some larger carriers have sought or voluntarily accepted price cap regulation does not establish a legal basis for mandatory imposition of such regulatory structures on other carriers.

[111] NECA has previously demonstrated that claims of cable company coverage in rural areas tend to be overstated. *See, e.g.,* NECA Comments, GN Docket No. 09-51 (filed Jan. 7, 2010). There, NECA showed that data provided by MediaPrints (an oft-cited source for cable coverage information) shows cable availability at the whole census block group level even if cable broadband service is available only in a small portion of the census block group area. *See also* WTA Reply Comments, GN Docket No. 09-51 (filed Jan. 22, 2010), Appendix A (detailing results of survey showing WTA members have unaffiliated CATV video service in only 11.58 percent of the 423 rural Western exchanges they serve, and then only in the principal population centers of such exchanges; and have competitive cable voice service in only 4.73 percent of the 423 rural Western exchanges they serve, again only in the principal population centers of such exchanges).

[112] 47 C.F.R. §§ 64.901-905.

NPRM does not explain why these rules have suddenly become inadequate for a broadband environment.[113]

An apparent factor behind the Commission's proposal to require RLECs to shift to incentive regulation is the belief RoR regulation encourages carriers to be inefficient.[114] RLECs are routinely accused of overbuilding their networks, and critics often point to examples where carriers have installed fiber optic facilities in areas where it may appear copper wire or fixed wireless circuits would be more efficient. Such claims are misplaced. As discussed above and in Appendix B, decisions by rural carriers to deploy fiber or other facilities that may at first appear unwise in fact typically reflect sound engineering practices, as engineers recognize the need to build networks to accommodate reasonable growth expectations.[115]

If "rural legends" regarding RLEC overbuilding under RoR regulation were true, one would expect to see RLECs investing large sums of money as rapidly as possible, taking on huge debt loads in the process, in order to maximize the supposed uneconomic benefits available to them under RoR regulation. But in fact the opposite is true. RLECs are extremely cognizant of the financial dangers associated with investing too much, too

[113] It is not necessarily true that most or even many states have "imposed" incentive regulation on small carriers. States actually apply a wide variety of techniques to regulate basic local exchange service rates that may or may not constitute the type of incentive regulation developed by the Commission for larger carriers. For example, agreements by carriers and state regulators to "freeze" local rates for a period of time may simply reflect a mutual desire to reduce or eliminate the need for traditional rate case proceedings, which are complex and burdensome for both RLECs and regulators. As a 2006 report by the National Regulatory Research Institute (NRRI) makes clear, there is actually wide variation among States in their approaches to regulating local service rates, but "[t]he most common trend among these 40 states is to regulate the rates of the large incumbents under a price cap plan while maintaining smaller incumbents under ROR regulation . . . ." National Regulatory Research Institute, State Retail Rate Regulation of Local Exchange Providers as of September 2005 (April 2006) at 2; http://nrri.org/pubs/telecommunications/06-05.pdf (2006 *NRRI Study*).

[114] *See, e.g., NOI and NPRM* at ¶ 50.

[115] *See also, supra* pp.18-21.

fast, and therefore typically follow an incremental "edge out" approach to their network build-outs.[116] It is not at all unusual, for example, for an RLEC to have multiple RUS loans staggered over periods of many years, each targeted to particular portions of network build-outs. This reflects the fact that RLECs and lending agencies such as RUS generally follow prudent investment and financing practices under RoR regulation.[117]

While the Plan describes in general terms supposed deficiencies in existing RoR regulation,[118] it does not even mention, let alone consider, the complexities that have caused the FCC to reject mandatory application of price cap regulation to RLECs over the past twenty years. For example, a critical factor in developing workable "price cap" rules for larger carriers has been the development of productivity factors.[119] But the

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[116] *See* Appendix B, *ACE Report*.

[117] In addition to restrictions on financing imposed by lending agencies such as RUS, RLECs are subject to significant oversight from boards of directors or subscriber boards, as well as external audits, NECA reviews, and potentially audits by state commissions, the Commission itself, and the Universal Service Administrative Company (USAC). *See infra* pp. 61-64.

[118] *NBP* at 147 ("Rate-of-return regulation was implemented in the 1960s, when there was a single provider of voice services in a given geographic area that had a legal obligation to serve all customers in the area and when the network only provided voice service. Rate-of-return regulation was not designed to promote efficiency or innovation; indeed, when the FCC adopted price-cap regulation in 1990, it recognized that 'rate of return does not provide sufficient incentives for broad innovations in the way firms do business.'")

[119] *See, e.g., Regulatory Reform for Local Exchange Carriers Subject to Rate of Return Regulation*, Report & Order, 8 FCC Rcd 4545 (1993) (*RoR Reform Order*); *recon*., 12 FCC Rcd 2259 (1997). A productivity factor for larger LECs was adopted and later raised based on actual carrier performance, *Policy and Rules Concerning Rates for Dominant Carriers*, CC Docket No. 87-313, Second Report and Order, 5 FCC Rcd 6786 (1990); *Price Cap Performance Review for Local Exchange Carriers*; and *Access Charge Reform*, Fourth Report & Order in CC Docket No. 94-1 and Second Report & Order in CC Docket No. 96-262, 12 FCC Rcd 16642 (1997). Subsequently, the FCC, as a part of access charge reform, changed the productivity factor (the X-factor) for large LECs as part of an agreed-to plan to reduce those carriers' access charges to specific rate targets. At that point, the X-factor was set at the rate of inflation, effectively freezing access charges for price cap LECs. *See, Access Charge Reform*, CC Docket No. 96-262, *Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long Distance Users*, CC Docket No. 99-249, *Federal-State Joint Board on Universal Service*, CC

Commission has never been able to find an appropriate productivity factor(s) to support mandatory price cap regulation for RLECs, and with good reason. RLECs typically average only about 4,000 access lines per company, and a substantial portion (28 percent, or 312 companies) actually have fewer than 1,000 access lines.[120] In contrast, ILECs voluntarily converting to price cap regulation are much larger.[121]

The NPRM also fails to include any specific proposed rules to govern a mandatory shift to incentive regulation, nor is there any substantial discussion in the NPRM as to how such a radical regulatory change might actually be implemented.[122] These deficiencies raise significant Administrative Procedure Act (APA) compliance issues that must be addressed prior to any further action on this proposal.[123]

The NPRM notes that the Commission previously has expressed concern about the risks of continued participation in NECA pools by carriers subject to incentive

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Docket No. 96-45, Sixth Report and Order in CC Docket No. 96-262 and 94-1, Report and Order in CC Docket No. 99-249, Eleventh Report and Order in CC Docket No. 96-45*,* 15 FCC Rcd 12962 (2000). *Errata* (rel. June 14, 2000) (*CALLS Order*). Of course, the fact that large LECs and some mid-size companies have voluntarily chosen to adopt specific productivity factors provides no basis for imposing the same factor on RLECs.

[120] NECA, *Trends 2009* at 4.

[121] For example, in 2006 the Windstream companies combined have 2.6 million access lines; Puerto Rico Telephone Company had nearly 1. 4 million access lines; and the three largest CenturyTel affiliates (excluding Embarq and Qwest) had more than 1.4 million access lines. *See*, FCC Statistics of Common Carriers, 2005/2006 Edition, Table 2.1 (http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-282813A1.pdf).

[122] The NPRM merely notes in this regard that some companies have voluntarily converted to price cap regulation in the past two years, and asks whether the methodology adopted in these voluntary situations (*i.e.*, freezing per-line ICLS support) might work on a mandatory basis for remaining RoR companies. *NOI and NPRM* at ¶ 56.

[123] Section 4 of the APA requires the Commission to provide notice to the public of its intention to adopt, change or repeal a rule and other specifics about the contemplated agency action. 5 U.S.C. § 553. Such notice must include “either the terms or substance of the proposed rule or a description of the subjects and issues involved”, *id*., at §553(b)(3), and should inform of the specific issues raised by a proposed new or amended rule so that the public can respond specifically and not just in general terms. *See, e.g., Florida Power & Light Co. v. U. S.*, 846 F.2d 765, 771 (D.C. Cir 1988).

regulation. It seeks comment on whether such concerns would remain if all RoR carriers converted to incentive regulation, and whether the pool would be able to continue to operate pursuant to regulation other than rate-of-return.[124]

These are significant concerns. As noted above, the option to participate in NECA's tariff and voluntary access charge pools has been a significant help to RLECs and the Commission itself. In particular, NECA tariff and pooling operations have provided these companies with administrative cost savings and reliable revenue flows in the face of continuous change and uncertainty in the federal regulatory landscape.

A rule requiring RLECs to convert to incentive regulation could significantly destabilize current pooling operations. Under mandatory incentive regulation, for example, companies that have completed plant upgrades would presumably respond to incentive regulation by curtailing further investment, and would seek to maximize returns by exiting the pool. On the other hand, companies that need to make further investments, notwithstanding inadequate cost recovery under incentive regulation, would be left behind. In a voluntary pooling arrangement this creates the potential of a downward spiral that could impact the pools' viability as well as the viability of remaining pool participants. Any decision that disrupts the NECA pools in this manner could also have serious adverse implications for accomplishment of the NBP's objectives. Conversely, continuation of NECA pooling may help speed deployment and adoption of broadband on a nationwide basis as rules are put in place to govern cost and revenue sharing among broadband "providers of last resort."

Rather than seek to require RLECs to convert to incentive regulation, the Associations recommend the Commission instead explore reasonable new optional approaches for incentive regulation, including incentive plans designed to work within

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[124] *NOI and NPRM* at ¶ 54.

the context of RoR regulation and existing pooling mechanisms. Several plans of this type were proposed in the context of prior Commission proceedings including the Multi-Association Group (MAG) Plan process, and the Commission has amassed a substantial record in this regard.[125] These proposals can easily be updated to reflect today's broadband environment, an approach that would be far more productive – and legally defensible – than the incomplete and unsupported proposals set forth in the NPRM.

For all the above reasons, the Associations recommend the Commission refrain from further action on proposals to require RLECs to shift to incentive regulation. Again, the Commission should instead work to improve and adapt existing mechanisms, building on the success of these mechanisms in establishing universal voice services, so as to permit RLECs to continue to expand and improve broadband services and adoption in rural areas.

V. THE NBP MODEL HAS SERIOUS SHORTCOMINGS AND CANNOT BE USED TO ESTABLISH BROADBAND FUNDING REQUIREMENTS IN RLEC SERVICE AREAS.

The NOI seeks comment on whether the Commission should develop a nationwide broadband cost model to estimate support levels for the provision of broadband and voice service and if so, whether the BAM should be used as a starting point. [126] At the outset, the Associations wish to make clear it is unlikely *any* econometric model can be developed to determine "specific, predictable and

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[125] *See, e.g., Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers* and *Federal-State Joint Board on Universal Service*, Report & Order and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd 4122 (2004) ("*MAG Order & Second Further Notice*"); *See also*, NECA Comments, CC Docket No. 00-256 (filed Feb. 14, 2002) (Explaining how optional incentive mechanisms can work in the pooling environment).

[126] *NOI and NPRM* at ¶¶ 17, 32.

sufficient"[127] universal service support for areas served by RLECs. Models are tools, and while the BAM is considerably more sophisticated than the "Synthesis" model used to determine non-rural company support levels, it nevertheless remains too coarse-grained to measure support needs for RLEC service territories.[128] Possibly such a model may have application for territories served by larger carriers, insofar as imperfections in the model can be "averaged out" over large areas. But such models do not work well for areas served by RLECs, where the costs of providing service can vary considerably based on each area's unique challenges. The use of a model in these instances would likely produce funding levels for small rural service territories that significantly undercompensate or overcompensate service providers based on particular circumstances, leading to significant service dislocations.[129]

The Associations have undertaken an analysis of the BAM based on descriptions contained in OBI Technical Paper No. 1, as well as related data sources.[130] The results

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[127] Section 254(b)(5).

[128] The following analogy might help in understanding this phenomenon. Take a single sheet of paper and a yardstick, and attempt to measure the paper's thickness. It cannot be done because the tool is not sufficiently precise. If you take the same yardstick and 1,000 sheets of paper, however, you could obtain a reasonably accurate estimate of the average thickness of each sheet.

[129] These are not new problems. In 2000, following extensive review and analysis of the Commission's "Synthesis" Model, the Rural Task Force (RTF) concluded that, "when viewed on an individual rural wire center or individual Rural Carrier basis, the costs generated by the Synthesis Model are likely to vary widely from reasonable estimates of forward-looking costs." *A Review of the FCC's Non-Rural Universal Service Fund Method and the Synthesis Model for Rural Telephone Companies*, Rural Task Force White Paper 4 (Sept. 2000) at 10. Commenting recently on the current BAM, the Commission's Office of Broadband Initiatives (OBI) likewise admits that, "when examined at a very granular level, the availability model will sometimes overestimate and sometime underestimate service levels, but should tend to balance out when aggregated to larger geographic areas." *OBI Technical Paper* No. 1 at 5.

[130] As noted above, the BAM itself, as well as the actual data underlying the Model's estimates, were not available to the public for testing. These analyses are therefore preliminary. And, since it is not clear whether this information will ever be made available to outside parties for testing due to its proprietary and confidential nature, any

of this analysis are described below as well as in Appendix A. As an initial matter, the Associations note the BAM is intended to satisfy three basic design parameters:

- The Model should augment the (existing) network in a cost effective and efficient way to achieve a desired standard of speed and reliability;
- The Model should simulate prudent business practices with choices that would be made by a viable company facing at least the potential for market competition; and
- The Model should consider and fit with public policy and the regulatory environment, which affect both operating expense (OpEx) and capital expense (CapEx). [131]

The BAM does not, however, satisfy any of these parameters. Because it relies on limited data, the Model cannot take into account the details of rural networks it proposes to augment. It does not measure funding requirements based on revenue and present value calculations consistent with costs and services. It does not account for "real world" technical and business conditions faced by rural telephone company engineers and managers.

Most importantly, the Model does not incorporate the universal service objectives of the 1996 Act for sufficient and predictable funding that supports services and prices in rural areas that are reasonably comparable to those offered in urban areas. While there are many uncertainties about how the BAM will actually be used to determine future broadband support, it appears under almost any scenario the funding estimates produced

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attempt by the Commission to utilize the model for funding will raise serious concerns under section 4 of the APA. *Supra* n. 123. Furthermore, when the Commission first decided that it would utilize a FLEC model to calculate support for non-rural carriers, it established 10 criteria which all methodologies used to calculate the forward-looking cost of providing universal service in rural areas must meet. One of those criteria states that "the cost study or model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment. All underlying data should be verifiable, engineering assumptions reasonable, and outputs plausible." *Federal-State Joint Board on Universal Service*, Report and Order, 12 FCC Rcd 8776 (1997) at ¶ 250.

[131] *OBI Technical Paper* at 16.

by the Model would be inadequate to support broadband deployment in RLEC territories. In fact, the Associations' analysis reveals that if the "gap" funding produced by the Model to support presently "unserved" areas were to be used to entirely replace existing high-cost support mechanisms, current RLEC funding would be slashed by as much as 90 percent, even though approximately 70 percent of RLEC service areas are currently "unserved" based on the proposed 4/1 Mbps broadband availability target.

Such large reductions in support flows would disrupt network investment in areas currently defined as served, which in turn would make it highly unlikely projected incremental build-outs will occur. Cuts of this magnitude will also put substantial upward pressure on rates for both voice and broadband services in RLEC serving areas. In addition, some RLECs may no longer be able to remain in business, which jeopardizes the availability of any communications services for the highest cost customers, for whom there is no competitive alternative.

The drastic underfunding of RLEC service areas that would result from the use of the BAM stems from several key flaws in the way the Model was built. While these flaws are described in detail in Appendix A, the following paragraphs outline several basic areas of concern:

First, the BAM incorporates a number of faulty assumptions regarding the extent to which particular areas are "unserved." Appendix A shows that in estimating coverage areas for wireless and cable broadband services, for example, the Model uses commercially-available coverage databases and maps that impute where carriers are licensed to provide service, rather than their actual service areas. In addition, the Model assigns the highest speed tested in each area to the entire area, even though many or most addresses in the area tested at lower speeds. This causes the BAM to substantially overestimate coverage by these technologies.

The Model also does not have the ability to estimate the availability of digital subscriber line (DSL) services accurately. This is because the BAM itself relies on a regression model based on relationships developed from DSL availability, or a model of DSL availability, in a "few" areas of the country, to determine the presence and speed of service nationwide. Furthermore, as shown in Appendix A, the Model relies on demand, speed and middle mile capacity assumptions which are not consistent with actual consumer demand. These flawed assumptions regarding relative availability of wireless and DSL services contribute substantially to the inaccuracy of the study's conclusions, and heavily bias the Model towards wireless technology.

The second significant set of flaws in the BAM involves processes used to determine the cost of extending existing facilities. It appears, for example, the Model did not incorporate data representative of RLECs. A table of vendor equipment costs from a mid-sized carrier[132] was used as the single source of DSL equipment costs, when such costs may be significantly higher for smaller carriers. In addition, a single "rural classification" for operating expenses was built into the Model. Given the varying costs incurred by smaller carriers in serving areas with different characteristics, it is unreasonable to assume a single rural overlay could be adequate. [133]

The Model also attempts to account for cost variations by dividing companies into three size groups, the smallest of which is under one million lines. Yet, no RLEC has

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[132] *OBI Technical Paper* at 88.

[133] NECA has calculated wide variations in the average middle mile costs. For example, NECA has found that the average cost per Mbps for a DS1 connection is $499.75 with inter-percentile range between $100 and $2,157. The average cost per DSL per month for these companies is $12.01, with inter-percentile range between $2 and $39. The average of monthly costs per Mbps for 1000 Mbps Ethernet connections is $8.29 with inter-percentile range between $2 and $18. *See* NECA Comments, GN Docket 09-51 (filed Nov. 4, 2009), Table 1 and 2.

more than a million lines and 99.5 percent of all RoR telephone companies have fewer than 50,000 lines.[134]

Since data on existing types and locations of equipment is not available, and will not be available even after the mapping project is complete, the Model algorithm merely guesses at what equipment "should" be placed to achieve optimum efficiency. A model that does not include actual mapping data cannot correctly estimate equipment placement in rural areas where geographic features may vary considerably.[135]

Despite claims of 80 to 90 percent accuracy,[136] the BAM has in fact not been statistically validated. The Model was compared to previous proxy models, but such comparisons are not akin to statistical validation. Statistical validation is a comparison of model results with a battery of actual data. Thus, accuracy claims of greater than 80 percent only apply to specific models, not to the modeling effort as a whole. When model estimates are used as inputs for other models, error is compounded making the overall accuracy much less than that of the individual models. And even assuming the model is statistically accurate for the industry as a whole, its accuracy still has not been demonstrated for use in small rural service territories. When handling data with a large range, unless the model has been shown to be accurate for a subset of the data, the model cannot be deemed appropriate for use with the subset.

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[134] The Model's documentation recognizes the need for additional data to predict costs accurately and implies that rural carriers should bear the burden of providing such data. But the Model is a voracious consumer of information, and RLECs would incur significant costs attempting to supply the Commission with sufficient information to maintain and improve the Model's accuracy.

[135] See Appendix A at 5.

[136] *BAM*, Attachment 4 at 2, 5.

Finally, while the BAM is said to have included over one hundred variables,[137] at least one important one was left out – middle mile capacity. The modelers apparently assumed that inadequate last mile infrastructure issues explain why target speeds are not being met, when in fact high middle mile and backbone costs typically play a significant role in preventing RLECs from offering broadband service at target speeds.

Another key area of concern relates to the way the BAM calculates the costs of providing broadband service. The Model applies an NPV approach that supposedly replicates decisions made by a business when it is considering deploying broadband-capable plant. Unfortunately, the approach does not consider several real-world parameters.

First, the Model generally treats existing investment as needing no ongoing cost recovery. This methodology is at odds with the way ILECs are required by state and federal regulators to spread investment cost recovery over the in-service life of equipment.

Second, as discussed more extensively above in Section II.C of these comments, deploying a network based on the BAM's methodology would be a costly mistake in the long run. A network built to support the 4/1 Mbps availability target will quickly be outmoded, as demand is expected to outstrip this level significantly over the next twenty years.[138] The Model's use of NPV as a planning tool thus leads to a short-sighted assessment of technologies. For example, in many locations, the Model seems to be

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[137] Modeling with many variables and large data sets will likely produce spurious relationships, which could lead to over fitting models that are ultimately unstable. Such models may appear to predict well for the dataset under consideration, but do poorly predicting in other situations.

[138] Twenty years ago consumer data speeds were measured in Kbps, with 14.4 Kbps considered "fast." Today, broadband speeds are measured in Mbps. Policymakers should think carefully about setting the equivalent of today's median broadband speed as a goal for rural America, since investments have a 20-year life span.

aimed at encouraging rapid build-outs of 4G wireless networks, whereas the use of planning tools more consistent with a highly uncertain, rapidly-changing environment would point toward a slower build out based on fiber technology.

Third, the Model uses growth in penetration rates to predict incremental revenue. The calculation of the investment gap is therefore highly sensitive to penetration estimates developed from the Pew database.[139] Since the Pew data used to approximate penetration rates was collected absent the stimulus of new broadband funding, it is inappropriate for use in a model predicting adoption rates after such stimulus. Consequently, the revenue calculations used in the BAM have limited validity.

A model based on flawed statistical techniques, unreliable and unrepresentative data, and unsound engineering assumptions cannot reasonably be used as a tool to estimate support needs for small rural service areas.[140] The concerns about data quality, model design, and model results described above and in the Appendices accompanying these comments cast significant doubt on claims regarding the BAM's accuracy, and strongly suggest it would be likely to disrupt the evolution of the broadband market in RLEC service areas rather than support its extension into unserved areas.

VI. MORE REASONABLE AND WORKABLE BROADBAND USF ALTERNATIVES EXIST AND SHOULD BE CONSIDERED BY THE COMMISSION PRIOR TO ADOPTING ANY RULES IMPLEMENTING NBP PROPOSALS.

A. In Developing the NBP the Commission Appears to Have Ignored Several Reasonable Alternative Funding Approaches.

Throughout the course of the NBP's development, the Commission was presented with numerous workable alternative mechanisms for funding broadband deployment in

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[139] *BAM*, Attachment 9 at 1.

[140] *See*, *e.g.,* Letter from Stephen L. Goodman, Counsel for ADTRAN, to Marlene H. Dortch, FCC, GN Docket No. 09-51 (filed May 28, 2010) (concerned that the technical and economic model used to derive the broadband availability gap in the National Broadband Plan may be flawed.)

rural areas. These proposals would have put the NBP on firmer ground, and made it possible for the Commission to achieve its broadband availability and adoption goals without the drastic adverse impacts on rural carriers and consumers likely to result from the proposed Plan. Indeed, there is a substantial record on universal service reform going back several years, with hundreds of pages discussing alternative proposals suggested by the Joint Board and RLECs.

For example, in comments submitted in response to NBP Public Notice #19 and in prior proceedings, various parties have suggested several approaches the Commission could follow to transition today's support mechanisms to broadband.[141] Unlike today's support programs, these would encompass all broadband network transmission facilities needed to offer high-speed broadband Internet access services to rural end users. Moreover, alternative approaches could be structured to include specific incentives for RLECs to deploy innovative broadband facilities in an efficient manner, and could also take into account revenues generated by the provision of broadband services. Most importantly, alternatives could be designed to satisfy the Act's "sufficiency" and "predictability" requirements, so carriers can expand and improve the broadband services they offer to consumers while maintaining affordable rates. The Associations again make clear they are willing to work with Commission staff to develop these proposals for prompt implementation.

[141] *See, e.g.,* NECA Comments on NBP Public Notice #19, GN Docket No. 09-51 (filed Dec. 7, 2009) at 12-15; Appendix C.

B. Alternative Funding Mechanisms Should Incorporate Actual Cost-Based Support and Continue to Permit RLECs to Provide Broadband Transmission Services on a Title II Common Carriage Basis.

A key feature of the various alternatives presented by the Associations and others is that support for RLEC networks would continue to be based on actual costs, as opposed to forward-looking costs or other theoretical costing mechanisms. Existing federal regulatory mechanisms that enable RLECs to recover their actual regulated costs have proven to be highly successful in furthering Congressional and FCC universal service goals in rural service areas.[142] Along with RoR regulation, the current cost-based regime has enabled RLECs to serve as COLRs, making available to all of the consumers in their territories high quality, affordable telecommunications services that are reasonably comparable to those offered in urban areas. Moreover, these mechanisms have allowed most RLECs to deploy at least basic levels of broadband to over 90 percent of their customer base, albeit at varying speeds.

Thus, while the High-cost program for RLECs needs to be updated to explicitly support broadband networks, the Commission should not simply abandon basing support on their actual costs. Any system of support not tied to RLECs' actual costs would likely diminish incentives for ongoing network investment and make the capital markets far more wary about extending financing to rural carriers. Furthermore, if an alternative system were to fail to recover a sufficient portion of an RLEC's network costs, it would place upward pressure on end-user rates which, in turn, would jeopardize achievement of the FCC's goals for increased broadband adoption in these areas.

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[142] In its 2007 Recommended Decision, the Federal-State Joint Board on Universal Service acknowledged the effectiveness of the existing rural High Cost program in maintaining an essential network for COLRs and in deploying broadband. *2007 Joint Board Recommended Decision*, 22 FCC Rcd 20477 (2007) at ¶30.

Contrary to the contentions of some, a support system based on actual costs does not encourage rural carriers to operate inefficiently. High-cost support, while critical to the achievement of universal service in rural service areas, provides only a portion of the cost recovery necessary to build and maintain a rural broadband network. RLECs also have strong incentives to invest prudently and operate as efficiently as possible to create value for consumers and increase demand for their service offerings.

Because of their small size, lack of financial resources, and lack of access to capital markets, RLECs must operate efficiently or go out of business. In addition, support based on actual costs is highly accountable to the public. RLECs must submit extensive data to potentially qualify for support, which is then subject to multiple layers of review. This includes external audits, NECA reviews, and potentially audits by state commissions, USAC, and the Commission itself. In many cases, investments and other substantial expenditures must be approved by RUS or commercial lenders (*e.g.*, RTFC and CoBank) before funds are committed.

In short, theoretical claims of "inefficiencies" caused by basing support on actual costs are not consistent with the real-world operating environment facing RLECs. Certainly they do not provide a basis for jeopardizing the proven success of actual cost-based support systems with an untested methodology.

Another common theme in alternatives submitted to the Commission in the NBP record is the continued option for RLECs to provide broadband transmission services on a Title II common carrier basis, as they do today. Title II regulation provides the Commission with the regulatory oversight necessary to ensure RLECs are serving the public as intended and using support appropriately to build and maintain their broadband networks. In addition, Title II requires common carriers to provide service to any member of the general public "upon reasonable request therefor" and at a "just and reasonable" rate.[143] Under Title II, common carriers are also required to provide services without "unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services."[144] Also, Title II requirements encompass COLR obligations as well, requiring RLECs to remain ready to serve all customers in their territories, regardless of the loss of some subscribers to competitors.

Congress, the Commission, and the American public should have assurances that federal USF dollars are being used as intended and that carriers are building the national broadband network prudently and consistently with the National Broadband Plan. Title II regulation, or comparable measures, provide that assurance.[145]

C. The Commission is Legally Bound to Give Alternative Proposals Serious Consideration.

Regardless of whether the Commission gave adequate consideration to the above-described funding alternatives in the context of developing the NBP, the APA requires it to do so before adopting any proposed rules in this or subsequent proceedings.[146] In

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[143] 47 U.S.C. § 201.

[144] 47 U.S.C. § 202.

[145] Allowing providers to offer supported broadband transmission services on a Title II basis does not require the FCC regulate all broadband providers under Title II. *See, e.g., Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33, Report and Order, and Notice of Proposed Rulemaking, 20 FCC Rcd 14853 (2005) (allows carriers option to provide DSL transmission services on Title II basis). The Associations take no position, for example, as to whether broadband services provided by price cap carriers should be subject to Title II regulation. The Associations were, however, pleased to see in the recent Notice of Inquiry regarding the legal framework for regulated broadband Internet services that the Commission does not intend to disrupt the *status quo* for ILECs or other common carriers that choose to offer broadband Internet transmission services on a Title II common carriage basis. *See Framework for Broadband Internet Service,* GN Docket No. 10-127, Notice of Inquiry, FCC 10-114 (rel. June 17, 2010) at ¶ 72. Nor does the Commission intend to alter the *status quo* with regard to the application of section 254(k) and related cost allocation rules for these carriers. *Id.*

[146] Under the APA, an agency must take a "'hard look' at all relevant issues and "consider[] reasonable alternatives to its decided course of action." *See, e.g., Neighborhood TV Co., Inc. v. FCC*, 742 F2d 629, 639 (D.C. Cir. 1984), *citing Motor*

addition, under the Regulatory Flexibility Act (RFA),[147] the Commission must consider less burdensome regulation as it moves forward with this rulemaking.

Congress adopted the RFA in recognition of the fact that uniform application of laws and regulations designed for large scale entities may adversely affect competition and discourage innovation.[148] Federal agencies are directed to consider alternative regulatory approaches for small businesses that minimize the economic impact of rules on small businesses and do not conflict with the stated objectives of applicable statues. The RFA requires the Commission to prepare and make available an Initial Regulatory Flexibility Analysis (IRFA) and a Final Regulatory Flexibility Analysis (FRFA).[149]

The Commission's IRFA issued concurrently with the proposed rulemaking must contain a detailed economic analysis of how the rule may impact small entities. The IRFA must also contain a description of significant alternatives that may minimize any negative economic burden that its rules may impose.[150]

The IRFA attached to the Commission's NPRM is severely lacking in both respects. The proposals in this NPRM will dramatically alter the landscape for thousands of small businesses, in a way that few other FCC proceedings have. Yet, the instant IRFA includes none of the required economic analysis and no discussion of alternative, less burdensome proposals. Instead, it appears the Commission seeks to shift its entire statutory burden to the public, expecting commenters to offer analysis and alternatives.

Vehicle Manufacturers Ass'n v. State Farm Mut. Automobile Ins. Co., 463 U.S. 29 (1983); *Citizen Potawatomi Nation v. Salazar,* 624 F.Supp. 2d 103 (D.D.C. 2009).

[147] Pub. L. No. 96-354 94 Stat 1164 (1980), amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Public Law No. 104-121, Title II, 110 Stat.857 (1996). (codified at 5 U.S.C. §§601-612).

[148] Pub. L. 96-354, Findings and Purpose, Sec. 2(a)(4)(5), 126 Cong. Rec. S299 (1980).

[149] 5 U.S.C. § 603.

[150] 5 U.S.C. § 603(a)

The IRFA offers no information about how the proposals to cap or eliminate support or shift RLECs to incentive regulation could impact businesses. It merely mentions that the requirements "are not likely to substantially change the current reporting, recordkeeping and compliance requirements."[151]

While the law specifies that IRFA requirements apply to "interpretative rules" only to the extent that such interpretative rules impose a collection of information requirement, the analysis is not so limited for other proposed rules.[152] Regardless of whether the Commission gave adequate consideration to the above-described funding alternatives in the context of developing the NBP, it must do so before adopting any proposed rules in this or any subsequent proceeding.

In these Joint Comments the Associations have sought to provide the Commission with analyses of the potential burdens of rules proposed in the NPRM, and to provide reasonable alternatives. The Commission should therefore consider these comments and those made by the Associations in subsequent *ex parte* communications in its FRFA analysis.

VII. ACTION IS NEEDED NOW TO REFORM THE USF CONTRIBUTION METHODOLOGY, ADDRESS CERTAIN DISCRETE INTERCARRIER COMPENSATION ISSUES, AND ENSURE THAT RLECS HAVE FAIR ACCESS TO VIDEO CONTENT.

RLECs require sufficient and stable sources of revenue in order to make the ongoing network investments necessary to keep pace with the bandwidth needs of their communities, and to offer their broadband services at affordable rates. There are three actions which the FCC can and should take immediately that would greatly assist in stabilizing RLEC revenue streams during the transition to comprehensive reform of the High-cost program and ICC. They are: (1) reform the USF contribution methodology,

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[151] *NOI and NPRM* at ¶ 52.

[152] 5 U.S.C. § 603(a).

including expansion of the contribution base to include, at a minimum, all broadband providers and services; (2) strengthen the call signaling rules in order to mitigate the problem of phantom traffic, and confirm that providers of interconnected VoIP services are subject to ICC payments; and (3) the Commission should help broadband adoption by ensuring RLEC have access to video content on reasonable and non-discriminatory terms and conditions.

Under the FCC's Broadband Action Agenda, NPRMs on USF contribution reform and ICC reform (which includes addressing phantom traffic and the treatment of VoIP traffic for purposes of ICC) will not be released until fourth quarter 2010.[153] In addition, the NBP does not contemplate new rules being implemented on these critical items until 2012, at the earliest.[154] The longer the FCC takes to address these issues, the more challenging it will be for RLECs to meet the broadband demands of their customers, as well as the goals of Congress and the Commission.

Fortunately, there is no need for the Commission to wait. There have been open proceedings on all three of these issues for many years, and the FCC has a more than sufficient record on each to proceed expeditiously with Orders, without the need for further public comment.

In addition, as discussed below, the Commission should focus attention on several regulatory reforms that would ensure RLECs' ability to obtain nondiscriminatory access to video content. While not explicitly recognized in the NBP, "access to video content" problems have significant potential to impede broadband investment and adoption rates in rural areas, and should be resolved as part of the Commission's broadband implementation strategy.

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[153] *FCC Announced Broadband Action Agenda*, News Release (Apr. 8, 2010) at 3.

[154] *NBP* at 149.

A. **Universal Service Contribution Reform.**

The FCC has had an open proceeding on the USF contribution methodology since 2001, and has sought comment on fundamental contribution reform several times.[155] The contribution factor during the second quarter of 2010 was 15.3 percent.[156] While an increase in assessable industry revenues and a decrease in the revenue requirement have resulted in a lower factor of 13.6 percent for the third quarter of the year,[157] it is clear the

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[155] *See, e.g., High-Cost Universal Service Support*, WC Docket No. 05-337, *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, *Lifeline and Link Up*, WC Docket No. 03-109, *Universal Service Contribution Methodology*, WC Docket No. 06-122, *Numbering Resource Optimization*, CC Docket No. 99-200, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98, *Developing a Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, *Intercarrier Compensation for ISP-Bound Traffic*, CC Docket No. 99-68, *IP-Enabled Services*, WC Docket No. 04-36, Order on Remand and Order and Further Notice of Proposed Rulemaking, 24 FCC Rcd 6475 (2008) at 6536-6564, 6669-6695, 6735-6762, App. A, ¶¶ 92-156, App. B, ¶¶ 39-104, App. C, ¶¶ 88-151 (*Comprehensive Intercarrier Compensation and Universal Service Fund Reform FNPRM*); *Commission Seeks Comment on Staff Study Regarding Alternative Contribution Methodologies*, CC Docket Nos. 96-45, 98-171, 90-571, 92-237, 99-200, 95-116, 98-170, NSD File No. L-00-72, Public Notice, 18 FCC Rcd 3006 (2003); *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, *1998 Biennial Regulatory Review – Streamlined Contributor Reporting Requirements Associated with Administration of Telecommunications Relay Service, North American Numbering Plan, Local Number Portability, and Universal Service Support Mechanisms*, CC Docket No. 98-171, *Telecommunications Services for Individuals with Hearing and Speech Disabilities, and the Americans with Disabilities Act of 1990*, CC Docket No. 90-571, *Administration of the North American Numbering Plan and North American Numbering Plan Cost Recovery Contribution Factor and Fund Size*, CC Docket No. 92-237, NSD File No. L-00-72, *Number Resource Optimization*, CC Docket No. 99-200, *Telephone Number Portability*, CC Docket No. 95-116, *Truth-in-Billing and Billing Format*, CC Docket No. 98-170, Report and Order and Second Further Notice of Proposed Rulemaking, 17 FCC Rcd 24952 (2002); *Federal-State Joint Board on Universal Service*, *et. al.,* CC Docket Nos. 96-45, 98-171, 90-571, 92-237, 99-200, 95-116, 98-170, NSD File No. L-00-72, Further Notice of Proposed Rulemaking and Report and Order, 17 FCC Rcd 3752 (2002); *Federal-State Joint Board on Universal Service*, *et al.*, CC Docket Nos. 96-45, 98-171, 90-571, 92-237, 99-200, 95-116, NSD File No. L-00-72, Notice of Proposed Rulemaking, 16 FCC Rcd 9892 (2001).

[156] *Proposed Second Quarter 2010 Universal Service Contribution Factor,* CC Docket No. 96-45, Public Notice, 25 FCC Rcd 2383 (2010).

[157] *Proposed Third Quarter 2010 Universal Service Contribution Factor*, CC Docket No. 96-45, Public Notice, DA10-1055 (rel. June 10, 2010).

factor over the long term is approaching an unsustainable level and jeopardizing the goodwill policymakers and the public have toward the Fund.

There is no reason with the voluminous record that already exists, the Commission cannot act now to reform the contribution methodology. Through appropriate reform, which must necessarily include expansion of the contribution base to include at a minimum all broadband Internet access providers, the FCC can quickly make the USF sustainable for the long term. Just as important, requiring equitable contributions from all broadband providers will also make more feasible the Fund growth that is necessary to enable the provision of affordable access to truly robust broadband services to all Americans, including those living in RLEC service territories.

Broadband Internet access providers collectively represent a large and growing source of connections and revenues. [158] By requiring contributions from these service providers, the size of the USF could be permitted to grow without imposing an unreasonable universal service fee on each communications service that is assessable for contributions. So long as the pass-through amount on each assessable service is nominal relative to its price, it is unlikely that such a fee would discourage a consumer's decision to purchase the service or render the service unaffordable. Also, by making broadband Internet access services assessable for contributions, the total cost of the USF would be distributed much more fairly among consumers than it is today, particularly in light of the High-cost program being reformed to directly support broadband.

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[158] High-speed Internet access connections over fixed-location technologies increased by 10 percent during 2008, to approximately 77 million, while the total number of high-speed connections over both fixed and mobile wireless technologies as of the end of 2008 was slightly over 102 million. *High-Speed Services for Internet Access: Status as of December 31, 2008*, Industry Analysis and Technology Division, Wireline Competition Bureau, at 6, 9 (Feb. 2010). In addition, the NBP states that broadband-related revenues are projected to grow steadily over time. *NBP* at 149.

B. **Strengthening the Call Signaling Rules to Mitigate Phantom Traffic and Clarifying that Interconnected VoIP Providers are Required to Pay Access Charges.**

Extensive records also exist on enhanced call signaling rules to address phantom traffic as well as the obligations of interconnected VoIP providers for the payment of ICC. For example, as recently as November 2008, the FCC sought comment on proposed rules that would facilitate the transfer of necessary call identification information to terminating service providers, improving their ability to bill providers from whom they receive traffic.[159] In addition, since 2006, numerous parties have made filings proposing rules to mitigate phantom traffic,[160] and when the Commission sought comment on the Missoula Plan, it issued a separate public notice seeking comment on the Missoula Plan's phantom traffic proposal.[161]

In addition, the Commission has sought comment on many petitions that have been filed by parties requesting a ruling confirming the obligations of interconnected VoIP providers with respect to the payment of ICC.[162] Comment was also sought on this

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[159] *Comprehensive Intercarrier Compensation and Universal Service Fund Reform FNPRM*, 24 FCC Rcd 6641–6649, 6841-6848, App. A, ¶¶ 326-342, App. C, ¶¶ 322-338. Under the proposal in the FNPRM, in the event that network traffic did not contain the information required by the Commission's rules, the terminating service provider would be permitted to charge its highest terminating rate to the service provider delivering the traffic.

[160] *See, e.g.,* NECA, Petition for Interim Order, CC Docket No. 01-92 (filed Jan. 22, 2008); Letter from Stuart Polikoff, OPASTCO, to Marlene H. Dortch, FCC, CC Docket No. 01-92 (filed Mar. 17, 2006); Letter from Karen Brinkmann, Latham & Watkins, on behalf of the Midsize Carriers, to Marlene H. Dortch, FCC, CC Docket No. 01-92 (filed Feb. 21, 2006); Letter from Glenn Reynolds, USTelecom, to Marlene H. Dortch, FCC, CC Docket No. 01-92 (filed Apr. 4, 2008); Letter from Jeffrey S Lanning, USTelecom, to Marlene H. Dortch, FCC, CC Docket No. 01-92 (filed Feb. 10, 2006).

[161] *Comment Sought On Missoula Plan Phantom Traffic Interim Process and Call Detail Records Proposal*, CC Docket No. 01-92, Public Notice, 21 FCC Rcd 13179 (2006).

[162] *See, for example*, *Pleading Cycle Established for Comments on Global Naps Petition for Declaratory Ruling and for Preemption of the Pennsylvania, New Hampshire and Maryland State Commissions*, WC Docket No. 10-60, Public Notice, 24 FCC Rcd 2692 (2010); *Pleading Cycle Established for Petition of the Embarq Local Operating*

issue as far back as 2004 in the IP-Enabled Services NPRM, where the FCC stated its belief that "any service provider that sends traffic to the PSTN should be subject to similar compensation obligations, irrespective of whether the traffic originates on the PSTN, an IP network, or on a cable network."[163] Thus, it would be entirely reasonable for the Commission to address these discrete ICC issues prior to issuing an Order on more comprehensive reform. Doing so would assure equitable treatment of all providers and help stem the steady decline in billable minutes-of-use due to uneconomic rate arbitrage while the Commission pursues more comprehensive USF and ICC reform.

C. The Commission Can Help Spur Broadband Adoption In Rural Areas By Ensuring RLECs Have Nondiscriminatory Access To Video Content.

The Commission has correctly recognized that there is a direct connection between a provider's ability to offer video service and to deploy broadband networks.[164] These findings are consistent with the experiences of RLECs who serve as both broadband service providers and multichannel video programming distributors (MVPDs).

Companies for Forbearance from Enforcement of Section 69.5(a) of the Commission's Rules, Section 251(b) of the Communications Act and Commission Orders on the ESP Exemption, WC Docket No. 08-8, Public Notice, 23 FCC Rcd 348 (2008); *Pleading Cycle Established for Feature Group IP Petition for Forbearance from Section 251(g) of the Communications Act and Section 51.701(b)(1) and 69.5(b) of the Commission's Rules*, WC Docket No. 07-256, Public Notice, 22 FCC Rcd 21615 (2007); *Pleading Cycle Established for Frontier's Petition for Declaratory Ruling Regarding the Application of Access Charges to IP-Transported Calls*, WC Docket No. 05-276, Public Notice, 20 FCC Rcd 19392 (2005); *Pleading Cycle Established for Grande Communications' Petition for Declaratory Ruling Regarding Intercarrier Compensation for IP-Originated Calls*, WC Docket No. 05-283, Public Notice, 20 FCC Rcd 16167 (2005); *Pleading Cycle Established for SBC's and Vartec's Petitions for Declaratory Ruling Regarding the Application of Access Charges to IP-Transported Calls*, WC Docket No. 05-276, Public Notice, 20 FCC Rcd 15241 (2005).

[163] *IP-Enabled Services*, WC Docket No. 04-36, Notice of Proposed Rulemaking, 19 FCC Rcd 4863 (2004) at ¶¶ 33, 61.

[164] *Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 as amended by the Cable Television Consumer Protection and Competition Act of 1992*, MB Docket No. 05-311, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 5101 (2007) at ¶ 62.

In fact, NECA has found that pool members offering DSL with a video component or option have a DSL adoption rate nearly 24 percent higher than companies offering DSL without access to any video services.[165] This not only increases the number of rural consumers taking advantage of the numerous benefits that broadband Internet access offers, it also results in increased revenues for RLECs. This increased revenue, in turn, provides RLECs with the incentive and additional resources to invest in the deployment of broadband services to additional rural consumers and to improve the quality (including speeds) of service where it is already offered. In short, the ability of RLECs to provide multichannel video services is a vital rural broadband issue.

However, RLECs face significant obstacles to obtaining nondiscriminatory access to the consumer demanded video content that is necessary for offering a viable multichannel video subscription service. These obstacles include:

- Outdated retransmission consent rules, which prevent RLECs from providing programming to consumers at market-based rates;[166]
- Forced tying, also known as forced carriage, where RLECs are required to purchase unwanted programming in order to offer "must have" content and is often imposed under the burdensome retransmission consent process;[167]

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[165] NECA Comments, on NBP Public Notice #19, GN Docket No. 09-51 (filed Dec. 7, 2009) at 6.

[166] *See*, OPASTCO, NTCA, ITTA, WTA, and Rural Independent Competitive Alliance (RICA) Comments, MB Docket No. 10-71 (filed May 18, 2010). The comments propose market-based reforms that would, among other things, allow rural MVPDs to provide channels from outside of their Designated Market Area, pool bargain, and have access to "most favored nation" pricing for programming.

[167] *See*, Letter from Stephen Pastorkovich, OPASTCO, *et al.* to Marlene H. Dortch, FCC, MB Docket No. 07-198 (Aug. 15, 2008). *See also*, *Implementation of the Cable Television Consumer Protection and Competition Act of 1992, Development of Competition and Diversity in Video Programming Distribution: Section 628(c)(5) of the Communications Act: Sunset of Exclusive Contract Prohibition*, MB Docket No. 07-29, *Review of the Commission's Program Access Rules and Examination of Program Tying Arrangements*, MB Docket No. 07-198, Report and Order and Notice of Proposed Rulemaking, 22 FCC Rcd 17791 (2007) at ¶120.

- Broadband tying, where RLECs are required to pay an additional fee for access to online content based on its number of broadband subscribers, regardless of whether or not these customers subscribe to multichannel video services;[168]
- Video programmers that cite the use of shared head-ends as an excuse to deny access to content or impose unwarranted and burdensome financial or technological obligations;[169] and
- Abusive and predatory pricing practices.[170]

As with the issues discussed *supra* (USF contributions, phantom traffic, the applicability of ICC to VoIP providers), the Commission should take immediate action to reform the program access rules, without seeking additional public comment, as there is a more than ample record upon which to act. Proper reform, as described in the cited comments, would help to drive rural broadband adoption and usage, as well as provide RLECs with the additional revenues necessary to improve the reach and quality of their broadband networks.

VIII. CONCLUSION

The Associations and their respective RLEC members support the universal broadband service goals of the NBP, and further agree existing high-cost USF mechanisms must be reformed in a comprehensive fashion to directly support broadband networks and services. Nevertheless, the Associations oppose the NBP's specific

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[168] *See,* OPASTCO Comments, MB Docket No. 07-269 (filed Jul. 29, 2009) at 13-16. *See also*, NTCA Comments, MB Docket No. 07-269 (filed May 19, 2009) at 5-6; American Cable Association (ACA) Reply comments, MB Docket No. 07-269 (filed Aug. 28, 2009) at 9-11. In addition, the Commission should carefully monitor the evolution of the market for web-based video content. Exclusive arrangements between content providers and large MVPDs that would prevent rural carriers from providing web-based programming would be highly detrimental to rural consumers and depress demand for broadband services. *See,* OPASTCO Comments, MB Docket No. 07-269 (filed Jul. 29, 2009) at 5-10.

[169] *See*, OPASTCO Reply Comments, MB Docket No. 06-189 (filed Dec. 29, 2006) at 12-13.

[170] *See id.,* at 13-14.

recommendations for High-cost program reform in RLEC service areas as they would fail to achieve the NBP's goal of making available affordable, robust broadband services throughout these territories.

In particular, the Associations urge the Commission to refrain from abandoning the highly successful actual cost basis of support for RLECs, and replacing it with an unreliable and unpredictable FLEC model or reverse auction mechanism. Likewise, the Commission should not impose an overall cap or freeze on the existing High-cost program for ILECs, or new caps or freezes on RLEC-specific mechanisms such as ICLS. Such actions would immediately dampen, if not eliminate all short-term prospects for improved broadband availability, service quality, and adoption in RLEC service areas, and would also likely produce significant end-user rate increases.

In addition, the Commission should not require RLECs to shift to incentive regulation, as it has been demonstrably ineffective in encouraging carriers to provide an evolving level of advanced services to consumers in high-cost areas. In contrast, RoR regulation has a proven track record of success in this regard, and remains fully viable in today's competitive broadband environment.

Instead, the Commission should focus on developing simpler, more reliable and workable alternative methods for supporting broadband in RLEC territories. Specific examples of such alternatives, which were provided to the Commission in the context of the NBP development proceeding, deserve further investigation by the Commission.

The Associations also recommend the Commission immediately reform the USF contribution system and, most importantly, expand the contribution base to include, at a minimum, all broadband Internet access providers. The Commission should also move quickly to address certain discrete ICC reform issues. These include strengthening the call signaling rules to mitigate phantom traffic as well as confirming that interconnected

VoIP providers are required to pay access charges. The Associations look forward to working with Commission staff in the coming months to develop these alternative approaches for prompt implementation.

July 12, 2010

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APPENDIX A

THE FCC's BROADBAND ASSESSMENT MODEL

RURAL ASSOCIATION STAFF ANALYSIS

The FCC's Broadband Assessment Model
Rural Association Staff Analysis

Executive Summary

The Commission's April 21, 2010 *Notice of Inquiry*[1] requests comment on a comprehensive Broadband Assessment Model (BAM).[2] The BAM is described in a technical paper prepared by the Commission's Omnibus Broadband Initiative (OBI) staff and included with the NOI as an Appendix.[3]

The Model's stated purpose is to approximate improvements needed to bring broadband availability up to targeted levels, and to estimate the costs and revenues of these improvements.[4] The NOI asks whether such a model should be used for sizing the federal Universal Service Fund (USF)[5], for guiding a bidding process to select broadband service providers[6], or for determining payments from the USF.[7]

The model's documentation describes three key design parameters:

1. The model aims to augment network infrastructure in a cost effective and efficient way to achieve desired standards of speed and reliability.
2. The model intends to simulate prudent business practices with choices that would be made by a viable company facing at least the potential for market competition.
3. The model tries to consider and fit with public policy and the regulatory environment, which could affect both operating expenses (OPEX) and capital expenditures (CAPEX). [8]

To assess whether the BAM succeeds in achieving these objectives, staff members of the Rural Associations, as well as managers and engineers for several individual rural rate-of-return incumbent local exchange carriers (RLECs), reviewed and researched many of the data sources referenced in the model documentation, tested methods summarized in the documentation, used

[1] *Connect America Fund*, WC Docket No. 10-90, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, *High-Cost Universal Service Support*, WC Docket No. 05-337, Notice of Inquiry and Notice of Proposed Rulemaking, 25 FCC Rcd 6657 (2010) at ¶¶ 14 – 20 (*NOI*).

[2] Broadband Assessment Model, Model Documentation, FCC (Mar. 2010) (*BAM* or *Model*).

[3] *The Broadband Availability Gap*, OBI Technical Paper No. 1 (Apr. 2010) (*OBI Technical Paper)*.

[4] *Id*. at 1; *BAM* at 7.

[5] *NOI* at ¶ 17.

[6] *Id*. at ¶ 20.

[7] *Id*. at ¶ 22.

[8] *BAM* at 16.

state-of-the-art mapping software to study exhibits in the documentation, and assessed econometric literature and Commission proceedings related to the model methods.

At the outset, we note the BAM is a remarkably complex compilation of available data, assumptions and imputation methods. Documentation supporting the BAM has so far been limited to partial descriptions of the model, its data and its conclusions. Neither the model itself, nor its coefficients, diagnostic statistics, external data or synthesized data, have been made available to the public for testing. Nevertheless, the reviewing team was able to draw many significant conclusions from available information, as documented in this Appendix.

Overall, we find with respect to areas served by RLECs that the BAM fails to meet its three basic design objectives. This failure occurs because the model relies substantially on inaccurate data that is unrepresentative of areas served by RLECs. The model also uses available data incorrectly, in ways that can be expected to substantially bias estimates, or to produce estimates that do not correlate with actual costs or revenues.

Because the model is unsupported in its assessment of current broadband availability, and in its assessment of current equipment deployment, the model has no way of correctly targeting the starting point of its network augmentation algorithms. Furthermore, the model calculates "gaps" in investment and operating costs in ways that will severely bias the outcome in RLEC serving areas. The shortcomings of the model with regards to areas served by RLECs eliminates any expected correlation between model conclusions and the real world costs or revenues that would be realized in achieving broadband deployment goals.

Since, as noted above, documentation supporting the BAM has so far been limited to summary descriptions, these analyses are necessarily preliminary. Should the Commission release additional information regarding the BAM, further review would be necessary.

Table of Contents

The BAM is composed of four basic modules, each of which has one or more sub-modules:[1]

A. Baseline Availability Module
B. Cost to Serve Module
C. Demand and Revenues Module
D. Financial Assessment Module

For ease of reference the following analysis highlights particular issues raised with respect to each individual module. However, in some cases flaws identified with respect to a particular module (*e.g*., insufficient data, lack of statistical validation) may be representative of problems applicable to other modules as well.

I. BASELINE DATA AND MODEL FLAWS

A. The Model's Wire Center Boundary Data Is Not Accurate in RLEC Areas

The Baseline module "inventories" the network as it is today, including equipment locations and local demographics. This module attempts to profile census blocks and identify unserved areas by imputing subscribers, population, economic data, facilities and services to existing telephone wire centers.[2] Importantly, the Baseline module sets up the "problem" for the remainder of the model, by determining which areas do not have adequate broadband service today. Subsequent steps and modules use this set of inferences to impute new facilities and costs to serve these areas.

While setting up the profile of census blocks, the Geographic Information System (GIS) Module within the Baseline Availability Module attributes to a census block any facilities within any overlapping wire center boundary,[3] to associate demographic and economic characteristics of the census block with the related network data. Usually, the region served by a wire center is the set of subscriber locations served by a single telephone exchange, with boundaries set by a state public utility commission. While census block boundaries are known precisely from publicly available data, wire center boundaries are not. Among other things, the GIS module develops data on existing wireline coverage to provide input to the Wireline Coverage Module (the second sub-module of the Baseline Availability Module).

[1] Broadband Assessment Model, Model Documentation, FCC (Mar. 2010) at 8 (*BAM* or *Model*).

[2] *Id*. at 18.

[3] A wire center is a building in a telecommunications network that houses switching and electronic equipment. Exchange carriers decide on location of cable routes to serve customers based on customer location, wire center capabilities, and a host of other factors that influence network efficiencies and local construction costs. *Id*. at 18-19.

All publicly available data on wire center boundaries originate from a single database published by Claritas, Inc.[4] Claritas information enables an algorithmic assignment of each subscriber's street address to a nearby serving wire center. Street addresses are "geo-coded," *i.e*., they are assigned latitudes and longitudes. Mapping software interpolates between street addresses assigned to one wire center and those assigned to a neighboring wire center, to impute the dividing line between the two areas. A collection of dividing lines makes up a theoretical wire center boundary.

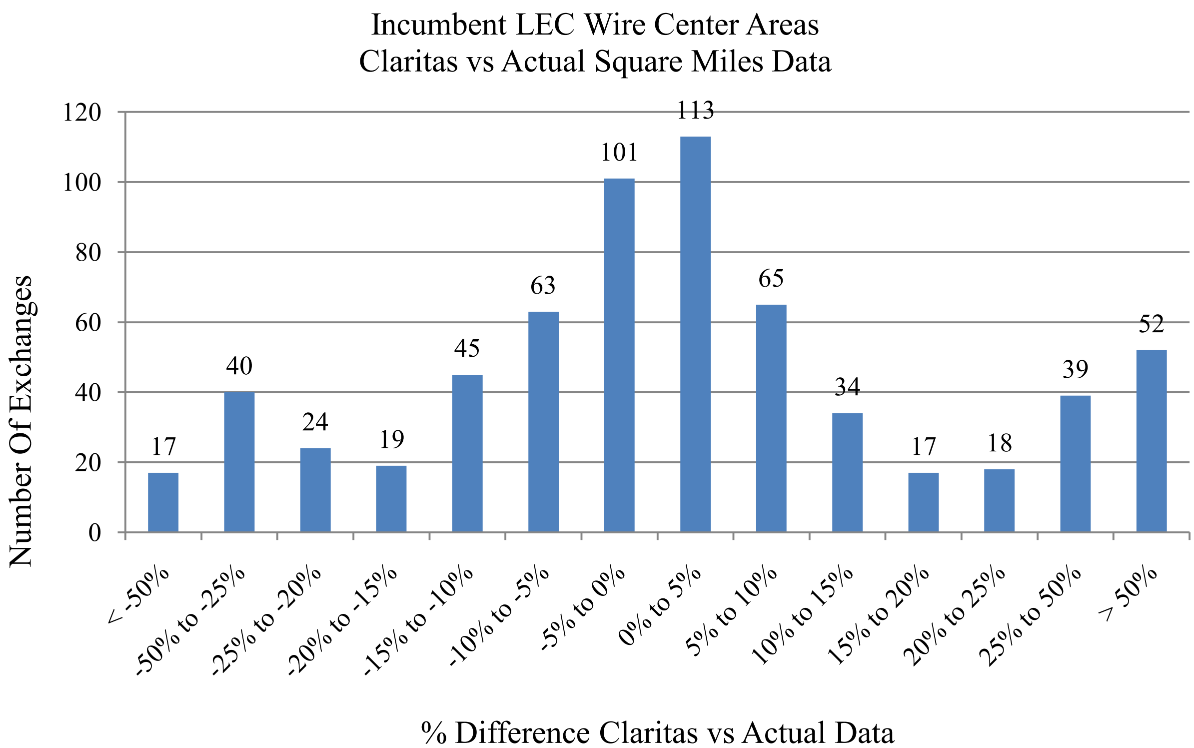
NECA has previously performed a study comparing actual telephone exchange boundaries with those developed from public sources.[5] As part of this analysis NECA collected paper or digitized maps of actual boundaries for 647 exchanges operated by 303 RLECs (approximately one-third of the total population). The study showed that actual exchange boundaries did not correlate well with the publicly available wire center boundaries.[6] In fact, as shown in Exhibit 1 below, only 214 of the 647 exchange boundaries analyzed in this fashion are within 5% of the publicly available data, and only 342 are estimated within 10%.

[4] Attachment 2 of the BAM cites TeleAtlas as the source of wire center boundary data. It appears, however, TeleAtlas and all other publicly available wire center data are compilations based on Claritas data.

[5] The NECA study was conducted in 2010. Data used for these analyses were obtained from Claritas in first quarter 2007.

[6] Exhibit 1 RLECs in NECA's study who provided actual serving area documentation at the exchange level, excluding some carriers whose documentation had been aggregated to a study area level, and not provided at the exchange level.

Exhibit 1



Thus, the wire center boundaries used in the Model are a weak basis for developing further estimates of existing network facilities. Assigning reliable demographics for RLEC wire centers would require substantially more accurate wire center boundaries.

B. The Model Wireline Coverage Estimates Are Based on Incomplete and Unrepresentative Sources

Using data from Alabama, Pennsylvania and Minnesota, the Wireline Coverage module estimates the availability of DSL service of various speeds for all telephone company locations in the country. While the Baseline Statistical Model documentation (BAM Attachment 4) claims to estimate availability for 0.768, 1.5, 3, 4 and 6 Mbps, data on most of these speeds are only available from Alabama.[7] According to BAM documentation, Pennsylvania's data only cover 1.5 Mbps, while Minnesota's data cover 0.784 Mbps.[8] Notwithstanding the availability of actual DSL speed data for Alabama, the model ignores this data and imputes its own availability measures instead.

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[7] Alabama Broadband Map at http://gis.kimballdata.com/alabamabroadband/mapprint.htm?lat=32.787&lng=-86.407&zm=7&ly=MaxDLSpeed

[8] *BAM*, Attachment 4- Statistical Baseline Modeling at 3.

Pennsylvania's mapping data include broadband speeds measured at telephone company facility locations where broadband service can be obtained, and where broadband services are available over wireless, DSL and cable modem facilities.[9] While the map shows widespread availability of DSL service, it also shows many RLEC areas that are unserved or underserved. Speeds available at DSLAMs or central offices were measured in groups: below 745 Kbps, 745 to 1550 Kbps, 1550 Kbps to 3535 Kbps, 3535 to 9080 Kbps, and over 9080 Kbps.[10] Nevertheless, the Commission's study used a different broadband data set obtained from Pennsylvania's Technology Investment Office. This data set merely indicates whether or not broadband is available in a census block at speeds of 1.5 Mbps or more.[11] Thus, while Pennsylvania's broadband coverage mapping identifies availability of broadband speeds conforming to the objectives of the National Broadband Plan[12], another data source that did not include such measures was used in the study.

Minnesota's broadband mapping program cited above produced an inventory of unserved areas, as well as areas served by each type of provider (fiber, cable, DSL, fixed wireless and mobile wireless). The program counts unserved households by census block, and catalogs broadband users' voluntary speed tests into a county level profile of possibly available speeds.[13] The county profile includes eight speed levels, ranging from 200 kbps to 100 Mbps. Yet, the BAM model used Minnesota data from a different source, which only delineated areas with broadband available at a download speed of 784 kbps.[14]

In summary, the model appears not to have used data from the broadband mapping programs of any of the three states, but instead relied on other data with less range-of-speed information. The model's DSL coverage data fall short because only three states' data are represented, the most relevant data available were not used, and most of the data relate to speeds that do not meet the Plan's targeted standards.[15]

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[9] *See,* Pennsylvania's Broadband Coverage Map at http://imapdata.com/ve_pabb/PA_PublicVE.htm

[10] *Id*. The documentation only says what speeds they used, not what was available at the Pennsylvania web site.

[11] *BAM*, Attachment 4 at 3.

[12] Connecting America: The National Broadband Plan, FCC (rel. Mar. 16, 2010) (*NBP*).

[13] *See,* Minnesota's Broadband Inventory Map at http://connectmn.org/mapping/Statewide_Broadband_Inventory_Maps.php

[14] *BAM*, Attachment 4 at 3.

[15] While a wealth of new data will be available as states complete their broadband mapping, this data is likely to lack specificity needed by this model. The data will measure advertised speeds, or speeds tested voluntarily by broadband users. The data will not assess the impact of middle mile constraints on the effective speed, thereby leading to the conclusion that loop and distribution plant fall short when the true need may be lower-cost middle mile and backbone facilities.

C. The Model's DSLAM Location Analysis Omits RLEC Data

For the imputation of DSL availability in Alabama (the primary data underlying the Availability Model), the model uses distances from each street location in a wire center area to the nearest central office or DSLAM. [16] While central office switch locations are readily available for all exchange carriers from NECA's Tariff 4 database, or from Telecordia's Local Exchange Routing Guide (LERG), the locations of DSLAMs for rural carriers are not generally available.

The BAM documentation does not specify the source of its DSLAM data, although it appears to come from databases used by non-rural carriers to expedite service ordering. [17] Such databases exclude DSLAMs belonging to RLECs. While actual speed data would be preferable to imputed speed data, if one must impute DSL speeds based on DSLAM locations, knowledge of the actual DSLAM location is critical because the theoretically possible speed available at a location depends on its distance from the DSLAM.

Because the locations of RLECs' DSLAMs in Alabama are not known, the available speeds at locations in rural Alabama, as imputed by the model, cannot be shown to relate to either the actual speeds available in Alabama, or even to the theoretically possible speeds.

D. The Model's Fiber Optic Cable Availability Analysis Omits RLEC Data

The GIS module estimates availability of service over fiber optic cable using a data set published by GeoTel Communications, which reports on metropolitan fiber routes for cities Metropolitan Statistical Areas (MSAs) and for 330 Core Based Statistical Areas (CBSAs – functional regions based around an urban center of at least 10,000 people).[18] CBSAs account for only 50% of the land area nationwide.[19] By definition, the non-CBSA areas are the most rural in the nation.

Exhibit 2, below, compares CBSAs in South Dakota to locations of RLECs' service areas:

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[16] *The Broadband Availability Gap*, OBI Technical Paper No. 1 (Apr. 2010) at 23 (*OBI Technical Paper)*.

[17] Rural carriers do not appear to report DSLAM location data to any publicly available database. In contrast, to expedite local interconnection arrangements common at their locations, non-rural carriers would have a reason to do so.

[18] *BAM* at 19.

[19] Areas calculated using Combined Statistical Area boundaries taken from 2009 Tiger line/shapefiles from the US Bureau of Census website, at http://www2.census.gov/cgi-bin/shapefiles2009/national-files.

Exhibit 2

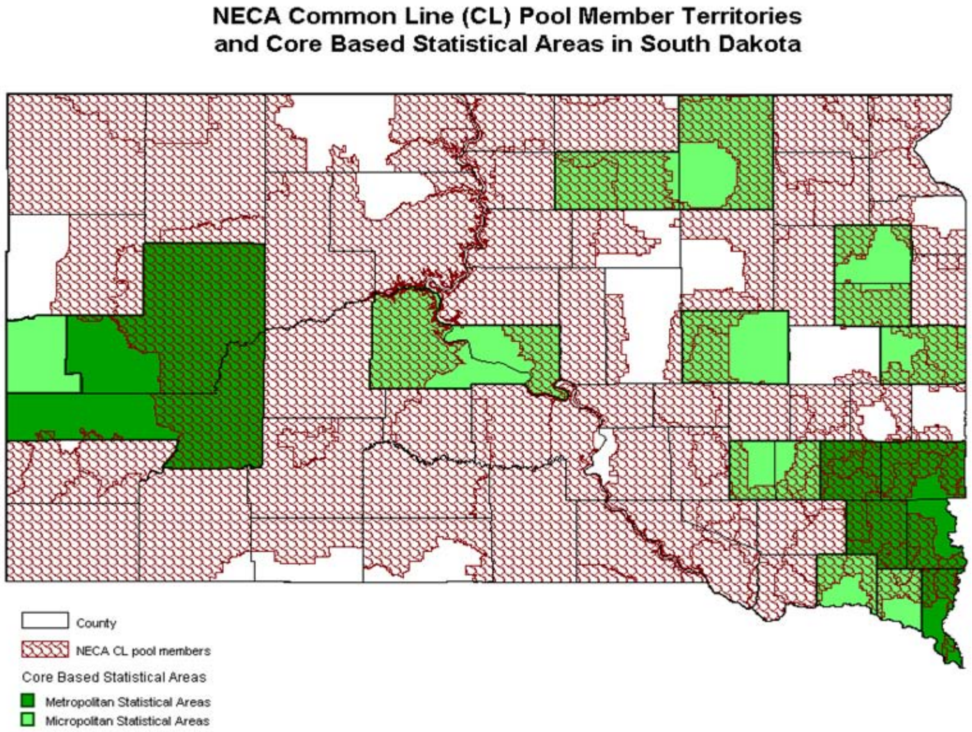


Exhibit 2 makes clear that in South Dakota, CBSAs cover only a small fraction of the land area. Similar results are found in many other states.

After identifying areas served by fiber using the CBSA data, the GIS module matches these areas with a database of fiber lit buildings. The FiberLit database is a product of GeoResults, developed using data from Telecordia's Central Location Online Entry System (CLONES). Since use of CLONES requires substantial staff commitment and is voluntary, CLONES is used only by the largest carriers as a means of expediting their service ordering processes. RLECs typically do not use this database. Consequently, the fiber-lit building data exclude RLECs' locations as well.[20]

The omission of RLEC fiber optic cable availability data from the BAM causes the model to work without knowledge of such facilities, thereby leading to incorrect determinations of efficient network structure, technology and costs to augment RLEC networks.

E. DSL Speeds Data Used by the Model Overestimate Broadband Availability

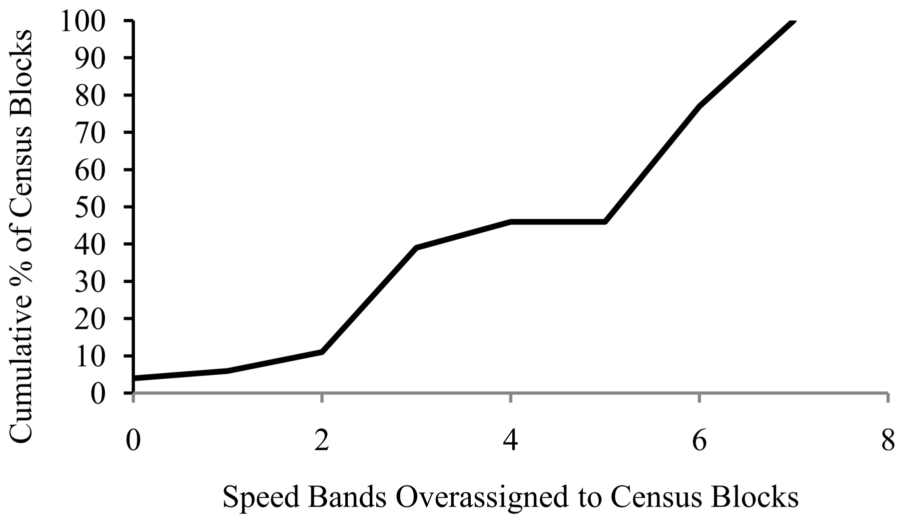
[20] *See*, Bellsouth Telecommunications, Inc., Direct Testimony of Shelley W. Pagdett, Before the Alabama Public Service Commission, Docket No. 29054, Phase III (Mar. 5, 2004) at 11-12 (for a summary of limitations of the GeoResults data).

Notwithstanding the inaccuracy of DSL availability data as described above, the GIS Module uses this data to assign DSL speeds to census block groups (CBGs). The process incorrectly assigns the highest recorded speed in any census block within a CBG to the entire CBG. This practice further contaminates the data in several respects. Available sample data often provide the minimum and maximum DSL speeds in a census block. The speed data do not usually show what service most customers in a census block can order, but rather whether there is *any* customer in the census block who can receive that speed.

The Alabama data show that this assumption grossly overestimates broadband speed availability. Among the 175,210 census blocks in Alabama, 4,002 were not sampled at all and 5,120 were reported as having no broadband available. 2,108 census blocks had sampled speeds that fell entirely within the first speed band, 384 Kbps to 768 Kbps. Forty-five other blocks had speeds sampled in only one speed range, for a total of 2,153 census blocks that have DSL in a known speed range. In all remaining 171,218 census blocks, the speed available to a customer is unknown because the sampled speeds fell into more than one speed range. In most cases, speeds were sampled in many speed ranges. Only 4% of census blocks have just one speed range, 3% of census blocks have two speed ranges, and more than 60% of census blocks have more than five speed ranges. Thus, assigning the highest speed range to all customers in the census block considerably overstates broadband speed availability. Exhibit 3 shows the degree of speed data contamination in Alabama.

Exhibit 3

Census Blocks Assigned Speeds Higher Than Measured Minimum



In summary, the methods of the GIS module systematically over-estimate DSL speeds available in most census blocks, by two or more speed bands. This means, for example, that a census block could be estimated to have 1.5 Mbps available uniformly, when it actually has 384 Kbps or less available in almost the entire block. This is potentially a very serious mis-targeting of the baseline speed in each block, contributing to equally serious errors in model estimates of the required network augmentations.

F. The Baseline Model Is Not A Good Estimator of DSL Availability

The Wireline Coverage module combines the synthesized DSL availability data described above with additional variables to derive a series of logistic regression models.[21] These models are used to estimate the probability of DSL availability at each of five speeds for a given census block. Numerous independent variables are tested in these models, including geographic, demographic, income, age and rural/urban variables. Separate models are developed for census blocks with and without access to high-speed cable facilities. For each census block, the model calculates a logit value, which is an indicator of the likelihood that the census block has DSL of the speed included in the model. The larger the logit value the greater the likelihood that the census block has DSL service at the modeled speed.

When compared to "actual" DSL availability, some census blocks without DSL were incorrectly designated as having DSL based on the logit value, while other census blocks were designated as not having DSL when in fact they did.[22] For each model, the BAM study chose a "discrimination threshold" near zero, which divided logit values into DSL availability categories with equal counts of false positives and negatives.[23] For a given census block, if the logit value exceeds the threshold, the census block is estimated to have access to DSL at that speed.[24] In instances where the logit value is much higher than the threshold, the model has greater power to discriminate. In cases that border on areas with strong and weak likelihood of service, the model documentation explains a power of discrimination as low as 50%—no better than a coin toss.

The report claims 80% discrimination accuracy, as measured against its baseline data, even though much of the baseline data was imputed.[25] Indeed, factors used to impute baseline availability for Alabama have much in common with data used in the Baseline Availability Model, *e.g.*, loop distances from central offices or field terminals, roadway distances and imputed available speeds. When a variable, such as loop distance, is used both to impute the current broadband service speed and to estimate the availability based on the model, the two quantities are assured of being correlated by statistical construction, whether or not the actual current broadband speed is correlated with the model outcomes. Thus, the report can make no claim to have validated the model's discrimination accuracy. In fact, the Availability Model is not even shown to be as accurate as a flip of a coin, when compared to actual availability data. In summary, the weak power of the logit model to decide on availability of a broadband speed renders its use here ineffective.

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[21] *BAM* at 20-21.

[22] *Id*. at 5.

[23] Because the discrimination threshold is a judgmental selection, it could introduce prediction bias.

[24] *BAM*, Attachment 4 at 3, documents six speed categories. Footnote 4 explains, however, that the models for the slowest speed of 384 Kbps were not used.

[25] *Id*. at 4.

G. Stepwise Regression Is Risky As Used for the Availability Model

The Model relies on statistical techniques to fill in missing data. For example, the analysis of wireline availability is based on the predictions of a stepwise logistic regression. The algorithm starts with the estimation of a constant-only model, followed by the estimation of many regressions with different combinations of variables. [26] The overall significance of the Model is assessed at each run and variables are added or eliminated accordingly. The Model documentation contends that this method yields predictors of wireline availability that are both statistically and practically significant. [27] The issue is whether the predictions of the BAM are as accurate as they are claimed to be.

The BAM was a sizable undertaking with a data set consisting of over 30,000 data fragment observations, *i.e*. observations derived from the intersection of census block and wire center data, and a modeling process involving over 100 variables.[28] Assuming the data set is accurate and the data dictionary includes all relevant variables, modeling with many variables and large amounts of data will likely produce spurious relationships. BAM cites a textbook by Hosmer and Lemshow to explain and justify use of stepwise logistic regression.[29] Stepwise regression is especially problematic when using a large data set because variables will likely be statistically significant, which could lead to overfitting models that are ultimately unstable.[30] Such models may appear to predict well for the states in which the model was constructed, but do poorly predicting in other locations.

An overfit model should not be used to estimate availability nationwide, as it has a high probability of producing estimates that are wrong simply because the model includes incorrect variables.

H. The Baseline Model Fails To Assess Middle Mile Capacity Data

The BAM study analysis involved over 100 variables, yet the data sets lacked a vital predictor of broadband service availability—middle mile capacity. The omission of this variable is a crucial weakness because low DSL speeds may simply result from service providers limiting speed to economize on expensive middle mile connections. In other words, the necessary infrastructure for higher-speed broadband deployment may already be in place in some locations, but broadband service cannot be delivered at the target speeds due to middle-mile capacity constraints. The BAM cannot be considered to provide a complete picture of broadband availability without considering this factor.

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[26] *Id*. at 1.

[27] *Id*. at 6.

[28] *OBI Technical Paper* at 24.

[29] *BAM*, Attachment 4 at 1, *citing* David S. Hosmer & Stanley Lemshow, Applied Logistic Regression, at 91 (2nd ed. 2000).

[30] *Id*. at 92.

II. COST TO SERVE MODEL FLAWS

A. The Cost to Serve Model Is Not Accurate for Areas Served by RLECs.

Using "data" developed in the Baseline Modules for its calculations, the BAM's CostPro Loop module attempts to determine what equipment should be placed in an area. The module traces paths along roadways to connect customers to broadband-capable routes, and then compares service locations on a route to network design standards described in BAM Attachment 5 to determine when a new field terminal is needed, where fiber cable should be placed, and where copper cable should be used.[31] Using a table of proprietary equipment costs for one mid-sized local exchange carrier,[32] the model then sums costs for each component in its design.

The data underlying this module does not reflect costs of RLECs, however. First, the prices paid by a mid-sized carrier are likely substantially different from the prices paid by a small local exchange carrier for equipment.[33] Second, as described in the Baseline Module assessment above, existing network equipment "data" used by the Cost to Serve model are imputed and the imputation is not based on attributes of RLECs. Third, the CAPEX model uses locations of DSLAMs to determine where routes should run and equipment should be deployed. Since, as explained above, RLECs do not use industry ordering databases to record DSLAM locations, the model cannot make the correct determination of DSLAM locations or associated CAPEX requirements for areas served by RLECs.

B. The Capital Expense Module Omits Considerations Critical to Network Design

The CAPEX model supporting the Plan is a forward-looking cost model, which is described as "a widely accepted, modern approach to network modeling practices used throughout the industry."[34]

Rather than identifying the type or locations of any existing equipment, the model imputes what equipment should be placed for optimum efficiency. The BAM documentation claims to lay out a new network "just like an engineer."[35] The criteria used by BAM may be sufficient in urban

[31] See section II.B of these comments for a discussion of deficiencies of these criteria.

[32] *OBI Technical Paper* at 88.

[33] While relying primarily of equipment cost data of one midsize carrier, the OBI documentation asserts that "smaller companies have the opportunity to join purchasing agreement with other small companies reducing scale." *BAM* at 23, Assumption 2. The assumption that discounts applied by vendors to purchases by the midsize carrier will be available to groups of small carriers does not reflect the realities of the rural equipment market. Nearly all the RLECs in the nation would need to join together to achieve a comparably sized purchasing block.

[34] *BAM*, Attachment 5- CostPro Loop at 4. BAM documentation incorrectly asserts that forward looking cost models are widely accepted for telephone network modeling (*Id*. at 4). See Section II.H below for a discussion of contrary determinations made by the Commission for areas served by RLECs.

[35] *See id*. at 4-5, for five repetitions of phrases such as "engineering practices."

areas, where physical topology is relatively homogeneous, and many of the neighborhoods have similar population density, construction requirements and costs, but the suggestion that a cost-efficient, rural network can be designed without actual knowledge of local conditions is not credible.[36]

Attachment 1 to this Appendix is a statement from Edward McKay, Vice President of Engineering and Planning at Shentel, a small telephone company in Virginia. Mr. McKay explains the many criteria critical to successful network design in rural areas, of which the BAM incorporates only the first six.[37] McKay's statement makes clear that reliance on this narrow set of criteria would lead to ineffective network designs. Consequently, the network designed by the BAM is not assured of being buildable or overcoming obstacles to construction specific to a rural area, and hence may not reflect a large component of actual construction costs. Even if built, the BAM network may need enhancements to resolve construction omissions in the model, causing its actual cost to far exceed the model estimates.

Finally, while the BAM documentation states that "widely accepted" engineering principles were used,[38] this judgment cannot be made about the application of the model to RLEC networks unless RLEC data are included in the model, and the model outputs have been validated against actual RLEC construction decisions.

C. The Operations Expense Model Omits Crucial RLEC Data

BAM documentation refers to layering-in of results from a 2003 CostQuest study of rural costs by company to create a "rural classification" of operating expense costs.[39]

Considering the variety of conditions served by RLECs, it is difficult to see how a single classification overlay could be accurate for all. A factor that reflects costs of a company serving an isolated town in the Midwest would likely not work for a carrier serving an expansive ranching region in the desert southwest.

Attachment 3 of the BAM documentation is a database outline, which shows the presence of tables of cost data associated with investment and expense components. The BAM documentation explains the development of a statistical model to estimate operating expenses. This model is said to be based on 758 unique rows of data from "a random sample … across 86 companies."[40] The level of detail used by this model is referred to in the Commission's Part 32

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[36] See generally a report by the Association of Communications Engineers in Appendix B of these comments.

[37] *See generally, BAM*, Attachment 5.

[38] *Id*. at 4.

[39] *BAM* at 29.

[40] *Id*. Apparently this data is taken from FCC ARMIS reports filed directly with the FCC by larger carriers, which is the only publicly available source of data which would display accounts at this level of detail.

rules as Class A accounting, which is required only of the largest telephone companies.[41] Few, if any, RLECs maintain Class A accounting. Thus, it appears that far from being "random", the data used for this analysis could not have included information from RLECs.

The BAM expense models attempt to account for variations in costs associated with company size by dividing companies into three size groups, based on subscriber line counts. The "smallest" size includes any company with fewer than one million lines nationwide. Exhibit 4, below, shows the distribution of RLECs by size. No RLEC has more than one million lines. Nationwide, 99.5% of all rural operating telephone companies have fewer than 50,000 lines (1,135 out of 1,140). Clearly, this "smallest" size grouping includes carriers who by RLEC standards are giants. Aggregation of small companies' costs with those of much larger companies can only obscure cost differences.[42]

Exhibit 4
RLECs by Customer Line Count Size

Line Size Group	Study Areas
Less than 1,000	331
1,000 to 5,000	521
5,000 to 10,000	163
10,000 to 50,000	120
50,000 to 100,000	4
100,000 to 300,000	1
Total	1140

Exhibit 5, below, shows that a model to estimate Central Office Equipment expenses of small companies based on cost data of large companies will grossly underestimate small company expenses. This exhibit uses data from the September 2009 Universal Service Fund submission[43] to develop average ratios of expenses to Telephone Plant in Service investment for five line size groups.

[41] Section 32.11(d) of the Commission's rules, 47 C.F.R. § 32.11(d), allows carriers to not maintain Class A accounting if they have annual revenues from regulated telecommunications operations that are less than the indexed revenue threshold, which is $100 Million, adjusted for growth in the GDP-CPI.

[42] The *BAM* documentation also lists assumptions used for network design. (*BAM* at 22). While the documentation admits that these assumptions may not be accurate in all cases, it asserts that the lack of accuracy will be mitigated as data assigned to census blocks is aggregated into larger areas. This assertion may work for urban carriers, but will likely be insufficient for RLECs, who often serve areas consisting of only a few census blocks.

[43] *See, 2009 NECA Universal Service Fund Submission of 2008 Study Results,* National Exchange Carrier Association, Inc. (Sept. 30, 2009) (*NECA 2009 USF Data Submission*).

Exhibit 5
Operating Expense Ratios by Line Size Group

Loop Size Group	CO Switching Expense	CO Transmission Expense
Less than 5000 Loops	0.01261	0.00824
5000 to 20,000 Loops	0.00934	0.00671
20,000 to 100,000 Loops	0.00661	0.00411
100,000 to 3,000,000 Loops	0.00407	0.00335
Over 3,000,000 Loops	0.00532	0.00366

As shown in the table, ratios of the smallest companies are more than double those of the largest companies, which indicates that the use of large companies' operating expense data for small, RLECs is inappropriate.

D. The Model Does Not Recognize the Cost of Maintaining or Operating Existing Equipment

The OPEX Module of the model "pairs with the Investment Module to estimate relevant incremental cost associated with a network augmentation."[44] In other words, the Investment (CAPEX) Module determines what additional network equipment is needed to extend broadband service to unserved areas, then the OPEX Module overlays an estimated expense factor on the investment calculated by the model.[45]

Similarly, BAM assumes that existing poles and conduit (brownfield construction) will be available to competing broadband providers, and does not include additional costs of this equipment.[46] This assumption omits a method of recovering ongoing costs for the use of those facilities, creating the untenable condition that the facility would continue in operation by its owner without recognition of its operating costs.

For a carrier who has not deployed any broadband capable equipment, this method allows expense recovery to support all of the carrier's ongoing broadband operating costs. In contrast, for a carrier that has already invested in broadband-capable equipment the Model would only provide funding for incremental investments. Exhibit 6 illustrates this effect for two carriers with identical equipment based on hypothetical values.

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[44] *BAM* at 26.

[45] "Regression analysis was then used to determine the relationship between capital spend *(sic)* on assets and ongoing costs required to maintain the plant." *Id*. at 29.

[46] *Id*. at 25.

Exhibit 6
Illustration of OPEX Calculation

		Carrier A Already has FTTN[47]	Carrier B All Facilities on Copper
A	New FTTN investment	$0	$10000
B	Copper loop upgrades	$10000	$10000
C	Expense allowance factor	.01	.01
D	New FTTN expense allowance (A×C)	$0	$100
E	Copper loop expense allowance (B×C)	$100	$100
F	Total expense allowance (D+E)	$100	$200

This example illustrates a model shortcoming because existing investments are treated as fully paid for, and in need of no continuing cost recovery. The carrier that has already partially upgraded its network would realize support based on the model at a much lower level than the carrier that has not made any upgrades. None of Carrier A's support would be directed to its existing fiber optic cable investment, while Carrier B would recover ongoing expenses for _all_ of its investment, including fiber optic cable.[48]

Under FCC rules, telephone companies are required to spread the recovery of investment costs over the in-service life of the equipment.[49] Failure to recognize embedded broadband equipment in support calculations would leave carriers' investments stranded with their only means of recovering remaining costs through increases in monthly customer charges, equal to the amount of lost support amounts.

E. The BAM Has Not Been Statistically Validated

The BAM documentation identifies four factors to consider when validating data and outputs:[50] the diversity of inputs to the model, asserted consistency of model logic with a number of regulatory principles, asserted reasonableness of results and "alignment" of estimated capital expenses with company data.

[47] FTTN = Fiber to the Node.

[48] Circumstances of Carrier A in this example should not be confused with the hypothetical condition of having built a fiber cable route using government grant money. If a facility is built with grant money, its full cost would be recovered up front from the grant, and its net investment value would be zero (investment cost less grant amount), and the corresponding depreciation expense would be zero. In contrast, Carrier A has invested in a new fiber route and is recovering its cost under a long-term depreciation schedule. Regardless of the method of recovering investment cost, either circumstance would entail continuing maintenance and support costs.

[49] 47 C.F.R. § 32.2000(g)(1) requires that depreciation reflect and continue through the "service life of the property".

[50] *BAM* at 25-26.

The first three factors are theoretical considerations. While diversity of inputs may improve a model, diversity in no way assures that the model has the right structure, relies on data needed to meet the estimation objective, or has statistical power to estimate reliably.

The model documentation also explains the ability of regulatory principles to influence support programs.[51] The documentation also lists some high-level principles with which it is compatible, such as infrastructure sharing and universal service.[52] Nowhere does the documentation explain, however, what the model does to achieve this compatibility, or what sets it apart from any other hypothetical model that is not compatible. Moreover, mere conformance to principles does not assure a valid statistical or engineering model.

After alluding to tests for reasonable results and successful comparison to company cost data, the documentation admits that the bulk of validation occurred in prior regulatory proceedings.[53] That is, validation was supposedly completed before the BAM was even developed. Thus, there is no basis for claiming the model has been validated by supposed "alignment" with company data. Furthermore, proceedings before the development of BAM are the very proceedings in which the Commission found that forward-looking cost models did not yet perform adequately for RLECs.[54]

The documentation admits that for "terrestrial wireline telecommunications, these tests were primarily based on other cost model work."[55] In other words, the model was validated by comparing its results to results from another model – clearly a conceptual comparison, but not a validation at all. Statistical validation of a model means that the model output is compared to a battery of actual (not theoretical) cases, to see if the model estimates closely relate to real world data.

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[51] *Id*. at 16.

[52] *Id*. at 25.

[53] *Id*. at 26.

[54] See Section II.H below.

[55] *BAM* at 26.

F. Claims Regarding the Model's Accuracy are Substantially Overstated.

The model documentation repeatedly claims to achieve a considerable level of statistical accuracy. For example, the models of operating expenses are said to have correlations ranging from 35% to 61%, with an 80% level of significance.[56] The models of broadband availability by speed are said to be typically 80% to 90% accurate.[57] The BAM documentation claims these models have discrimination accuracy higher than 85% at the census block level, and even higher nationwide.[58] These claims are not justified, however, since all accuracy assessments in the model documentation are made using the data on which the models are based.

In the case of the operating expense model, for example, the data are not drawn from RLECs at all; consequently, whatever accuracy is achieved by the model is achieved only for the larger non-rural carriers. Although the models of broadband availability include data of some RLECs, the assessment of model accuracy reflects data of all exchange carriers, so the measurement of accuracy blends together data of both large and small companies. When a single statistical model is used to estimate data across a large range, it is critical that the model's accuracy be assessed separately for each size range.

The following example illustrates the importance of assessing the accuracy of the model by size stratum:

Using publicly available loop cost data reported by exchange carriers, [59] a simple linear regression was created to estimate total unseparated embedded cost based on loop counts.

$$\text{Cost} = 1{,}757{,}069 + 345.90779 \times \text{Loops} \qquad R^2 = 0.98$$

The overall R-squared statistic, based on data from 1,452 study areas, shows that this model has excellent accuracy, explaining 98% of the variance in costs reported by the full set of exchange carriers. Exhibit 7 below displays the underlying data and the model, showing that the data points follow the trend line well.

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[56] *Id*. at 30.

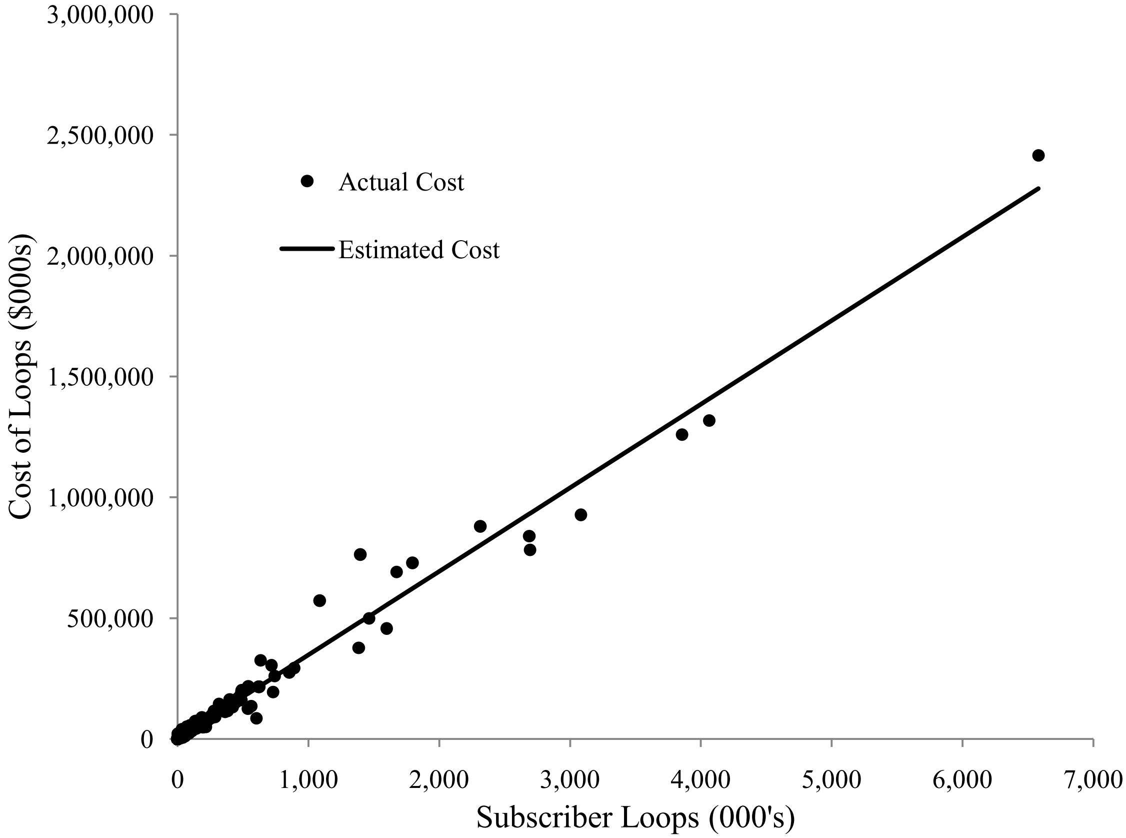
[57] *Id*., Attachment 4 at 2.

[58] *Id*. at 5.

[59] *See NECA 2009 USF Data Submission* (Sept. 30, 2009).

Exhibit 7

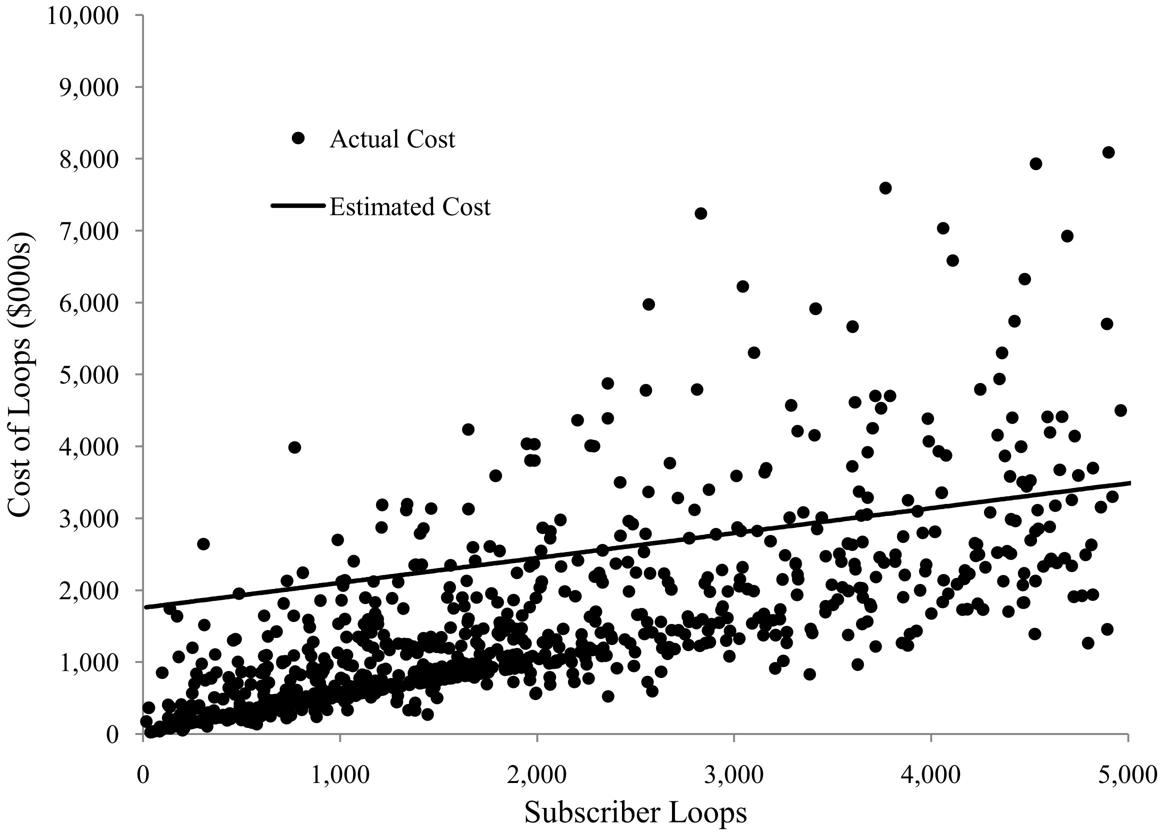
Loop Cost Model and Data



To test the accuracy of the model for subsets of exchange carriers, the data of 926 study areas were selected that had fewer than 5,000 loops, and the model's R-squared statistic for these study areas was calculated to be -0.12, worse than zero accuracy. While the overall R-squared statistic indicates excellent accuracy, the subset R-squared statistic is negative, meaning that the subset would have been better estimated by a simple mean, rather than using an overall model. Exhibit 8 displays the data of the subset and the overall model. The subset of data falls mostly on one side of the model, and has much greater apparent spread about the trend line than in Exhibit 7.

Exhibit 8

Loop Cost Model and Data - Carriers with Fewer than 5000 Loops



For comparison, a subset model was developed, with the following result.

$$\text{Cost} = 153{,}993 + 711.53195 \times \text{Loops} \qquad R^2 = 0.40$$

This model shows that the intercept for the subset model is much lower than for the overall model, but the incremental cost per loop of 711.53 is about double that of the overall model. The R-squared statistic for this model shows that the power of a simple linear model to accurately estimate cost for the subset is much lower than would be concluded based on the overall model. This illustration confirms the principle that an overall model cannot be said to be accurate for a subset of carriers unless it is validated against the data of those carriers.

G. The Documentation of Accuracy of Model Components Does Not Imply Accuracy Overall

The BAM is actually a collection of several models. Accuracy claims in the documentation are made relative to individual models, not relative to the combined estimates based on all models. Even if the accuracy claims were valid for RLECs on an individual model basis, this would not imply relevance for the composite of all models.

Since the documentation does not supply data by which to assess the composite accuracy of the models, the following illustration includes analysis based on other data supplied by 673 cost company exchange carriers who participate in NECA's common line (CL) and traffic sensitive (TS) pools. This illustration includes the following steps:

1. Develop three separate linear regression models.

2009 Access Lines = 23.28 + 0.9449 × 2008 Access Lines $R^2 = 0.99$
2009 CL Cost = 19788 + 20.25655 × 2009 Access Lines $R^2 = 0.78$
2009 TS Cost = 9869 + 0.85857 × 2009 CL Cost $R^2 = 0.59$

2. Create an estimate for each study area based on each model.[60] For each exchange carrier, these calculations are as follows:

Estimated 2009 Access Lines = 23.28 + 0.9449 × 2008 Access Lines
Estimated 2009 CL Cost = 19788 + 20.25655 × Estimated 2009 Access Lines
Estimated 2009 TS Cost = 9869 + 0.85857 × Estimated 2009 CL Cost

Because the second model uses the estimate calculated by the first one, and the third model uses the estimate calculated by the second one, the final calculation is a composite estimate for each study area.

3. Compare the composite estimate to the actual data that the composite estimate is intended to model.

The R-squared statistic was calculated relating each set of composite estimates to the set of actual data. The composite estimate of CL Cost was compared to actual CL Cost, and similarly for TS Cost. The R-squared statistics for these models are as follows:

Exhibit 9
R^2 Statistic of Composite Estimators

Quantities Estimated	R^2
CL Cost	0.58
TS Cost	0.15

While individual estimators may have relatively high accuracy, the combination of two estimators into a single package often shows a substantial degradation in accuracy. Although the BAM documentation claims that even though each step may entail some measurement or estimation error, when all steps are completed, errors will cancel out. Exhibit 9 proves this premise to be false. While this example was made using estimation errors, the actual source of error does not matter. Measurements in each of the three steps correlated well with the actual

[60] These models allow one to perform a series of estimates, with each estimate building on the previous one. The intent is not to propose that such a series of estimates is needed, but rather to show the effects of combining three individually accurate models.

data, but the combined model was not a strong estimator. In fact, the combined model was alarmingly weaker than any of its building blocks. Before considering using separate models for universal service fund sizing or payments, overall model accuracy must be demonstrated.

H. BAM Documentation Does Not Correctly Reflect the Record

The Model documentation incorrectly claims that the CostProLoop Module is an accepted standard throughout the industry.[61] Prior Commission proceedings did adopt a forward-looking cost model as the basis of universal service support for non-rural carriers, but the Commission declined to adopt a model for RLECs.[62] In those proceedings the Federal-State Joint Board recommended, and the Commission agreed, the "Synthesis" Model should not be applied to RLECs because the model did not include sufficient detail about RLECs' networks and costs.[63]

In that case the data shortcomings of the Synthesis Model were identified against the objective of the model, which was to estimate the forward-looking cost of deploying voice-grade local telephone service. In this proceeding the Commission seeks to use a model to estimate the forward-looking cost of deploying broadband service over a variety of speeds and technologies. The data prerequisites of such a broadband model are substantially more demanding than those of a voice-grade model.

As discussed extensively above, data used in the BAM to estimate RLEC costs are inadequate. For example, the data related to areas served by wire centers, broadband availability or speeds, facilities in place to support broadband build-out or construction costs do not adequately reflect rural areas. In addition, the BAM did not improve on considerations involved in efficient deployment of field terminals and cable. While the BAM documentation explains significant improvement in modeling related to some data sources[64] and algorithms to place new equipment along roadways, the above analyses clearly show such improvements are superficial, at best, in improving the model's ability to estimate rural broadband costs.

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[61] *BAM*, Attachment 5 – CostProLoop at 4.

[62] *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Fourteenth Report and Order and Twenty-Second Order on Reconsideration, *Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers*, CC Docket No. 00-256, Report and Order, 16 FCC Rcd 11244 (2001) at ¶ 25. The Commission concluded that additional study data were needed before such a model could be found suitable for RLECs, and kept individual cost as basis for support to RLECs.

[63] The Joint Board recommendation drew on the recommendation of its Rural Task Force. *See*, Letter from William R. Gillis, Chair, Rural Task Force, to Magalie Roman Salas, FCC (Sept. 29, 2000 (attaching the Rural Task Force Recommendation). That recommendation concluded that the current model was "not an appropriate tool for determining the forward looking cost of rural carriers". *Id*. at 18. Reasons included the model's inaccuracy of estimating wire center area, subscribers by wire center, route miles by serving area, required cable, central office equipment, general support equipment, and operating expenses.

[64] For example, data on the location of subscribers, roadways, central offices and field electronics have all been improved.

I. BAM Data Requirements Will Be Prohibitively Expensive to Collect and Maintain

The BAM documentation concedes that better data are needed for the Model to accurately predict costs in all areas.[65] The implication is that Model inaccuracies would be solved if carriers would submit the requisite data. Unfortunately, the model is a voracious consumer of information. To satisfy the Model fully, each carrier would need to create, populate and make available several new databases containing masses of new data, as well as maintain those databases on a continuing basis. Examples of new data include the following:

- Locations, functions and capacities of all field terminals, as well as identification of the central office and head-end serving the terminal
- Locations of all fiber optic routes for feeder and distribution plant
- Locations of households for which broadband service is available by speed of service, in a form compatible with model requirements presumably based on state mapping programs.[66]
- Wire center boundaries
- Costs of each network element in new construction projects, by vendor and by capacity
- Class A level telephone accounting
- Take rates for broadband data, video and bundles, by wire center or census block
- Revenues per customer separately for data, video and bundled broadband service

Since such data are not used for the operations of RLECs, the only purpose for collecting and maintaining these databases would be to populate the model. The development cost would certainly add millions of dollars to the continuing operating cost of RLECs.

III. DEMAND AND REVENUE MODEL FLAWS

A. Revenue Forecasts Do Not Reflect The Services That Will Be Obtainable

BAM fits Gompertz curves of customers' broadband adoption rates using demographic characteristics from Pew surveys. Using these curves, the Model predicts customers' adoption rates over time for every census block under consideration.

Use of Pew survey data in this manner is inappropriate because such data cannot be translated to actual demand patterns in unserved areas. For example, a high income household may typically buy triple-play service, yet video—one component of the triple play—won't be available in areas

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[65] *BAM* at 17 ("the precision of model outcomes will be impacted by the quality of available input data"). *Id*. at 18 ("Inconsistent and Limited Industry Data").

[66] A review of mapping products in several states does not find uniformity of measurement and reporting methods sufficient to assure its usability in a model.

where the maximum speed is only 4 Mbps.[67] Therefore, linking high income to take rates will likely overstate take rates of high-end service in areas that can only receive 4 Mbps service.

Moreover, the fitting of the Gompertz curve for rural locations highlighted in the Gompertz Penetration Rate Paper adds to the concern about predictive accuracy because it exhibits serious serial correlation—a likely result of a poorly specified model.[68] The fitted model shown in Attachment 9 exhibits serial correlation or persistence of errors from one period to the next.[69] In early years, the estimated values (from solid line) are above actual values (squares) and in later years the fitted values are above actual values. Serial correlation is likely to result from a poorly specified model – a curve which doesn't fit the data well

B. The Broadband Penetration Analysis Does Not Reflect Response to Funding Changes

The Pew Survey identifies historical interactions between broadband usage and demographic factors. By focusing on historical data, the Pew data measures relationships between broadband penetration and other variables *absent* the stimulus of new broadband funding. These data, therefore, cannot be used to predict future broadband deployment trends, when new broadband funding can be expected to impact market conditions. Some areas would receive more broadband support under the new plan than they do now, leading to improvements in broadband availability and affordability, as well as increases in penetration rates compared to past trends. Similarly, other areas would receive less broadband support, so curtailment of broadband deployment and increases in broadband prices can be expected. A slowdown in broadband subscription growth, or even reductions in subscriptions may occur. Consequently, the model's estimates of penetration levels cannot be judged accurate.

C. The Penetration Analysis Confirms Plan Bias Toward Urban Consumers

It bears noting that while the BAM's broadband penetration analysis predicts rural broadband subscriptions will peak at about 60%, a modest increase overall from today's levels, urban penetration is predicted to grow at a faster rate, to about 75% overall.

To the extent the model's penetration estimates can be considered reliable at all, acceptance of these projections confirms the NBP's overall bias towards urban consumers.[70] That is, a plan that expects the urban/rural gap to increase, rather than to close, would appear to fail in its objective.

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[67] *See*, Appendix B, *ACE Report* at 3, 6.

[68] *BAM*, Attachment 9-Gompertz Penetration Rate at 4.

[69] *Id*.

[70] Indeed, by this measure, the plan would achieve its take-rate goals among high-income urban populations, at the expense of other groups.

D. The Model's Calculation of Investment Gap is Extremely Sensitive to Growth Predictions

The model estimates an "investment gap" by comparing the present value of costs and expenses over 20 years.[71] In this comparison, alignment of predictions of cost and revenue predictions is critical.

Exhibit 10 is a display of selected broadband penetration predictions by the model for a rural census block that follows the rural average model exactly.[72]

Exhibit 10

Predicted Rural Broadband Penetration Growth

Current Penetration	Prediction Date	Predicted Penetration	Relative Growth
3%	20 years	62%	1,967%
10%	15 years	62%	520%
30%	8.5 years	62%	107%
40%	6 years	62%	55%

This exhibit shows that the relative growth predicted by the model is highly sensitive to the census block's current penetration level. Because revenue predictions track penetration predictions, this exhibit also illustrates the relative growth in predicted broadband revenues. Because predicted revenues are a critical component of the cash flow analysis, minor errors in penetration estimates can have a large impact on the estimated investment gap.

The potentially serious degradation of the model's estimate of the investment gap using this method is understood by the following comparison. If network augmentation and other costs predicted by the model increase for an area by a typical amount of three per cent per year, the predicted 20-year cost increase would be about 80%. If the penetration model predicts 1967% revenue growth for the same area, the model would estimate a huge inconsistency between costs and revenues. For predicted costs and revenues to relate reasonably well, the model needs a way to assure that such inconsistencies do not occur.[73]

E. Incremental Analysis Has Significant Problems

The model uses incremental analysis to estimate the cost of building network in unserved areas.[74] This analysis is flawed in several ways. First, the model assumes networks can be planned marginally and the current infrastructure will continue to be in place, even though the

[71] *BAM* at 43.

[72] *OBI Technical Paper* at 48, Exhibit 3-S.

[73] Moreover, the use of inaccurate imputed data to determine current broadband service makes the gap calculation especially problematic.

[74] *OBI Technical Paper* at 1.

model results in massive decreases in support funds for current infrastructure.[75] While acknowledging that past funding was critical to current network deployment, the BAM study does not account for changes in the current support funds as part of its incremental analysis.

Second, the Model's county-by-county incremental analysis is at odds with exploiting economies of scale. The BAM study recognizes economies of scale in build-outs, especially for wireline infrastructure, where fixed costs are high,[76] but the BAM analysis partitions markets by county to determine the probable most efficient technology. Thus, wireless may be the chosen technology in one county while wireline is chosen in an adjacent county. By diminishing a network's scale of operations, the overall service cost will likely increase.

Finally, the lease costs in Exhibit 4-BZ for equivalent middle mile connections exceed build-out costs by 13% to 1020%.[77] Unexpectedly, the Exhibit shows a lack of correlation between these two measures of cost. The differences imply that lease charges for middle mile capacity are either much higher than costs, or actual costs are inconsistent with TELRIC.[78] Without resolving this discrepancy, the TELRIC model should not be used to predict network augmentation costs.

F. Net Present Value (NPV) Calculations Use Inconsistent Forecast Horizons

A twenty-year life span is assumed for most network assets.[79] Twenty years is the normal life span for cable facilities in a telephone network. A much shorter period is normal, however, for electronic equipment, usually seven years. During the Model's twenty-year depreciation cycle, therefore, electronic equipment presumably would be replaced twice. Cost of these replacements should also be included in the model, but the BAM documentation does not say whether they were. If they were excluded, the total augmentation costs used in the NPV calculations were understated.

The NBP's 4/1 Mbps speed target clearly does not correspond to this twenty-year time horizon. Even assuming that demand doubles every three to four years and capacity starts at 1 Mbps, which is below the 3.1 Mbps nationwide median in the first half of 2009,[80] the speed requirement would greatly exceed 4 Mbps by the end of the twenty-year time horizon. Indeed, if demand only doubles every four years, 32 Mbps would be required by the end of the twentieth year. If demand doubles every three years, by the end of year twenty the speed requirement would be roughly 105 Mbps. Clearly, a network designed for 4/1 Mbps would be outmoded within a few

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[75] NECA estimates that Common Line pool members stand to lose substantial support funds. *See*, Financial Assessment Model Flaws below.

[76] *OBI Technical Paper* at 2; *BAM* at 33.

[77] *OBI Technical Paper* at 121.

[78] One reason why TELRIC has not performed well is the arbitrary allocation of transport costs to services. The FCC uses a one-third rule to assign transport costs: one-third is assigned to middle mile, one-third to voice, and the remaining third to wholesale or enterprise traffic.

[79] *OBI Technical Paper* at 34.

[80] *Id*. at 43.

years. If the model aims to calculate the present value of a network that will serve needs over 20 years, it must base equipment costs on a consistent service level, one much higher than 4/1 Mbps. As presented, the model uses the lower cost of the lower speed equipment, and represents that that equipment will continue to serve needs for the full 20 years, substantially understating the actual upgrade costs of equipment.

G. As A Planning Tool NPV Omits Critical Considerations

A strategy of building a copper-based DSL network is clearly a costly mistake.[81] No prudent company would construct a network to accommodate 4 Mbps per customer, when such a network would soon be obsolete. An NPV analysis based on a one-time project is not appropriate for evaluating potential strategies in a highly uncertain, rapidly changing environment. Rather, real options theory presents a more promising way to model investment behavior in this environment.[82] If technology and demand are uncertain, real options theory recognizes that when making decisions, businesses weigh the value of waiting to build and the value of looking over multiple time horizons. A negative NPV for the first service contract build may lead to a positive NPV on future service contracts. In an uncertain, evolving environment, real options theory indicates a slower build-out based on fiber technology as a better option—an alternative rejected in setting the objectives of the BAM.

IV. FINANCIAL ASSESSMENT MODEL FLAWS

A. The CAF Could Have Severe Consequences for Areas Served by RLECs

The overall purpose of the Broadband Assessment Model is to estimate the gap between anticipated revenues and the costs of augmenting networks to provide broadband service.[83] In addition, however, the NOI asks whether such a model also "could be an appropriate tool in determining appropriate support amounts".[84]

In response to this question, following is an analysis of federal support changes that are likely to result if the model were used to determine funding to RLECs from the Connect America Fund (CAF), in replacement of existing universal service support. Impacts are estimated nationwide, though individual company impacts will vary depending on current funding levels, as well as attributes of a service territory.

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[81] *Id*. at 1, 47.

[82] *See, e.g*., Avinash Dixit & Robert S. Pindyck, Investment Under Uncertainty, Princeton University Press (1994). *See also,* Hans T. J. Smit & Lenos Trigeorgis, Strategic Investment in Real Options: Real Options and Games, Princeton University Press (2004).

[83] *OBI Technical Paper* at 1.

[84] *Connect America Fund*, WC Docket No. 10-90, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, *High-Cost Universal Service Support*, WC Docket No. 05-337, Notice of Inquiry and Notice of Proposed Rulemaking, 25 FCC Rcd 6657 (2010) at ¶22 (*NOI*).

The NBP's estimates the investment gap at the national level by calculating the NPV of cash flows over 20 years using an 11.25% discount rate, and summing the investment gap of the least-cost technologies in unserved counties.[85] A substantial portion of this gap is estimated not to be in areas served by RLECs. Also, the NBP model may calculate wireless, as opposed to DSL, as the least-cost technology. If such funding were awarded to a wireless carrier, funding for the existing wireline network would be reduced further.

If CAF based on the current unserved gap funding model is the only funding mechanism for infrastructure, rural wireline service is projected to ultimately lose approximately 85% to 90% of current high-cost funding.[86]

In 2009, areas served by RLECs received $1.961 billion in high-cost funding.[87] Exhibit 11 presents the breakdown by funding category.

Exhibit 11

High Cost Funding Received in Areas Served by RLECs

Funding Category	Annual Amount (millions)
High Cost Loop	$814
Safety Net Additive	28
Safety Valve	2
LSS	275
ICLS	842
Total	$1,961

To compare the funding under the CAF with current universal service funding, the present value of the CAF for both operating shortfalls and capital expenditures was calculated. Over the next 20 years, these same serving areas are estimated to receive annual CAF payments of between $73 million and $99 million for operating shortfalls, or between $570 million and $780 million in present value dollars. In addition, the present value of CAF for capital expenditures is estimated to be between $1.08 billion and $1.45 billion. Therefore, the combined present value of CAF for both operating shortfalls and capital expenditures is estimated at $1.69 to $2.23 billion. Current annual USF support to these areas of $1.961 billion was discounted for 20 years to yield $15.364 billion. Thus, the present value of CAF is between 10% and 15% of current universal service support. The NBP also proposes to reduce and ultimately eliminate switched access charges during the same period, thus eliminating an additional source of network cost recovery for these areas.

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[85] *NBP* at 33.

[86] Assuming that the *BAM* results are used for the distribution of the CAF.

[87] Exhibit 11 shows data of carriers who participate in NECA's common line pool.

If the high-cost funding support for existing networks continues, but total support including CAF is capped at 2009 levels, RLEC serving areas are projected to lose approximately 52% to 56% of their current high-cost funding.

In 2009, $4.5 billion in high-cost funding was received by rural ILECs, non-rural ILECs and CETCs. This amount discounted for 20 years at a rate of 11.25% is $35 billion in present value dollars.

If total broadband funding is not more than the 2009 high-cost funding, and $23.5 billion is used for CAF to build out unserved areas,[88] then $11.5 billion in present value dollars, or $1.467 billion annually, will be available to maintain existing networks. Assuming areas served by RLECs continue to receive 44% percent of high-cost funding, the annual support for existing networks is $645 million, or $5.053 billion in present value dollars. This $5.053 billion and the estimated CAF flowing to NECA companies of between $1.650 and $2.230 billion comprises 44% to 48% of the $15.364 billion present value over the same period of the existing universal service payment.

Calculation Methods for Above Analyses:

The funding share for areas served by RLECs was calculated using maps from the OBI,[89] which displayed the level of investment gap and assumed lowest-cost technology. These maps were geo-coded and the information extracted for each county. ILEC study area boundaries were overlaid on the county maps. As there is not a one-to-one correspondence between counties and study areas, the percent of overlap between study areas and counties was computed. If a county fell entirely within the boundary of a study area, the county's investment gap was estimated at the midpoint of its dollar range. If a county fell only partially within the serving area, the county's investment gap was estimated as the percent of its geographic area within the serving area multiplied by the county's midpoint investment gap. Finally, the investment gap was summed across all counties either wholly or partially in the serving area.
Calculation of the approximate investment gap for the highest-cost counties, *i.e.* those with a gap greater than $20 million, required an additional assumption because no measure of center was known. For this highest-cost category, three estimates, ranging from $20 to $35 million, were tested. The national investment gap under each of these scenarios was compared with the

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[88] It is not clear, however, that the scenario described here is what the NBP intends as it reduces and eliminates high cost support over the transition and moves all support to CAF.

[89] The OBI estimates the reimbursement of capital expenditures and operating expenses needed to close the investment gap as well as the following: base-case national investment gap, investment gap by county (*OBI Technical Paper* at 7, Exhibit 1-D), lowest-cost technology by county (*Id*. at 12, Exhibit 1-I) and expected incremental revenues (*Id*. at 5, Exhibit 1-A). In preparing its analysis, NECA mapping data sources were used to overlay model results. 2007 wire center boundaries from Claritas, Inc. were matched to the LERG, NECA Tariff No. 4, CLLI codes and study areas. County boundaries were obtained from MapInfo Professional v.10 from Pitney Bowes Software, Inc.

reported level, $23.5 billion. The highest-cost estimates resulted in national investment gaps between $20.9 and $24.2 billion, demonstrating that the estimates were reasonable. After rescaling to make the estimated national investment gaps equal the reported one, the investment gap for territories served by RLECs was calculated to be between $7.87 and $7.97 billion, or 33.5% to 33.9% of the total gap.

Exhibit 12 summarizes the estimated values of the investment gap for areas served by NECA member companies:

Exhibit 12
Investment Gap in Territories Served by RLECs

Estimate for the Highest-cost Investment Gap Category	Investment Gap in Territories of RLECs	National Investment Gap	Scale factor	Investment Gap in Territories of RLECs Scaled to $23.5B
	(A)	(B)	(C) = (A) / (B)	
$20.0 million	$7.0 billion	$20.9 billion	33.5%	$7.87 billion
$27.5 million	$7.6 billion	$22.6 billion	33.6%	$7.90 billion
$35.0 million	$8.2 billion	$24.2 billion	33.9%	$7.97 billion

<u>Investment Gap Assigned to DSL and Assumed to Be Awarded to ILECs</u>
Because under the proposed NBP wireless and wireline companies would compete for universal service funds, only a portion of the total funding will be awarded to wireline companies. In CL study area territories where DSL is identified as the lowest-cost technology, rural incumbent carriers are assumed to supply all DSL infrastructure. Their share of the investment gap is presented in Exhibit 13: [90]

Exhibit 13
Investment Funding Gap Apportioned to Wireline Service in Territories of RLECs

Estimate for the Highest-cost Investment Gap Category	DSL* Investment Gap in NECA CL Pool Member Territories	Investment Gap in Territories of RLECs	Percentage of Investment Gap Awarded Wireline Service	Investment Gap Awarded to Wireline Service Scaled to $23.5B
	(A)	(B)	(C) = (A) / (B)	
$20.0 million	$1.5 billion	$7.0 billion	21%	$1.69 billion
$27.5 million	$1.9 billion	$7.6 billion	25%	$1.98 billion
$35.0 million	$2.3 billion	$8.2 billion	28%	$2.23 billion

*DSL was chosen as the least-cost technology.

Thus, only between 21% and 28% of the funds, or $1.69 to $2.23 billion of the $23.5 billion funding shortfall, will be awarded to wireline service in territories served by RLECs.

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[90] *OBI Technical Paper* at 12, Exhibit 1-I.

Share of Capital Expenditure and Annual Operating Shortfall Funding

Initial capital expenditures for these territories, where DSL technology has the lowest broadband availability gap, is calculated according to the following formula:

CAPEX =
National CAPEX × ILECs' % of National Investment Gap × ILECs' % of Funding Won

Using $15.3 billion as an estimate of national capital expenditures, the range of capital expenditures is calculated as follows:

$15.3 billion × 0.21 * 0.335 = $1.08 billion
$15.3 billion × 0.25 * 0.336 = $1.29 billion
$15.3 billion × 0.28 * 0.339 = $1.45 billion

At a national level, the annual "levelized" operating expenses and incremental revenue flows were estimated for the 20-year span. At an 11.25% rate of return and present value of $17.1 billion, the "levelized" operating expense payment is $2.18 billion per year. Similarly, the "levelized" incremental revenue per year is $1.14 billion based on a present value $8.9 billion. Thus, nationally the annual shortfall is $1.04 billion over a 20-year period. The national operating expenses and incremental revenues were apportioned according to the following formula:

Shortfall =
National Shortfall × ILECs' % of National Investment Gap × ILECs' % of Funding Won

The range of operating shortfall is calculated as follows:

$1.04 billion × 0.21 * 0.335 = $0.073 billion = $73 million
$1.04 billion × 0.25 * 0.336 = $0.087 billion = $87 million
$1.04 billion × 0.28 * 0.339 = $0.099 billion = $99 million

Therefore, the estimated operating expenses less incremental revenue gap, or shortfall is between $73 and $99 million per year.

V. CONCLUSION

The various data and model flaws identified above with respect to the BAM's four main modules suggested strongly that the Model does not provide reliable estimates of costs for expanding broadband service in areas served by RLECs. Nor does the Model reliably estimate revenues RLECs could be expected to obtain from providing broadband services. Furthermore, the BAM cannot be adapted or enhanced to perform these functions effectively without imposing unacceptably high administrative costs on providers. Therefore, the model cannot rationally be used to determine broadband support payments for areas served by RLECs.

Attachment 1 to Appendix A

Statement of Edward H. McKay, Vice President, Engineering & Planning

Shentel

STATEMENT OF:

EDWARD H. MCKAY
VICE PRESIDENT, ENGINEERING & PLANNING
SHENTEL

Engineering Considerations for New Subscriber Loop Construction
June 21, 2010

I am Edward H. McKay, Vice President of Engineering & Planning at Shentel, located in Edinburg, VA. I hold B.S. and M.E. degrees in electrical engineering from the University of Virginia, and I have 14 years of engineering experience in the telecommunications industry with GTE, MCI, Verizon, and Shentel. This experience includes planning, design, and network deployments for local loop, local switching, interoffice trunk facilities, broadband loop, and broadband transport.

Shenandoah Telephone Company, a subsidiary of Shentel, provides regulated and unregulated telephone services throughout the northern Shenandoah Valley of Virginia and surrounding areas. This includes local telephone service to approximately 24,000 access lines, and approximately 12,000 digital subscriber lines. The Shentel network also includes over 1,000 route miles of fiber.

The Shentel Engineering and Planning Department has responsibility for planning and designing fiber and copper facilities, local loop equipment, local switching equipment, interoffice trunk facilities, broadband loop equipment, and broadband transport facilities.

Shentel factors in the following criteria when planning and designing an extension of broadband and local exchange service to customers in new developments.

1. Locations of customers to be served by the extension
2. Locations of existing central offices
3. Counts of customers on each segment of fiber or copper
4. Expected penetration and use of DSL service by subscribers
5. Existing roadways
6. Cost of electronics to support broadband
7. Locations of existing field electronic equipment
8. Compatibility of new equipment with existing network equipment
9. Current broadband network utilization
10. Rights-of-way into and within the development
11. Topographical features including streams, rivers, rock ledges.
12. Location of railroads and existing utilities
13. Existing pole lines and underground conduit
14. City, county, and state construction and permitting requirements
15. Make-ready requirements for attachments to existing pole lines

Failure to consider any of these criteria during the budgeting process could lead to significantly higher overall project costs. In particular, if only the first six items are considered, costs of the project are typically much higher than budgeted. Based on past experience, actual project costs can more than double if only the first six items are considered.

Edward H. McKay

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Appendix B

Good Engineering Practices Relative to Broadband Deployment in Rural Areas

Report of the Association of Communications Engineers

July 9, 2010

ASSOCIATION OF COMMUNICATIONS ENGINEERS

Good Engineering Practices
Relative to Broadband Deployment in Rural Areas

Introduction

With the American Recovery and Reinvestment Act of 2009 (ARRA), Congress mandated that the FCC develop a National Broadband Plan "to ensure that all people of the United States have access to broadband capability." Keys to meeting this mandate in the most efficient and economical manner include maintaining the existing broadband infrastructure and deploying new broadband infrastructure in currently unserved areas. The National Broadband Plan prepared by the FCC falls short of meeting this mandate because its recommendations for accomplishing the broadband build out to unserved areas do not employ good engineering practices.

The Association of Communications Engineers (ACE) is made up of individual firms employing professional engineers dedicated to the improvement and advancement of telecommunications technologies throughout the United States. ACE member firms provide services related to telecommunications and other advanced technologies including planning, design, project management, economic analysis and construction management. For over 50 years, ACE engineers have helped companies deploy new technologies, extend services into rural areas, and provide cost effective solutions to complex problems. ACE has prepared this paper to highlight concerns about the FCC's National Broadband Plan.

Background

Good engineering practices applicable to the deployment of telecommunications systems require sound planning and careful consideration of the overall project or system objectives, alternatives, user requirements, proposed system capabilities, available resources, restrictions or limitations, economic life cycles, public health & safety and other social impacts. This paper outlines high level engineering considerations applicable to broadband telecommunications systems, especially as they relate to the derivation of Universal Service Funds for Broadband in the United States.

1. Broadband services are becoming essential services for citizens throughout the country; especially for citizens in rural areas that do not have easy access to retailers or consumers. Reliance upon these systems is increasing, and user demand continues to expand in terms of penetration and broadband speed.

2. Broadband delivery systems must be capable of providing the needed performance (speed), quality of service, availability and reliability and must accommodate future demands.

3. “One size” does not fit all; broadband system designs must accommodate the specific needs and restrictions of the area in which they are deployed. A national financial model is unlikely to reasonably represent the many factors that must be considered with the engineering design.

4. Technology designs should produce the best possible long term value and usefulness, avoiding foreseeable obsolescence.

Scoping

Engineering tasks take place in several steps beginning with the development of an initial idea for a product, system or activity. Engineering typically focuses on the technical aspects, as shaped by the business (financial) and marketing (user) objectives. Technical solutions tend to be bound by (1) technical feasibility, (2) available resources, and (3) time, all of which are interrelated. For broadband systems, a clear identification of the anticipated network capacity and functionality is required to support customer use over the life of the investments. Both long term and short term networking needs must be considered in the engineering plan.

The initial tasks of the engineer are to establish a set of requirements, identify possible solutions, estimate the cost and time necessary to implement the solutions, then determine if the available funding can reasonably support the technical solution and deliver the desired results within the allotted schedule. Once the fundamental requirements are established, the engineer develops the project details, addresses technical challenges, and prepares documentation necessary to implement the system.

Network designs must take into consideration current and projected network reliability and capacity requirements to meet consumer demand over the useful life of the construction project.

The Broadband Assessment Model (BAM) proposed by the FCC does not account for the iterative process essential to responsible engineering practices.

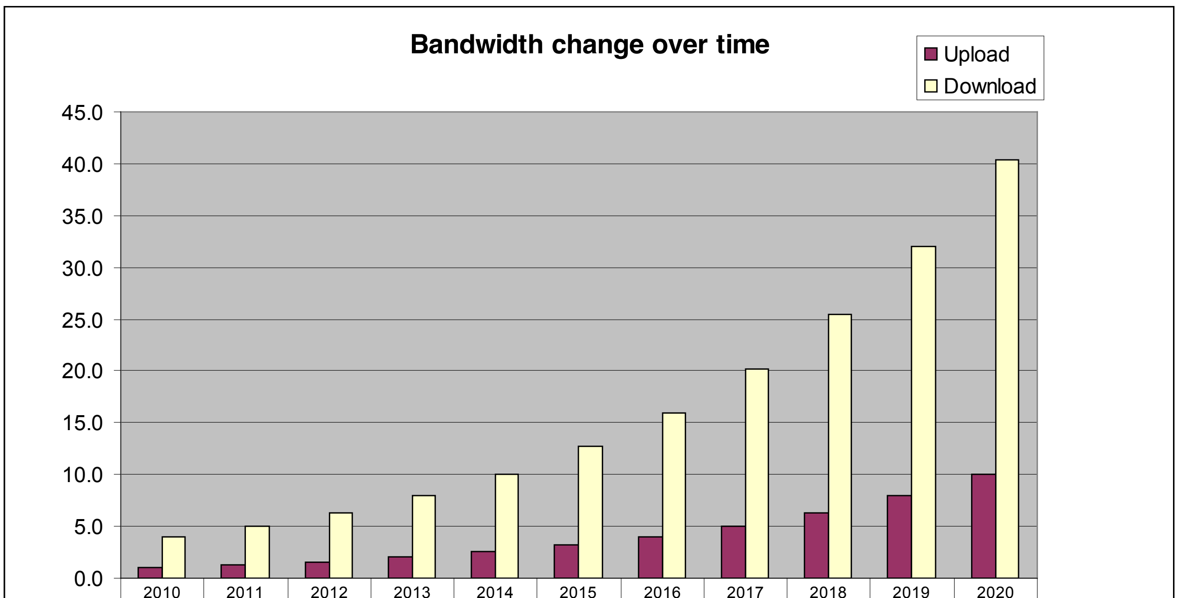
Determination of Broadband Requirements

The concept of “broadband” is relatively new. In 1999 the FCC first defined broadband as a data service with speeds of 200 Kbps in the last mile. In 2008 the definition of broadband was expanded, with a minimum downstream speed set to 768 Kbps. Round one of the broadband programs associated with the American Recovery and Reinvestment Act of 2009 (ARRA) retained this 768 Kbps downstream threshold as well as defining the upstream threshold at 200 Kbps. In the Notice of Funding Availability for Round two of the Broadband Initiatives Program, the Rural Utilities Service “… determined that rural areas without service at 5 Mbps (upstream and downstream combined) lack high speed broadband service sufficient to facilitate rural economic development as required by the Recovery Act.” Whether the service is called “broadband” or “high speed”, Americans are creating, transmitting and receiving data in increasingly large volumes, and are demanding that these data be transmitted very quickly. According to the Omnibus Broadband Initiative (OBI) Technical Paper No.1 (the OBI Report), bandwidth projections are found to be “doubling every three years”.

During the planning and design process, the engineer must anticipate user demand and ultimate system capacity. The Golden Gate Bridge carried an average of 9,000 vehicles per day when it was opened in 1937. Today an average of 120,000 vehicles make the crossing each day. The comparison is far from perfect, however the concept is clear: Systems must be planned and designed to accommodate growth.

During 2010, common engineering practices anticipate that residential end user demand will exceed download speeds of 20 Mbps, with projections reaching beyond 100 Mbps. A base calculation will include 100 – 200 Kbps for voice, 3-4 Mbps for basic internet applications, and a minimum of 8 Mbps for a single high definition broadcast video stream, resulting in a minimum 12 Mbps of download requirement. The OBI notes that other applications may include 3 Mbps for streamed standard definition classroom lecture video, or 6 Mbps for 2-way video teleconference. The National Broadband Plan notes that Smart Grid applications are expected to require between 100 Kbps and 500 Kbps. The FCC has long held that video transmission is a fundamental component of "Advanced Services". Typical IPTV systems are designed to accommodate a minimum of 20 Mbps today, and are projected to require at least 40 Mbps with the advent and adoption of 3D TV and continued use of high-definition (HD) programming.

The National Broadband Plan notes that currently the average actual download speed in American households is 4 Mbps, and that bandwidth usage is doubling every three years, or about 25% per year. This rate of growth is charted in Figure 1, and shows that the average American home is expected to require download rates significantly higher than 4 Mbps as soon as next year. Some estimates, such as the Cisco's Visual Networking Index, predict faster growth in the next two years, with the rate of growth slowing after 2013.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Upload	1.0	1.3	1.6	2.0	2.5	3.2	4.0	5.0	6.4	8.0	10.1
Download	4	5.0	6.4	8.0	10.1	12.7	16.0	20.2	25.4	32.0	40.3

Figure 1: Bandwidth Growth based on "doubling every 3 years"

When considering the overall system requirements, the engineer will consider the needs of the users and the anticipated demand. If there are significant differences in user requirements from one area to another, the engineering criteria may be customized to local needs. As an example, broadband users in rural settings may have greater need for higher speeds as compared to their urban counterparts. For rural America, the economics of daily living and business include a higher cost for fuel and transportation, which translates to time and money. As examples, Telemedicine/Home Telecare, Distance Learning, public safety and remote security may have a greater impact in rural areas.

The above examples focus on residential uses. Every broadband delivery system must also serve other end-users, including businesses, schools and colleges, hospitals and medical facilities, cell sites, public safety entities, government facilities and other anchor institutions. These end-users have a wide variety of specific needs that are often greater than the typical home use. The National Broadband Plan recognized these needs by setting a goal 1 Gbps for all anchor institutions.

The National Broadband Plan specifically addresses the shortcomings of bandwidth to medical facilities, noting that a significant number of physician's offices do not have access to 4 Mbps broadband, and that this problem is seven times worse in rural areas compared to urban settings. Proper engineering practices will include identification of critical communications gaps such as Health Information Technology and will seek solutions to close these gaps.

The FCC has noted that high cost funding sources are to be used to extend broadband to "unserved" areas, defined as housing units that do not currently have access to 4 Mbps data services. For a successful program, it is essential that all parties agree on the geographic extent and details of these unserved areas. Detailed maps showing the boundaries of these unserved areas are essential to the development of a broadband system capable of serving the target areas. In the absence of official maps or reliable data, the engineer may need to conduct field research and validate available data to identify unserved areas.

Unserved areas may be very small geographic areas that have little or no usable existing infrastructure. These areas may also include difficult construction conditions resulting in high costs per subscriber. Low housing densities and/or poor economic conditions may also factor into the overall evaluation of a system to provide service in a particular area. The design of a technology solution to serve multiple small unserved pockets may be influenced by the presence of nearby systems that might be expanded to cover the unserved area. Even at a high cost per user, the extension of an existing system of any technology may be more practical and more cost effective overall than attempting to establish a small pocket of a new technology. To evaluate technology alternatives network planners must take into consideration capabilities of existing network assets e.g. fiber sub loop, use and location of existing remote terminals, availability of existing conduit, pole attachments, and location of commercial power supplies. Good planning and thorough engineering will consider all existing infrastructure and synergistic opportunities.

In summary, good engineering practices will ensure that broadband systems are designed to support future data speed requirements. Failure to anticipate these requirements may result in the construction of a system that is almost immediately obsolete, and which will require significant upgrades or possibly a complete replacement to meet these future needs.

The 4 Mbps download and 1 Mbps upload speeds proposed by the FCC for universal service fall short of reasonable network design criteria and do not align with responsible long term planning.

Technology Selection

The selection of a particular technology or delivery system may or may not be strictly driven by technical requirements. Factors that might influence this choice include existing infrastructure, interconnection with other broadband networks, local factors such as customer density and usage characteristics, local economic expansion or contraction, expertise, time to market, anticipated trends in technology development and operational costs.

Broadband delivery systems available today include a variety of wireless and wireline distribution techniques. The OBI Report describes several systems currently considered potential candidates for the provision of broadband services. The most prominent technologies described by the OBI are 4G wireless (Long Term Evolution, or LTE) and 12 kft Digital Subscriber Line (DSL). Other technologies have capabilities that may also be considered, including Fiber to the Premises (FTTP), WiMAX (wireless) and hybrid fiber-coaxial cable system (HFC).

Wireless

A major benefit to wireless distribution systems is the potential to accommodate mobility and portability. When moving from one location to another within coverage of the system, the user can access and deliver information with ease. In the case of medical care, an ambulance may be remotely connected to a hospital or trauma center and transmit critical patient information with the hospital or specialists at the scene of an accident and while in transit. As part of the technology selection, the engineer must identify which wireless systems support mobility, and which do not. As an example, a system designed for fixed wireless access may not support mobility.

Good engineering practices will consider the ultimate capacity of a wireless system in a real-world environment. Wireless technology will have a different value proposition, and may not be a good long term solution compared to fiber or fiber and copper based on bandwidth projections and rural engineering economics.

Wireless signals are limited by a variety of factors, such as the signal-to-noise ratio (SNR) available at the receiver. Depending on the frequency used, a line-of-sight or near-line-of-sight path may be required on a wireless link. Terrain, foliage and buildings are three significant obstacles for any wireless system to overcome. For short distances at low frequencies, 700 MHz will have the greatest success in non-line-of-sight applications. The OBI describes such 4G systems as operating at 700 MHz with cell radius distances of 2, 3, 5 or 8 miles, depending on terrain.

In a typical cellular network configuration, multiple sectors provide coverage in different directions from the base station. Depending on the system design, the same frequency may be used by adjacent sectors or by adjacent cells. An operator may need to implement one or more techniques to minimize interference between sectors and cells. Interference is a major contributor to the "noise" factor described above. When neighboring cells are operated by different companies, the options to control interference may be limited.

In any implementation, low signal to noise ratios will first degrade the throughput, lowering the speed ("bandwidth") available to the end user, and if the SNR drops below a certain threshold, the link will become unusable. For LTE, sophisticated modeling and operations management are necessary to predict and adapt to these conditions.

Small cell radii, such as the 2 to 8 mile distances noted above, are necessary to deliver an adequate SNR to the area subscribers. At greater distances, potential users are unable to obtain the desired upload and download speeds. A radio signal at 700 MHz, even though unusable (as designed), will propagate for many miles beyond the defined cell radius. It is common for faint 700 MHz signals to extend well beyond 35 miles from their point of origin. Signals reaching beyond the desired cell radius are considered noise in the analysis and operation of a system, and may significantly degrade the performance of neighboring systems.

Every wireless system experiences a decrease of signal strength with greater distances from the cell site, and an increase in noise. The result is a decrease of SNR, and a corresponding decrease in effective throughput. For example, CDMA systems capable of delivering more than 2 Mbps near the cell site are found to commonly deliver user speeds of only 300 to 800 Kbps.

The actual usable bandwidth capabilities of wireless systems are dependent on many factors, including the signal to noise ratio described above. Estimates of usable bandwidths at speeds of 10, 20 or even 80 Mbps have not been supported in real-world deployments. Practical download speeds with wireless systems appear to be in the 8-10 Mbps range for close proximity to the cell site. A system designed for a throughput of 4 Mbps at the edge of the cell will have limited ability to meet the expanding demands of the typical consumer. High bandwidth internet applications such as medical imaging and file transfer will strain the network. In addition, a single stream of standard definition video will strain the network and a single high-definition video stream will exhaust this 4 Mbps capacity. As the speed requirements for many existing and new applications continue to increase, key data components of the wireless network would require great leaps in technology. Wireless might be an attractive choice compared to fiber or fiber/copper if capacity or consumer use in a local area is not expected to scale quickly or increase by any significant amount over time.

Realities of real world terrain conditions and natural and manmade obstructions vary greatly with the earth's geological features. Good engineering practices require the use of propagation prediction studies and detailed analysis of predicted signal strengths as well as interference from both internal sources (self-interference) and external sources (neighbors). Frequency coordination is a mandatory function of wireless design and deployment.

Another challenge with some wireless solutions is the lack of "real world" testing. For example, LTE systems are in the very early stages of deployment. As a result, there is not a sufficient bank of data available to validate its modeling or speed projections. As a result, techniques needed to optimize the performance of the LTE systems are still being developed by the operators and the users. While a few large carriers are able to invest in large scale systems, smaller operators have limited options to purchase, test and deploy LTE base station equipment.

There are few, if any LTE user devices such as hand held computers or plug-in adapters available for purchase in the US market. Only after commercial deployments by major operators are completed will concerns about the technical viability of these systems be answered by real world test data and urban end-user experiences. While manufacturers will eventually make equipment available to smaller operators, actual cost of the infrastructure and user devices in a rural setting can only be estimated. Today equipment pricing can only be based on the pricing leverage and economies of scale enjoyed by large operators.

WiMAX base stations and CPE are commercially available, and represent a viable short-term technology choice for some operators. Engineers and planners should be aware that the capabilities of this technology may quickly be overshadowed and possibly rendered obsolete by the predicted wide scale use of LTE

Another significant concern is the lack of available spectrum. The OBI Report accurately notes that "no U.S. service provider currently has more than 2x10MHz of contiguous spectrum in the 700MHz band.", while acknowledging that Verizon Wireless and AT&T have significant spectrum holdings. The high costs and lack of access to spectrum is a major hindrance to rural operators who might otherwise consider the use of 4G wireless technologies. Even if new spectrum is released in the near future, the lag time between release of spectrum and availability of low-cost, mass produced equipment will delay usability of such spectrum for many years to come.

Technology changes or upgrades for wireless systems are often forced upon the provider with the incremental technology developments in data speed, coupled with the consumer's move to the fastest speeds available with each new handset replacement. A responsible engineer will anticipate significant advancements beyond the initial technology.

The FCC's Omnibus Broadband Initiative and the Broadband Assessment Model oversimplify the challenges of deploying a stable, reliable and effective wireless system, and make significant assumptions about the as-yet unproven LTE technology.

<u>Wireline</u>

The "value proposition" for wireline systems is the potential to deliver large amounts of bandwidth to a specific location. Wireline systems include all technologies based on the placement of a physical cable between the operators' central location and the customer's premises. This section focuses on 12 kft DSL and Fiber-To-The-Premises (FTTP). Other technologies such as hybrid-fiber-coax may have comparable capabilities, and may be the best choice for specific operators.

12 kft DSL is described by the OBI as Asynchronous Digital Subscriber Line "2+" (ADSL 2+) deployed with a maximum loop lengths of 12,000 ft. ADSL 2+ technology, based on the International Telecommunications Union (ITU) G.992.5 Standard is mature and widely deployed, although typically with l8,000 ft. or longer loops. To convert a system from an 18 kft design to a 12 kft design, the engineer must re-evaluate the size and location of all copper cables in the serving area, and identify new locations for the remote electronic equipment. In a theoretical wire center with the central office at the center of an 18 kft circle, a minimum of 4

new remote cabinets, each with a reach of 12 kft, would be required to replace the original electronics. Each of these remotes would need a high capacity circuit back to the central office. This high capacity link might be accomplished with bonded copper pairs, but most likely would require the construction of new fiber cable to each remote cabinet. Most exchanges have non-ideal geometries, and the number of new remote cabinets would need to be designed for each existing DSL serving area based on these unique local conditions.

The engineer should carefully consider future bandwidth expansion requirements before deploying a 12 kft DSL system, as a requirement to increase system capacity from 4 Mbps to 6 Mbps or 8 Mbps would require another complete redesign effort, purchase of new remote cabinets, and the construction of additional fiber.

FTTP designs currently encompass two major architecture design concepts: Gigabit Passive Optic Networks (GPON) and Active Optic networks. With GPON system, the optical signal is passively split between many users, usually with a maximum ratio of 64:1. In order to maximize each subscriber's bandwidth, many operators do not exceed a 32:1 split. GPON can deliver speeds of 2.4 Gbps on the downlink and 1.2 Gbps on the uplink to be shared by either 32 or 64 subscribers at distances of at least 12 miles, depending on the splitters used. Next Generation XPON networks are expected to increase the available bandwidth to 280 Mbps per user. Compared to active systems, GPON systems require lower fiber counts, and may require fewer miles of new construction in a particular serving area. With an active solution, each user has a direct fiber connection, which enables a much higher ultimate bandwidth capability than GPON. Speeds in excess of 1 Gbps are possible with active networks today. With careful design, OSP facilities may be flexible enough to accommodate either an active solution or a PON solution, or to be migrated from PON to active in the future. Standard engineering practices will consider the fact that the fiber investment will likely be a 20 to 30 year investment while the electronics are a 5-7 year investment.

The engineer should be mindful that demand for copper cable had decreased, and the costs of manufacturing copper cable have increased. As a result, installation of fiber cable is generally a less expensive option compared to copper cable.

The FCC underestimates or ignores the new construction that will be necessary to convert to or deploy a 12 kft Digital Subscriber Loop solution, and does not consider the short economic life span of this bandwidth limited technology.

Backhaul

For any broadband distribution system, the overall planning and design must include consideration of backhaul, or the "second mile" between the distribution electronics and the central facility. All of the distribution systems described above (12 kft DSL, LTE or WiMAX, FTTH) require a high capacity link in this second mile. The two most common techniques include construction of fiber or microwave links.

Fiber construction for the second mile involves the same techniques, challenges and risks of a FTTP system. Fiber systems can be implemented as "protected" with an appropriate choice of electronics for failover switching. The capacity of a fiber backhaul is usually limited only by the capabilities of the terminal electronics.

Microwave backhaul systems may utilize licensed or unlicensed frequencies, and may or may not be protected. Often a protected terminal includes all of the components of a non-protected terminal, resulting in twice the cost. In congested areas it may be difficult or impossible to obtain licensed spectrum, and the unlicensed spectrum may be affected by interference. More rural areas will have fewer challenges related to spectrum. Microwave antennas may require significant loading capabilities for the tower or support structure, depending on the size and quantity of antennas proposed at a location. Each microwave backhaul link must be individually engineered to ensure that the line of sight is clear and to make sure the system will perform properly in all seasons and all weather conditions. Systems operating on longer links at higher frequencies (18 and 23 GHz and higher) may be significantly affected by weather.

Microwave backhaul is more common with wireless systems as the same tower that is used for the LTE (or WiMAX) antennas might be used for the microwave dish. However, with the backhaul bandwidth requirements required by LTE systems (requiring up to Gigabit bandwidths), fiber backhaul is often the optimal choice. Microwave is less commonly used for FTTP and DSL systems due to the fact that it is more likely that new towers may be required for the microwave antennas.

Interconnections and interoperability with neighboring networks or transiting systems must also be considered when planning network routes and capacity requirements.

The FCC's model does not allow for the multiple real-world challenges of designing efficient and reliable backhaul systems.

<u>Restrictions and Limitation Considerations</u>

As part of the planning and implementation of a broadband system, the engineer must account for "real-world" restrictions and limitation of all types. For wireline systems, these include varying soil conditions, local depth requirements, significant physical or geographic barriers (rivers, railroads, interstates), local planning & zoning restrictions, considerations of planned growth, access to easements or rights of way (or lack thereof), etc.

Good engineering practices include the consideration of alternatives, which may include the use of various routes, techniques or technologies. For example, railroad and interstate crossings tend to be very expensive due to the extra safety precautions and other unique requirements that must be considered. The use of aerial construction along some wireline routes may be a more economical choice compared to buried techniques in areas where buried cables have tight corridors or are expensive to construct. A more expensive choice of utilizing flexible duct as opposed to directly burying a cable may be prudent in congested areas where dig-ins are likely, or where multiple buried utilities are present. Similarly, a longer route may be preferable to a shorter route along busy highways or interstates, to avoid a greater risk to workers and passing drivers both during construction and subsequent maintenance.

Construction costs in rural areas differ greatly and conditions could vary widely within the same serving territory. In some areas, rural construction is relatively inexpensive (cable plow with minimal directional boring). In others, it is expensive (rocky areas requiring rock saw or congested corridors). There is no “ubiquitous” set of rural construction costs that apply to every situation.

During the design of a wireless system, local Planning and Zoning requirements may be imposed, including height restrictions, masking or hiding antennas, landscaping, etc. These types of special accommodations often result in delays and significantly increased costs. Often existing towers are found to be inadequate due to limitation of structure loading, ground space, height, or specific location. The owner of an existing tower is not obligated to lease space, and may withhold permission either for competitive reasons or in an effort to obtain higher rental fees. Terrain conditions and natural and manmade obstructions vary greatly from location to location, often changing significantly over a distance of just a few hundred feet. Two towers in close proximity may yield very different coverage characteristics.

When considering the implementation of a fixed wireless system, the engineer will consider the challenges of using directional antennas for customer locations. These types of antennas are often used where an indoor unit is not capable of receiving a usable signal. Typically a directional antenna will be installed on the outside of a building or on a pole or tower, usually by the service provider. Costs for installing a fixed wireless system at the customer premises are often greater than the cost of the electronics, and may significantly affect the economic viability of a network deployment.

The Broadband Assessment Model proposed by the FCC cannot anticipate and resolve the multiple challenges and complications faced by operators and engineers on a daily basis, let alone track these challenges as they evolve over time.

Example Technology Comparison - FTTP vs. 12K DSL or LTE

Engineers should test assumptions when considering a technology choice. As an example, a 12 kft DSL system may be more expensive than a FTTP design in thinly populated rural areas along roads that radiate away from a population center. With loaded copper plant, the loops may extend out to 20 miles or more. Consider a road, 20 miles in length, leaving a community and generally following the bottom of a river valley. For such a case, the road is not straight but instead follows the twists and turns of the valley. It is common for farms and ranches to be located along the road and in the valley, with a few located in the higher ground on spurs from the main road. To generalize the design parameters, assume that the node electronics for both 12 kft DSL and LTE are spaced 4 miles apart to allow a reach of 2 miles in each direction.

The minimum number of nodes necessary to serve this area is 5, with the first located 2 miles out of town, and the others at 6, 10, 14 and 18 miles respectively. The “second mile” fiber necessary to support all five nodes will require 18 miles of fiber construction. The incremental cost to extend fiber to each home along the roadway is minimal as the fiber drop needs only be extended from the nearest point on the road to the home. Homes located on the higher ground, off “spur” roads will require varying amounts of construction, depending on the exact geography. In a carefully designed system, it may be possible to provide broadband to these “spur” homes with DSL technologies, however there is no known wireless implementation that will economically extend from a backbone to serve one or two homes. Costs to serve these homes are clearly higher than a comparable number of homes located in a densely populated area such as a town.

The cost to serve this same area with a 12 kft DSL design would presumably be lower due to re-use of existing copper drop cables; however the DSL network would have a limited bandwidth expansion capability.

The cost to serve this same area with an LTE design would presumably be lower if the cost of installing fiber drop cables exceeded the cost of installing Fixed Wireless Access CPE equipment. In many real-world examples, towers will not exist at the necessary strategic locations, and even if they did, intervening terrain will likely affect the coverage capability of the towers.

The broad assumptions included in the FCC's Broadband Assessment Module do not allow for local conditions or special considerations which may drive up the cost for all possible solutions.

Engineering Economics

Proper engineering practices require the engineer to ensure that engineering economic principals are considered and reviewed with the finance, operations and marketing resources for any project. Each component of the system will have a different economic life expectancy. Most electronic systems have an economic life of about 7 years. Some highly evolving products, such as personal computers and wireless handsets, have a turn-over of 2-3 years. Other, more stable technologies may reasonably be expected to function for 10 to 13 years, depending on the useful life of the equipment. The assets with the longest economic lives are cable plant and towers, which may be useful for 30 years or longer. It is reasonable to assume a lifespan of over 20 years for fiber and towers. If an economic study is to consider the value of a system over a 20 year period, a good economic model will account for the replacement of electronics at least twice during this period (once every 7 years). Mobile wireless systems have experienced a particularly robust evolution, moving from analog cell phones to "2nd generation" digital in 1996, 2-1/2 G (text messaging and e-mail) in 2000, 3 G (web browsing and picture messaging) in 2005 and 4G in 2009. With roughly four years between generational advances and no end in sight, it is reasonable to anticipate that the emerging 4G LTE systems will be replaced within 7 years.

Ideally the design of broadband systems could be simplified to a pre-defined process, even modeled by a set of standardized equations to identify least cost solutions. Preliminary estimates of a project cost may be based on relatively simple mathematics, as an example. The practicing engineer recognizes that such an approach can only be applied to an accurate, consistent and repeatable data set. During the design process, the engineer will consider the whole set of unique requirements and limitations applicable to a specific service area. As more variables are introduced to a model, the likelihood and magnitude of an error increases dramatically. The National Broadband Plan refers to a highly sophisticated and complex analytical model for estimating construction and operating costs for broadband systems, to be applied across the nation. Application of a generic financial model may result in a project budget that limits the ability of the engineer to implement a system capable of delivering the desired broadband services to the targeted service area. In addition, the application of a generic financial model may result in a more expensive solution because the modeled solution was under-designed and reached the end of its useful life before reaching the end of its economic life.

Environmental Considerations

Rural network constructions must consider the cost and delays associated with special studies required to secure construction permits to address issues with all types of systems. In particular, the National Environmental Protection Act criteria must be addressed. These include a site-specific examination of the potential impact to endangered species, culturally sensitive areas, historic impacts, wetlands, state or federal ownership, tribal or Native American needs, and social impacts of construction activities. As part of the engineering process, the engineer will incorporate the requirements for these entities into the overall project analysis.

Conclusion

The application of good engineering practices result in the best long term use of available capital, provide the operator with the maximum opportunity to accomplish the intended goals, and target the available technologies to the specific needs of the customer base and/or general public. The examples cited in this paper illustrate the difficulty of applying a single set of criteria nationwide, and emphasize the evaluation of local user needs, local restrictions and limitations as well as the alternatives available with the various technology options. The Broadband Assessment Model cannot anticipate or predict the real world deployment challenges faced by engineers and service providers in the provision of broadband services to all the people of the United States. As a whole, the National Broadband Plan underestimates the bandwidth needed in rural areas, and overlooks the realities and complexities of creating sound designs and sustainable, usable broadband systems.

Respectfully Submitted;

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Appendix C

Carrier of Last Resort Responsibilities

Carrier of Last Resort (COLR) Obligations

Federal ETC Requirements

- Voice grade access to the Public Switched Telephone Network (PSTN)
- Local usage
- Dual tone multi-frequency signaling or functional equivalent
- Single party service or functional equivalent
- Access to 911, E-911
- Access to operator services
- Access to IXC services
- Access to directory assistance (DA)
- Toll limitation for low-income consumers

Local COLR obligations fall into five broad categories:

1. Duty to serve. A COLOR must extend retail voice service to any potential customer on request, within its franchisee area, subject only to reasonable conditions, and in accord with reasonable quality standards.
2. Line extensions. A COLR must extend its lines into any unserved newly built areas, subject to reimbursement for costs in some or all cases.
3. Exit barriers. A COLR must continue providing service until granted permission to exit.
4. Other retail benefits. A COLR may be required to provide certain additional economic and service benefits to specified customers and former customers.
5. Carrier-to-carrier duties. A COLR must provide certain interconnection and other wholesale services needed by other carriers.

Various state COLR obligations:

- Access to (a) single party local exchange service, or (b) service that is equivalent, in all substantial respects, to single party local exchange service.
- Access to all interexchange carriers offering service in the customer's local exchange.
- Ability to place calls.
- Ability to receive free unlimited incoming calls.
- Free touch-tone dialing.
- Free unlimited access to 911/E-911.
- Access to local directory assistance (DA).
- Customer choice of flat-rate local service or measured-rate local service.
- Free provision of one directory listing per year.
- Free white pages telephone directory.
- Access to operator service.
- Voice grade connection to the PSTN.
- Free access to 800 or 800-like toll-free services.
- One-time free blocking for information services and one-time billing adjustments for changes incurred inadvertently, mistakenly, or that were unauthorized.
- Access to telephone relay services.
- Toll-free access to customer service for information about state lifeline, service activation, service termination, service repair, and bill inquiries.
- Toll-free access to customer service representatives fluent in the same language (English and non-English).

- Free access to toll-blocking service.
- Free access to toll-control service, but only if (i) the utility is capable of offering toll-control service, and (ii) the customer has no unpaid bill for toll service.
- Access to two residential telephone lines if a low-income household with a disabled person requires both lines to access state lifeline program.
- Free access to state Relay Service via the 711 abbreviated dialing code.
- Each local exchange service provider shall make available to all its customers at affordable prices all essential telecommunications services.
- "Essential telecommunications services" means all the following:
- Single-party voice-grade service with:
    - Line quality capable of facsimile transmission.
    - Line quality capable of data transmission.
    - Dual-tone multi-frequency touch tone and rotary pulse dialing operability.
    - Access to emergency services numbers and 9-1-1 operability where requested by local authorities.
    - Equal access to interlata interexchange carriers subject to Federal Communications Commission orders and rules.
    - Equal access to intralata interexchange carriers pursuant to schedules, terms and conditions imposed by commission orders and rules.
    - Single party revertive calling, if 2 or more pieces of customer premises equipment can be simultaneously active on the line or channel being used by the customer.
    - A reasonably adequate number of calls within a reasonably adequate local calling area as defined by the Commission.
    - Connectivity with all public toll, local, wireline and wireless networks, and with various internet service providers.
    - Telecommunications relay service to facilitate communication between teletypewriter users and non-teletypewriter users.
    - Access to operator service.
    - Access to directory assistance.
    - Toll blocking, 900 and 976 number blocking and extended community calling blocking options.
    - Intercept and announcements for vacant, changed, suspended and disconnected numbers in oral and TTY-readable formats.
    - A directory listing with the option for non-listed and non- published service.

CERTIFICATE OF SERVICE

I hereby certify that a copy of the Associations' Comments was served this 12th day of July, 2010 by electronic filing and e-mail to the persons listed below.

By: /s/ Elizabeth R. Newson
Elizabeth R. Newson

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