ALASKA COMMUNICATIONS

CLOSING THE MIDDLE MILE GAP IN ALASKA

A PROPOSED PLAN OF ACTION FOR ALL OF ALASKA

NOVEMBER 16, 2015

AH 11 1/34

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

1 THE IMPORTANCE OF UNIVERSAL BROADBAND 1

2 ALASKA SUFFERS FROM A MIDDLE MILE GAP 1

TABLE 2.1 ALASKA BUSH OVERVIEW 2

3 THE COST OF CLOSING THE MIDDLE MILE GAP IN ALASKA 5

4 CREATING THE ALASKA MIDDLE MILE ADMINISTRATOR 6

TABLE 4.1 E-RATE AND RHC SUPPORT IN ALASKA & LOCATIONS SUPPORTED 8

5 FUNDING THE ALASKA MIDDLE MILE NETWORK 10

CONCLUSION 14

APPENDIX A: FEDERAL UNIVERSAL SERVICE SUPPORT IN ALASKA 16

APPENDIX B: EXCERPTS FROM THE ALASKA BROADBAND TASK FORCE REPORT 19

EXECUTIVE SUMMARY

The benefits of broadband communication are well known. They include stimulating the local economy and improving opportunities in people's work, school, health, safety, and civic lives. The costs of implementing universal broadband are highest in the very locations that need it the most: remote areas, which lag behind the rest of the nation in many of the same aspects that broadband can most efficiently address.

The challenges of ensuring that remote parts of Alaska have access to advanced telecommunications and affordable broadband services comparable to that which is available to the rest of the nation are well documented. Critically, Alaska needs to close the "middle mile gap." The lack of adequate, affordable broadband transport capability between remote towns and villages in Alaska and any provider's core network is known as the "middle mile gap."[1]

The middle mile gap can be viewed in part as a "rent or build" matter. Today, a number of federal programs are paying too much for inefficient satellite capacity (or comparably priced terrestrial capacity) instead of funding the construction of more efficient and more capable facilities that can supply middle mile capacity at cost-based rates. Current economic "rents," even on recent, publicly-financed facilities, are higher than they should be, reducing the public interest benefits of this taxpayer-funded investment and causing federal support programs to overpay for under-performing broadband. As has been demonstrated in Alaska, public funding without an appropriate administrative framework and continuing regulatory oversight runs the risk of failing to produce *affordable* advanced broadband capability that is reasonably comparable to that available in the state's population centers.

Today, potential broadband service providers in Southwest Alaska are asked to pay over $7,000/Mbps/month for the same terrestrial broadband middle mile service that customers in Anchorage can purchase for between $20-$36/Mbps/month. Thus, building new, efficient terrestrial facilities, while necessary, is not a sufficient condition to chart a path to higher broadband adoption rates and lower universal service costs in the future. To achieve that goal, and to achieve public benefits from any public investment, there must be assurances not only that the services will improve, and capacity will be sufficient for future demand, but also that middle mile services will be neutrally managed, so that they will be available on a nondiscriminatory basis, and priced at cost. Only under those conditions will federal universal service support be

---

[1] "Middle mile" refers to that portion of a network that connects central offices or aggregation points with a core network. Middle mile is distinguished from the "last mile," which provides the link between the central office or aggregation point and end-user homes and businesses. In rural parts of the Lower 48 states, the network is often characterized by long last-mile loops that have been optimized for voice; most of the work on improving broadband is focused on improving the quality of the last mile. As discussed herein, Alaska's challenge is somewhat different. In remote areas, individual villages often are relatively compact, but they are separated from each other, and from the state's population centers in Anchorage, Fairbanks, and Juneau, by great expanses of impassable wilderness that are not connected to the statewide road network, power grid, or terrestrial telecommunications networks.

sufficient to enable the availability of affordable and reasonably comparable voice and broadband services, even in the most remote parts of Alaska.

The federal government has a choice: Continue policies and programs that subsidize the high monthly cost of bandwidth provided over inadequate infrastructure that cannot meet the needs of the broadband age, or support the construction of a comprehensive, modern middle mile network that, properly administered, will reach more communities, deliver more bandwidth, offer more expansion capability, and deliver higher quality services, with greater reliability and redundancy, all at lower prices. A targeted middle mile deployment program can ultimately reduce the need for future federal universal service subsidies, even as it increases broadband adoption and usage in Alaska.

The cost is not insignificant. But it is manageable. Middle mile facilities that enable retail broadband Internet access services meeting FCC speed and performance standards could be deployed in Alaska by redirecting some of the existing federal universal service funding for the state and targeted investment of other already-budgeted universal service funds, with the ultimate goal of reducing the demand for federal universal service disbursements to the state. Based on cost estimates from the Alaska Broadband Task Force, for an estimated investment of $65 million per year over ten years, high-speed middle mile capacity can be extended throughout Alaska to enable unserved communities to have access to robust broadband capability. While $65 million per year is material, all or a substantial portion of that investment could well be funded by re-purposing existing federal universal service support that Alaska already receives. In fact, that sum represents about 20 percent of the annual federal universal service support – which totaled over $300 million in 2014 – that flows to Alaska today.

To achieve the desired results of increased availability of high-quality broadband at affordable retail rates, all Alaska service providers should be able to purchase middle-mile transport at just, reasonable, and nondiscriminatory prices that enable them to deliver broadband Internet access services that are affordable and reasonably comparable – in price and performance – to those available in Anchorage. A neutral administrator is the only way to ensure that publicly-funded middle mile facilities will be constructed, operated and maintained in this manner for the benefit of the public. If the network is constructed, operated and maintained in the public interest as a public resource, by a neutral, statewide administrator, all users can have access to competitive broadband services on reasonable, non-discriminatory terms. Creation of a *public* Alaska middle mile network will lead to expansion of broadband availability throughout the state, improvements in the capacity, quality and reliability of broadband services, lower rates for consumers, and further infrastructure investment.

Both the Universal Service program and Alaska will be better off with the construction of new middle mile facilities, operated for the benefit of all, that will reduce the demand for public support over time. As a national mandate, the challenge of providing universal broadband access to Alaskans can and must be overcome.

1 THE IMPORTANCE OF UNIVERSAL BROADBAND

Broadband today is essential to participation in the economy, especially for Americans in rural and remote locations. The absence of adequate, reliable, affordable broadband affects all aspects of rural life, including health care, education, transportation, energy, employment, public safety, and participation in civic life.

The U.S. Department of Commerce (NTIA) recently released the report of its Broadband Opportunity Council, including findings that broadband today is an essential part of U.S. infrastructure on a par with electricity and water. It also found that broadband often is least accessible in communities that have the *greatest need* for the economic opportunities presented by access to advanced communications services. Typically, such communities are removed from many economic and social resources, and are disproportionately populated by the most vulnerable citizens. Many are on Tribal lands. Nationwide, experts have observed a growing "homework gap" affecting the next generation of citizens and wage earners. Students may have broadband access in school, but without effective access to advanced broadband capability at home they are being left behind their connected peers.

2 ALASKA SUFFERS FROM A MIDDLE MILE GAP

The FCC recognizes that Alaska lags behind the other states in access to broadband. In the Eighth Broadband Progress Report, in 2012, the Federal Communications Commission ("FCC" or "Commission") found that 48.9 percent of rural Alaskans lacked access to basic broadband at 3 Mbps downstream/768 kbps upstream.[2] Even in non-rural areas of Alaska, 19.6 percent of residents lacked broadband access at that speed, more than twice the national average. Earlier this year, the FCC concluded that 25 Mbps/3 Mbps broadband "has become 'table stakes' in 21st century communications,"[3] and found that 81 percent of rural Alaskans – more than four out of

---

[2] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 11-121, Eighth Broadband Progress Report, FCC 12-90, 27 FCC Rcd 10342 (2012), at Appendix C. Data on such service can download from the Internet to the user at three megabytes per second while the user can upload data to the Internet at 768 kilobits per second, roughly one-quarter as fast. By comparison, the FCC requires recipients of its Connect America Fund (CAF) program to provide a minimum of 10 Mbps downstream and 1 Mbps upstream.

[3] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 14-126, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, FCC 15-10, 30 FCC Rcd 1375 (2015), Statement of Chairman Tom Wheeler.

five – lack access to broadband Internet access service at that speed.[4] Similarly, the Alaska Broadband Task Force found that Alaska is one of the worst states in the nation for availability of broadband to residential and small business customers.[5] Where broadband is offered in Alaska, the available speeds are among the slowest in the nation.

A number of factors have played a role, but chief among them has been the sheer difficulty of deploying, operating, maintaining and upgrading telecommunications facilities in the state – particularly critical middle mile infrastructure.[6] Alaska has an extraordinarily large land mass that must be traversed both within the state and between the state and rest of the nation, the dispersion of the population, challenging topography, harsh weather and soil conditions, uniquely short construction season, constraints on the local labor force, absence of a road system connecting more than one hundred communities to each other and the outside world, and limited access to the power grid, all contribute to the problem.[7] These factors increase the cost and risk of deploying, operating and maintaining appropriate telecommunications facilities and providing affordable broadband services in much of Alaska.

Alaska's population of roughly 710,000 includes approximately about 100,000 people (14% of the state's total population) who live in the "Bush" – that is, locations that are not on a road system connecting them to other population centers such as Anchorage, Fairbanks or Juneau. A *majority* of Alaska's nearly 300 communities are in the Bush – 188 in total.[8]

Table 2.1 Alaska Bush Overview

	Number of Communities	Percentage of Communities	Population (2010 Census)	Percentage of Population	Households (2010 Census)	Percentage of Households
Bush	188	65%	96,588	14%	31,055	12%
Non-Bush	103	35%	613,643	86%	220,884	88%
Total	291	100%	710,231	100%	251,899	100%

[4] *Id.* at Appendix D.

[5] Statewide Broadband Task Force, "A Blueprint for Alaska's Broadband Future" (Oct. 24, 2014), at 5 ("Broadband Task Force Report"), available at: http://www.alaska.edu/oit/bbtaskforce/docs/Statewide-Broadband-Task-Force-Report-FINAL.pdf.

[6] See footnote 1 for a description of "middle mile."

[7] More than half of ACS's wire centers are dedicated to serving some 49 Bush communities that are off the road system and disconnected from statewide electrical power networks. Even where ACS has fiber facilities, the distance from the local (rural) serving wire center to the nearest aggregation point is often hundreds of miles, vastly different from typical inter-office transport in the contiguous 48 states, and a significant cost factor for Alaska carriers. Further, without an Internet access point in the state, Internet traffic must be hauled to Seattle or Portland, a more complicated arrangement and much farther distance than for those connecting in the lower 48 states.

[8] A map showing these remote communities is included in **Appendix B.**

These communities are scattered across the state (a land mass roughly equal to one-quarter of all the contiguous United States), isolated by some of the harshest conditions on the planet. The Bush communities vary in size from fewer than 20 inhabitants to several thousand, meaning that the per-unit cost to provide modern telecommunications networks is extremely high.

Quite simply, no other state in the nation faces the problem of connecting so many locations separated by such great vacant distances and physical barriers. As the Commission has already recognized, "it is important to ensure our approach is flexible enough to take into account the unique conditions in places like Alaska . . . , such as its remoteness, lack of roads, challenges and costs associated with transporting fuel, lack of scalability per community, satellite and backhaul availability, extreme weather conditions, challenging topography, and short construction season."[9]

Moreover, because there is no Internet access point ("IAP") within the state of Alaska, all Internet traffic must be aggregated in Anchorage or Juneau and then travel more than a thousand miles via submarine cable to the nearest IAP in either Portland, Oregon or Seattle, Washington, adding to the overall cost and complexity of providing advanced telecommunications capability in the state.

Because of the great difficulty connecting Alaska's remote communities to each other and to the nearest fiber-based telecommunications facilities in the state's larger population centers (Anchorage, Fairbanks, and Juneau), most remote communities are served only by out-of-date technology – either limited capability point-to-point microwave or satellite-based radio connections, with each leg of such transport covering hundreds or thousands of miles, most of which is not powered by the electrical grid but rather by local, high-cost diesel generators.

Network upkeep typically requires flying a technician to an island location or remote village site without road access, paying the technician for two to three days, depending on weather conditions, incurring higher fuel costs to access the site, and hauling equipment in and out with the technician on each site visit. Fuel must be flown in, by helicopter, to many remote locations to operate generators needed to power telecommunications equipment.

The unique qualities of the state have caused a middle mile gap to develop. Anchorage and Fairbanks are located on a large fiber middle mile ring that also connects other population centers in Alaska, such as Glennallen, Valdez, Seward, Kenai, Soldotna, Homer, and Kodiak. Juneau is connected via undersea fiber optic cable. However, for the Bush and other remote Alaskan communities, middle mile connectivity is almost always restricted to high-cost, high-latency, limited-capacity satellite transport, or outmoded terrestrial, point-to-point microwave links. Without a road system connecting these remote communities, and without access to the

---

[9] *Connect America Fund*, WC Docket No. 10-90, Report and Order and Further Notice of Proposed Rulemaking, FCC 11-161, 26 FCC Rcd 17663 (2011) ("*Transformation Order*"), at ¶ 508.

power grid, the economics of middle mile deployment are extremely challenging.[10] Today, most of these communities simply do not have access to the high-capacity facilities necessary to support advanced broadband capability at the minimum standard accepted by the FCC, let alone the scalability to meet future demand.[11]

Satellite service providers have not been able to deliver 10 Mbps/1 Mbps broadband (the minimum standard required when federal Connect America Fund ("CAF") Phase II universal service funding is received pursuant to the Commission's statewide offer of support to price cap carriers) to residential users, much less the 100 Mbps or 1 Gbps service demanded by many institutional and enterprise customers. Moreover, satellite service is plagued by high levels of latency making it poorly suited to sophisticated, real-time interactive applications. Terrestrial point-to-point microwave service provides an effective middle-mile solution in some locations where fiber deployment is impractical. However today's microwave technology has limited capacity compared to a fiber network, and a higher operating cost per unit of bandwidth. Typically, microwave is sufficient only to connect smaller villages to a regional hub where a fiber connection is available.[12]

In 2013, the Alaska Broadband Task Force examined the broadband infrastructure needs of Alaska, and recommended prioritizing deployment of middle mile facilities in order to improve current broadband service levels. The Alaska Broadband Task Force indicated that **over 5,000 miles of new fiber routes would be required to complete a comprehensive middle mile network that could effectively enable statewide broadband deployment**. The report acknowledged that middle mile capacity must be in place before last mile connectivity can be achieved.[13]

---

[10] The FCC's modeling has assumed that deploying fiber over routes not connected by road would require 1.2 times the distance in airline miles; however, there is no factual basis to support this assumption in Alaska, where the lack of a road may often signal the presence of impassable natural barriers. In fact, often the most efficient route between communities not on the road system requires the deployment of undersea cable facilities with their landing stations and related infrastructure.

[11] Quintillion Subsea Operations, LLC ("Quintillion") has commendable plans to be the exception to the rule by bringing modern connectivity to six remote Alaskan communities by way of a submarine fiber optic cable currently under construction. Quintillion's plan is to construct a submarine fiber optic network linking cities in Asia and Europe via the Arctic Ocean, traversing the coast of Alaska along the way. In connection with that larger plan, Quintillion has the ability to build a business case for incremental private investment that is unique and limited to a few coastal locations in Alaska.

[12] A recent FCC technical paper concluded that, once transport requirements reach 155 Mbps, fiber-based middle mile is the only effective solution. *The Broadband Availability Gap*, OBI Technical Paper, Federal Communications Commission, April 2010, page 115.

[13] FCC high-cost programs have principally supported last mile (loop) rather than middle mile costs. However, in many communities in Alaska, particularly in the Bush, it is the cost of deploying advanced, high-capacity middle mile facilities that is the limiting factor. See

In short, Alaska presents truly unique challenges for broadband availability. The lack of fiber-based *middle mile* transport capacity is a critical shortcoming in Alaska, causing the state to fall behind the other states in access to broadband capability. Alaska needs a comprehensive middle mile solution based on scalable, affordable fiber deployment throughout the state. Today, Alaska's middle mile gap is of greater consequence than ever because of the ever-increasing demand for high-capacity, high-speed, low-latency connectivity throughout the state. The longer it takes to identify and implement an Alaska middle mile solution, the farther behind the state will fall. The uniquely high cost of deploying terrestrial middle mile infrastructure capable of delivering high-speed broadband services to Alaska's remote populations has left Alaska without the modern facilities that have proved commercially viable in the rest of the nation.

3 THE COST OF CLOSING THE MIDDLE MILE GAP IN ALASKA

The FCC has concluded that deployment of fiber-based middle mile facilities is preferable to other technologies in most locations. The Alaska Broadband Task Force similarly concluded that the most efficient way to solve Alaska's middle mile challenges is a combination of fiber and high-capacity microwave facilities, with satellite serving as a short-term, interim solution in certain areas. According to the Task Force's report: "When there were fewer than 300 users on the entire proposed network, microwave was the most viable economic option. But when there were greater than 300 users, fiber optic cable became a viable option to support a larger number of users."[14]

In 2012, the University of Alaska, Fairbanks, modeled a Scenarios Network for Alaska and Arctic Planning ("SNAP") middle mile network that would bring high-speed broadband connectivity to Alaska's currently unserved communities. The Alaska Broadband Task Force estimated that the cost of building out the necessary middle mile facilities throughout Alaska according to the SNAP architecture could be completed for approximately $640 million ($610 million for new construction of fiber and microwave facilities, and $30 million to upgrade existing microwave systems).[15]

Using these projected costs, the total investment required to complete the middle mile infrastructure necessary to deliver universal broadband is roughly $65 million per year for ten years. This would enable the construction of a robust, scalable, predominantly fiber-based middle mile infrastructure with sufficient capacity for competing providers to serve the present and projected needs of most Alaskan residents, institutions and businesses.

In addition, if the capital costs of middle mile infrastructure were covered by public funding that can be treated as a contribution to capital for accounting purposes, then the network owner would

---

Appendix A for an expanded discussion of the impact federal universal service programs have had in Alaska.

[14] Broadband Task Force Report at 27.

[15] *Id.* at 33. This paper is focused on the middle mile, rather than last mile, precisely because middle mile is the foundation on which last mile must be built to enable broadband connectivity at homes and businesses.

not need to recover depreciation expenses or return on investment. ACS estimates (based on calculations done by the FCC and its Connect America Cost Model ("CAM")) that, in such a case, annual operating costs would require an additional amount of roughly 13 percent of the cumulative plant-in-service, partially offset by an anticipated increase in revenue from customers. The end result, after ten years, is that affordable broadband could be made available across the state *at reduced levels of continuing support*.

The Alaska Middle Mile Network, if managed correctly, should achieve the FCC's dual goals of significantly enhancing broadband availability in unserved areas while reducing the overall level of universal service support flowing to Alaska. At an estimated continuing support level of roughly $40-$60 million per year, the Alaska Middle Mile Network should enable competing retail providers to deliver data services and prices to remote communities that are affordable and reasonably comparable to those available in Anchorage. Moreover, as more middle mile facilities become available, revenues will grow to an increasing percentage of the ongoing operating cost, and after the construction is complete, revenues may continue to grow while ongoing operating and maintenance costs should remain stable.

With cost-based middle mile transport rates, prices charged to end-user customers would be significantly lower than they are today, reducing the gap between rural and urban services and rates. This will not only enhance service levels and increase consumption of broadband in remote areas of Alaska, it will also reduce the demand for ongoing subsidy support through the FCC's Rural Health Care and E-Rate programs. Further, the Alaska Middle Mile Network would enable residential broadband options meeting the FCC's CAF Phase II minimum speed standard of 10 Mbps/1 Mbps at prices reasonably comparable to those available in Anchorage, as measured by the Commission's rate comparability benchmarks.

Admittedly, some support in addition to that what Alaska receives today will be needed during the deployment phase, to ensure that last-mile broadband is available to unserved homes, schools, and businesses at affordable rates. But, as discussed below, those amounts can be found among already-budgeted resources, and the net result will be much more advanced service, at lower cost, than what is available today. In the long term, the benefits will outweigh the cost.

4 CREATING THE ALASKA MIDDLE MILE ADMINISTRATOR

The deployment of middle mile infrastructure, while necessary, is not sufficient to achieve the desired goals of enhanced broadband for all. To be successful, middle mile capacity must enable broadband Internet access service for all Alaskans at affordable rates. One very costly way to accomplish this would be to contrive a complex mechanism to subsidize multiple carriers, paying for the construction of duplicate facilities,[16] or subsidize a single, monopoly service provider;

[16] An example of this is the FCC's experience with the so-called identical support rule. In eliminating its identical support rule the Commission concluded that the rule did not provide appropriate levels of support for the efficient deployment of mobile services in areas that did not support a private business case for mobile voice and broadband. Instead, it led the construction of multiple overlapping networks in areas where private investment had already incurred. *Transformation Order*, at ¶ 502.

regulation would be needed, however, to ensure that subsidized entities offer non-discriminatory access and provide affordable, reliable and high-quality services to end-users.

A more efficient solution would be to fund the construction of a single, public middle mile network, neutrally administered for the benefit of all. In order to do so, the FCC should authorize a neutral administrator of the Alaska Middle Mile Network that would be owned, operated, and maintained either by an agency of the state of Alaska or a non-profit entity chartered for the purpose of constructing, owning, operating and maintaining affordable middle mile capability. It should make middle mile capacity available to all service providers in the state on equitable and non-discriminatory terms, so competitive and affordable broadband services can be made available throughout Alaska. It should own and operate the network, maintain and upgrade it, and generally operate for the benefit of the public. Wholesale services would be subject to the oversight of the FCC under Title II of the Communications Act, as well as the Regulatory Commission of Alaska (the "RCA"). The administrator would be prohibited from participating (directly or indirectly) as a competitor in downstream retail markets.

Such an approach would be consistent with the Commission's recent determinations to "eliminate duplicative support"[17] by providing support to "at most one provider in any given area."[18] By providing support to such a single, neutral, publicly-owned or non-profit network administrator, the Commission will combine the efficiency of its "one network" support policy with the benefits of competition among retail broadband Internet access service providers that all have affordable and nondiscriminatory access to the essential middle mile capacity input that underlies their respective retail offerings.

In order to ensure efficient use of Alaska Middle Mile Fund resources, the FCC should require the administrator to seek competitive proposals for the design and construction of middle mile facilities. Within ten years, the network should be capable of bridging the middle mile gap to all Alaska communities that are not served and will not become served as a result of the FCC's CAF Phase II programs.[19] The fiber-based network (or a combination of fiber and high-capacity microwave) should be designed to enable scalable last-mile connections that can deliver high-speed, low latency broadband Internet access services meeting the Commission's CAF Phase II standards.

Once the network is completed, further support from the Alaska Middle Mile Fund should be limited to covering the costs of operating, maintaining, repairing and upgrading the network, as required to meet future demand and FCC-mandated performance criteria, less amounts received from wholesale middle mile customers.

---

[17] *Id.* at ¶ 507.

[18] *Applications of GCI Communication Corp., ACS Wireless License Sub, Inc., ACS of Anchorage License Sub, Inc., and Unicom, Inc. For Consent To Assign Licenses to The Alaska Wireless Network, LLC*, WT Docket No. 12-187 WC Docket No. 09-197, Memorandum Opinion and Order and Declaratory Ruling, FCC 13-96, 28 FCC Rcd 10433 (2013), at ¶130.

[19] The FCC has established CAF to fund the deployment of last mile in an effort to further the deployment of last mile facilities.

Further, the FCC should require capacity on any network that has been constructed with an up-front public grant or loan to be priced at no more than a set premium above the highest corresponding tariff or commercially available urban (Anchorage) rate, as a condition of receiving any type of federal universal service support for services that utilize such capacity. The premium would be set by developing cost-based rates using actual construction costs net of any grants or other contributed capital received by the owner, and comparing them to contemporary urban rates for like services. To ensure that universal service support is efficiently distributed, this condition should be extended to all services making use of up-front federal support for Alaska middle mile facilities.

Alaska has extensive experience with cooperative sourcing to efficiently meet basic infrastructure needs that is directly applicable to this proposal. For example, the Alaska Railroad Corporation has been owned by the state of Alaska since 1985, and is operated for the benefit of the public. According to the corporation, though it was created with public funds, today it is self-sustaining, its services supported by freight and passenger transport fees and real estate owned by the corporation.

The Alaska Energy Authority ("AEA") assumed responsibility for the Bradley Lake Hydropower generation project, which began commercial operation in 1991. Six power companies entered into an agreement with the AEA to collectively purchase 100% of the power generated at Bradley Lake at the lowest unit cost of energy in Alaska. AEA ownership of the project ensures the rural "Railbelt" area a stable local source of low-cost power while helping the local economy.

Absent a neutral middle mile administrator, regulation will be necessary to prevent the abuse of monopoly power where public funding is provided up-front for the deployment of facilities for which no competitive alternative exists. Failure to address the need to have publicly-financed infrastructure accessible and affordable to all will result in a failure of the program. This is precisely what occurred with a large public investment in middle mile infrastructure in southwest Alaska. An investment of $88 million in federal grants and low-cost loans through the Broadband Initiative Program failed to lower the cost of service, has failed to yield services and rates comparable to what is available in urban areas, failed to reduce the demand for federal universal service subsidies in the relevant area, and failed to result in the delivery of broadband meeting current Commission standards to many of the intended beneficiaries. In that part of the state, the substantial influx of federal funds was premised on the replacement of inefficient satellite capacity with modern, high-speed fiber and microwave technology. Yet, as shown in Table 4.1, this region now draws the largest portion of E-rate and rural health care funding in the state, and has not experienced any reduction in either rates or subsidies following that significant public investment.

Table 4.1 E-Rate and RHC Support In Alaska & Locations Supported

	E-Rate Program	RHC Program

Total support to Alaska (2014)	$63,933,089	$59,990,960
Total locations supported by federal program	458	349
Support to SW Alaska communities	$39,415,396	$28,982,908
Locations supported in SW AK communities	79	71
Portion of total support to SW AK communities	62%	48%
Portion of locations in SW AK communities	17%	20%

In southwest Alaska, prices for broadband capacity have remained high. Middle mile transport on the network is sold to wholesale customers (if capacity is available at all) at rates exceeding current satellite prices, and are 200+ times the prevailing Anchorage rates. Even so, end-users do not necessarily have access to broadband capacity at rates and speeds comparable to customers in urban areas.

ACS's services and customers also have been impacted by the flawed implementation of this public investment. ACS is the local exchange carrier in several remote communities that are on the route of that publicly financed middle mile project. Unfortunately, the funds were not administrated by a public agency or non-profit entity but rather were distributed to a single, unregulated company that competes with ACS and other LECs for retail customers. To the extent that company makes available to competing service providers any capacity on this subsidized network, it does so at rates that are many multiples of the revenue that could be generated by a service provider such as ACS. As a result, Internet capacity in these locations continues to be unavailable to unaffiliated telecommunications providers at affordable rates. Despite the significant public investment in this area, ACS's customers continue to be denied broadband service in this area.

Thus, it is not clear how this particular federal subsidy achieved federal objectives. ACS proposes a different approach for Alaska middle mile, one that would lead to improved service, greater retail competition, *and* reduced reliance on federal subsidies over time. The creation of a competitively neutral middle mile administrator is at the heart of this proposal.

5 FUNDING THE ALASKA MIDDLE MILE NETWORK

The Alaska Middle Mile Network will require support that is sufficient to ensure robust broadband capability can be made available to all customers at affordable rates. The required funding for the Alaska Middle Mile Network should be generated in significant part, if not entirely, by repurposing federal universal service support already flowing to the state.

Alaska received a total of approximately $319 million in universal service funds in 2014. (As shown in Table 4.1, above, a material portion supports services that incorporate excessively priced middle mile capacity offered by a single monopoly provider.)

ACS proposes reforms that would redirect a portion of the support that Alaska receives from some of the FCC's existing universal service mechanisms to the proposed Alaska Middle Mile Network. An example of how more than $100 million in annual funding may be redirected from existing programs to the middle mile network is shown on the following table:

Table 5.1 Illustrative Distribution of Federal Support in Alaska (In Millions)

Support Distributed In Alaska	High-Cost	Low-Income	RHC	E-Rate	Mobility Fund II	RAF
Actual (2014)	$182	$13	$60	$64	n/a	n/a
With Proposed Changes	$157	$13	$40	$42	$25	$25
Difference Available for AK Middle Mile Fund	$25	n/a	$20	$22	$25	$25

The amounts shown in the table are derived as follows:

High Cost Support. Of the $182 million in support flowing to Alaska ETCs[20] from the federal high cost support mechanisms, CETCs in Alaska received $105 million in high-cost support in 2014 (with $67 million going to a single carrier) under the now discredited "identical support" rule. In the 2011 *Transformation Order*, the Commission created a process for phasing down and ultimately eliminating support flowing to CETCs under this rule, but delayed the start of this transition for CETCs serving "remote areas of Alaska," which include those outside the population centers of Anchorage, Fairbanks and Juneau.[21] At the start of the transition, on July 1, 2012, baseline CETC support flowing to CETCs serving the "non-remote" areas around

[20] An Eligible Telecommunications Carrier ("ETC") is a telecommunications carrier eligible to receive universal service funding. Most competitive ETCs are wireless providers, but cable operators and other local exchange carriers also may be CETCs.

[21] *Transformation Order* at ¶ 529.

Anchorage, Fairbanks, and Juneau totaled approximately $45 million.[22] Today, part way through the transition, the total is still more than $27 million.[23] Against this backdrop, as CETC support is phased out, ACS believes that it would be reasonable for the Commission to redirect at least $25 million that was previously received by CETCs serving these "non-remote" areas of the state to an Alaska Middle Mile Fund.

Rural Health Care Support and E-Rate Support.[24] ACS proposes that the rural rate or pre-discount price used to determine support under the rural health care support mechanism for publicly-funded middle mile facilities be limited to no more than a set premium over the urban rate. The premium would be set by developing cost-based rates using actual construction and operating costs, net of any grants or other contributed capital received, and comparing them to contemporary urban rates for like services.

ACS proposes that E-Rate support for rural schools and libraries would be limited in an analogous manner to that for rural health care providers, *i.e.,* that E-Rate support for services to schools and libraries would be limited to a premium over rates for similar services available in Anchorage that is based on the actual differences in the cost of service, net of any grants or other capital contributions received.

---

[22] Universal Service Administrative Company, *Federal Universal Service Support Mechanisms Fund Size Projections for Third Quarter 2012* (Apr. 26, 2012), Appendix HC01 (Lines 78-82, showing non-remote CETC support of $9,116,964 for the third quarter of 2012, a total that reflects the initial 20 percent reduction at the start of the phase-down; annualizing this figure and reversing the 20 percent reduction shows a total baseline amount of roughly $45.6 million), available at: http://www.usac.org/about/tools/fcc/filings/2012/Q3/HC01-%20High%20Cost%20Support%20Projected%20by%20State%20by%20Study%20Area%20-%203Q2012.xls.

[23] *See Connect America Fund,* WC Docket No. 10-90, Letter from Christine O'Connor, Executive Director, Alaska Telephone Association, to Marlene H. Dortch, Secretary, FCC (filed Oct. 29, 2015), at "Alaska Plan Universal Service Support Schedule, " Schedule 3 (showing 2014 Non-Remote CETC Support of $27,350,796).

[24] ACS applauds the FCC for its recently announced E-rate infrastructure expansion program that may contribute to the solution. Nevertheless, this program is bound by national requirements that are challenging to satisfy in Alaska, it is of limited scope, and its duration is uncertain. Because it is predicated on individual schools, school districts or libraries, or regional consortia requesting support to particular locations, it does not have the statewide perspective that is required to assure a comprehensive, statewide middle mile network that can close the broadband gap for all remote communities. Moreover, the Commission's rules do not require the owners of facilities deployed pursuant to the E-rate infrastructure program requirements (or incremental capacity built alongside the E-rate funded infrastructure) to offer other service providers affordable, open, or nondiscriminatory access to middle mile capacity on the resulting networks. Thus, there is a significant risk that these investments will replicate and exacerbate the problems being experienced in southwest Alaska, hinder the FCC's ability to ensure affordability or reasonable comparability of broadband services and rates, and foreclose competition.

With respect to the rural health care telecommunications support mechanism, current FCC rules do not cap the reimbursable rate based on the lowest rate available elsewhere in the state. Some carriers providing supported services to schools, libraries and rural health care providers include in their pre-discount prices an amount for middle mile transport equal to or greater than a commercial rate they offer for comparable services over satellite facilities. This has resulted in rural health care support for rates in Bethel, for example, of $7,500/Mbps per month when the rate for the same capacity in Anchorage is $20 - $36/Mbps per month or less.[25] Thus, under current E-Rate and rural health care support rules, of the $124 million in annual E-Rate and RHC support provided to 807 Alaska locations in 2014, over half – more than $68 million – went to 150 locations on the TERRA-SW network alone. (*See* Table 4.1.)

Under ACS's proposal, if middle mile construction data indicate that the actual net cost to build and operate similar facilities generated an average multiple of not 200+ times the urban rate but only, say, 50 times that rate, a reduction in the multiple of 75% would lead to a corresponding 75% reduction of the $68 million per year from these programs currently supporting southwest Alaska locations to $17 million per year. *This single reform would more than cover the $44 million that would be redirected to the middle mile project from the E-Rate and RHC programs in the example above.*[26]

At a minimum, ACS estimates that these changes could enable the Commission to redirect more than $40 million in support from the rural health care and E-Rate support mechanisms to the Alaska Middle Mile Network. Because service providers would still be permitted to charge compensatory (just not exorbitant) rates, ACS believes there would be no loss of service to schools, libraries, or rural health care providers around the state as a result of these changes. On the contrary, if the resulting middle mile network is neutrally managed and open to all providers under reasonable and nondiscriminatory rates, terms and conditions, the availability of that network would increase competition, improve services, and help ensure affordable rates for anchor institutions and residents alike. Far from diminishing services to current customers such as rural health care facilities, schools and libraries, re-purposing support to invest in middle mile infrastructure available to all providers would lead to *more* competitors in the market, competing on equal footing, for services supported by the rural health care and E-Rate mechanisms.

---

[25] FCC rules do not require that such bids be cost-justified nor compared to rates elsewhere in the state. Furthermore, while FCC rules cap RHC support for satellite-based services based on the rate for a terrestrial alternative, if available, the converse is not true, 47 C.F.R. §§ 54.609(d)(1) and (d)(3). Terrestrial services are eligible for support without regard for cost, even if a similar satellite service would be cheaper.

[26] Posted Rates for TERRA SW show the monthly rate of a 50 Mbps Ethernet circuit to be $372,400 under a three-year contract. GCI's Anchorage Tariff indicates the rate for a 50 Mbps Metro Ethernet circuit under a three-year contract to be $1,800 per month, and ACS believes that such service is available under commercial contracts for even less. The TERRA-SW rate is therefore over 200 times the Anchorage rate. ACS believes that the actual cost of a 50 Mbps microwave/fiber circuit from any community served by TERRA-SW to Anchorage, after accounting for the $44 million BIP grant award received to construct TERRA-SW, should be lower, roughly 5 to 20 percent of the current TERRA-SW posted rates.

ACS does not propose that any existing contract would be abrogated or any service provided thereunder would be terminated. Savings will be realized over time, for example, as contracts supported by E-Rate and the rural health care support mechanisms are re-bid at more reasonable levels. ACS believes that these changes can yield substantial support for the Alaska Middle Mile Network without any material impact on the services available to end-users, including the institutions that currently rely on E-Rate and rural health care support. Indeed, the lower price and higher performance levels of the Alaska Middle Mile Network over current facilities likely will drive up demand for the new facilities, further increasing the efficiency of the program.

Mobility Fund II. The FCC initially budgeted up to $500 million annually for a new Mobility Fund Phase II, to support deployment of mobile broadband technologies.[27] In 2014, the Commission recognized that the support was more urgently needed for "preserving and extending service in those areas that will not be served by the market without governmental support."[28] Adequate and affordable middle mile capability is an essential component of mobile service, without which even the most advanced wireless network will fail to meet speed, capacity and latency requirements. Whether delivered via a mobile or fixed last mile platform, wireless broadband services in Alaska requires substantial investment in terrestrial middle mile infrastructure. To avoid outdated middle mile from becoming a bottleneck to advanced mobile services, the Commission should target at least five percent of the funds reserved from Mobility Fund Phase II ($25 million) to address Alaska's middle mile gap.

Remote Areas Fund Support. Similarly, the FCC has proposed to devote at least $100 million annually to a Remote Areas Fund ("RAF"), targeted at enabling broadband deployment in census blocks that are above the "very high cost" threshold for CAF Phase II support, and not otherwise served via the Phase II competitive bidding process.[29] Given that Alaska contains a disproportionately large number of such census blocks, a portion of these funds is likely to flow to Alaska. Indeed, the Commission has already sought comment on the proposal of the Alaska Rural Coalition to devote at least $25 million of the RAF budget to middle mile infrastructure investments in Alaska, which Alaska Communications fully supports.

In the aggregate, these three sources of funding – CETC, Mobility and RAF – could generate $75 million annually for the Alaska Middle Mile Fund. In addition, savings to the RHC and E-Rate programs would be generated each and every year if the FCC adopts a cap on service prices for publicly financed middle mile facilities. ACS estimates that, over time, the amount of support required for RHC and E-Rate contracts could be reduced by one-third without any reduction in services. ACS expects that the savings would likely be *even greater* – perhaps in the range of $30 to $70 million per year or more – farther along in the program, as the availability of this new affordable middle mile capacity drives down the cost of E-Rate and RHC contracts.

---

27 *Transformation Order* at ¶ 519.

28 *Connect America Fund, et al.*, WC Docket No. 10-90, *et al.*, Report and Order, Declaratory Ruling, Order, Memorandum Opinion and Order, Seventh Order on Reconsideration, and Further Notice of Proposed Rulemaking, FCC 14-54, 29 FCC Rcd 7051 (2015), at ¶ 239 ("*CAF Omnibus Order*").

29 *Transformation Order* at ¶ 534; *CAF Omnibus Order* at ¶ 30.

With modest reforms, such as those described above, to each of these support mechanisms, the FCC can improve their efficiency and use support already flowing to Alaska to help close the middle mile gap without significantly impacting other supported services. Support for the Alaska Middle Mile Network can be funded entirely by repurposing amounts flowing into the state from existing funds, and implementing efficient pricing policies, plus targeting modest amounts of support from the as-yet unallocated RAF and Mobility Fund II programs.

As indicated in Section 3, ACS proposes that the neutral Alaska Middle Mile Network administrator be permitted to recoup a portion of its costs by charging Alaska ETCs for access to the network. Charges for federally subsidized middle mile infrastructure should be regulated to ensure they are just, reasonable and non-discriminatory, and to ensure that the provider can (with the assistance of federal high-cost support) recoup its capital and operating costs and sustain robust broadband service over time.[30] Because the network would be publicly supported, with up-front funding being provided for construction, effectively shifting the risk of construction from the service provider to the public, then capacity on that network should be priced at a reasonable, cost-based premium above commercially available urban (Anchorage) rates that enables affordable and reasonably comparable retail broadband services. Appropriate oversight will minimize the burden on the universal service program.

The Universal Service Administrative Company ("USAC") should distribute the funds to the administrator and periodically audit the Alaska Middle Mile Network to ensure that support is being used for the purpose for which it is intended.

CONCLUSION

It is clear that Alaska broadband middle mile service will not be affordable without public support. The single largest project to date in Alaska has been viable only with considerable federal support, and rates to many customers still are not affordable because capacity is limited and the operator extracts monopoly rents.

However, it is equally clear that the social benefits accruing from such capability more than justify the public support needed to create and sustain such a network. Because the network must be built with public funding its makes sense that it should be owned and operated by a competitively neutral entity, for the benefit of the public. Both the federal universal service program and Alaska will benefit if adequate support is redirected to new middle mile facilities, and if such facilities are owned and operated by a neutral administrator for the benefit of the public.

---

[30] In the same vein, where any other provider of middle mile transport has received any form federal support including grants, low interest loans, or any form of universal service support that was used to finance or justify the construction of its middle mile facilities, FCC oversight should limit providers offering transport services on those facilities to other telecommunications providers to a set premium over the highest tariff or publicly available urban (Anchorage) rate. This will eliminate the need for other providers to recreate expensive middle mile infrastructure in areas where, with public assistance, it already exists.

The FCC is obligated to fulfill the Communications Act's mandate that *all* Americans have access to reasonably comparable, and affordable, high-quality services, including broadband. Adopting the reforms proposed herein will put the FCC on track for achieving that mandate in Alaska within ten years.

APPENDIX A

FEDERAL UNIVERSAL SERVICE SUPPORT IN ALASKA

The federal Communications Act of 1934, as amended, requires that all Americans, including those in rural and high-cost areas, have access to reasonably comparable and affordable telecommunications services. Historically, this was achieved in large part through internal subsidies in monopoly-provided services. In Alaska, the vast middle mile (interexchange) distances were covered through a combination of external and internal subsidies. Following the introduction of competition in the U.S. telecommunications market, federal policy attempted to make such subsidies explicit, to drive all services to their most efficient pricing, and to rely to the greatest extent possible on market forces to drive investment and innovation. Subsidies were targeted to specific purposes (such as helping make service affordable to low-income customers) and specific parts of the network (such as high-cost loop support).

Beginning in 1996, through USAC, the FCC administered four explicit universal service support programs: (1) high-cost support; (2) low-income support; (3) funding for connections to schools and libraries ("E-Rate"); and (4) funding for connections to rural health care facilities ("RHC"). High-cost support has been provided to local exchange carriers serving rural and high-cost areas primarily to support the last mile (also called the local loop or common line). Low-income support (also known as Lifeline service) is a program that subsidizes the cost of basic monthly local exchange telephone service for low-income individuals. E-Rate funds telecommunications services and related facilities for schools and libraries. The RHC program funds services for hospitals and health clinics in rural areas. *Under current FCC support policies, there is no program that directly addresses Alaska's middle mile problem.*

With the introduction of the "same support" policy, competitive eligible telecommunications carriers ("CETCs") had a strong incentive to cherry-pick high-cost areas within supported study areas. CETCs do not have the same obligations as incumbents to serve 100 percent of any area, nor to offer the same service quality, reliability and affordability mandated as the incumbent.

Support flowing to both incumbent LECs and CETCs alike is intended primarily to offset the costs of the "last mile" or customer connection – no support has been designated for middle mile *per se*. While last mile is traditionally viewed as the portion of the network most in need of support, as last mile costs are spread over a much smaller demand when compared to middle mile, this often is not the case in Alaska. Particularly in the Bush, middle mile costs can far exceed last mile costs. Because the middle mile gap is unique to Alaska, the solution must be tailor-made for Alaska.

In 2011 the FCC froze legacy high-cost support for the vast majority of lines in the nation, including ACS's operations, and replaced it with the CAF. Under CAF Phase I, high-cost support was frozen at 2011 levels and must be used for broadband rather than voice service. Under CAF Phase II, the FCC has proposed to extend ACS's frozen support and impose additional broadband build-out obligations to unserved end-user locations. No support is proposed to help fund middle mile infrastructure to remote Alaska communities.
The Remote Areas Fund ("RAF") is intended to fund broadband service in extremely high-cost areas not supported by CAF Phase II. Unfortunately, this program is capped at $100 million per

year for broadband deployment to unserved, very high cost areas nationwide. The Alaska share of the RAF would be insufficient even if entirely devoted to middle mile.

The FCC also created a Mobility Fund designed to provide a one-time infusion of support to make available to all areas of the nation a minimum level of mobile telecommunications services without increasing the overall size of the universal service fund. For the Mobility Fund Phase I the FCC allotted $300 million for deployment of 3G or better mobile telecommunications service in unserved areas. The FCC initially budgeted up to $500 million annually for a Phase II Mobility Fund to support deployment of mobile broadband technologies. However, in 2014 the Commission recognized that the support was more urgently needed for preserving and extending broadband service in those areas that the market would not serve at all without governmental support. Adequate and affordable middle mile service is an essential component of mobile service. The Commission therefore should target at least five percent of the funds reserved from Mobility Fund Phase II ($25 million) to address Alaska's middle mile gap

Direct-to-home satellite service is unlikely to satisfy the needs of most rural Alaskans. The bandwidth is limited and expensive; the service is plagued by latency and weather-related interruptions; getting trained technicians and equipment to remote communities is difficult and expensive; and there is no coverage for wide swaths of Alaska that cannot "see" a geostationary satellite in equatorial orbit. Consequently, the Alaska Broadband Task Force rejected a satellite solution to solve the middle mile problem. They proposed a combination of roughly 80 percent fiber and 20 percent high-capacity microwave links to bridge the middle mile gap in Alaska.

Approximate Allocation of Federal Support to Bush and Non-Bush Alaska in 2014:[31]

	BUSH	NON-BUSH	TOTAL
HIGH-COST SUPPORT	$53,032,004	$129,281,521	$182,313,525
PERCENTAGE	29%	71%	100%
LOW-INCOME SUPPORT	$9,005,057	$4,008,847	$13,013,904
PERCENTAGE	69%	31%	100%
E-RATE SUPPORT	$48,222,156	$15,710,933	$63,933,089
PERCENTAGE	75%	25%	100%
RHC SUPPORT	$44,480,653	$15,510,307	$59,990,960
PERCENTAGE	74%	26%	100%

Notes:
1. Non-Remote Alaska assumed to be non-bush.
2. CETC high-cost and low-income support allocated directly to Bush or non-Bush category for regional CETCs based on identified service area.
3. CETC high-cost and low-income support allocated between Bush/non-Bush for statewide CETC service area based ratio of ILEC Bush support to ILEC non-Bush support.
4. Rural Health Care and E-Rate support allocated based on applicant service location.
5. Non-Bush locations are those with road connections to Anchorage and Fairbanks, Juneau, Sitka, Ketchikan, and Kodiak.

[31] The figures in this chart reflect an approximate allocation of support between Bush and non-Bush areas of Alaska, because the Alaskan Bush does not precisely correspond to any of the subcategories of support that USAC routinely reports. The majority of high-cost and low-income support flows to non-Bush locations primarily because there are significantly greater numbers of people and lines located in rural, high-cost – but non-Bush – communities in Alaska. Although there are fewer Bush lines, the level of per-line support available in the Bush is greater.

APPENDIX B

EXCERPTS FROM THE ALASKA BROADBAND TASK FORCE REPORT

Statewide Broadband Task Force
"A Blueprint for Alaska's Broadband Future"
October 24, 2014

Available at: http://www.alaska.edu/oit/bbtaskforce/docs/Statewide-Broadband-Task-Force-Report-FINAL.pdf.

PREFACE

Planning for Alaska's broadband future is imperative because the state lags in adequate statewide infrastructure. In fact, a December 2012 "State Broadband Index" developed by TechNet, an advocacy group comprised of innovators and technology leaders, ranks Alaska 49th of all 50 states in broadband adoption, network quality, and economic structure.

INTRODUCTION

The Federal Communications Commission (FCC) has recognized that the transition from traditional telephony to broadband is underway and anticipates that broadband infrastructure will be the core delivery system for all forms of communication by 2020. In setting the new standards for broadband deployment and adoption throughout the country, the FCC has established a goal for download/upload speeds. The FCC has set the minimum performance expectation at 4 megabits per second (4 Mbps) download and 1 megabit per second (1 Mbps) upload and expects this to increase. The National Broadband Plan established a national goal for 100 million U.S. homes to have affordable access to actual download speeds of at least 100 Mbps and upload speeds of at least 50 Mbps by 2020, which is one of the key reasons why the Task Force chose 100 Mbps both download and upload as the goal for Alaska. With that as the standard, the FCC says:

- Alaska ranks at the bottom in the percentage of households with access to broadband at 100 Mbps.
- At even slower speeds of 200 Kbps, an FCC report issued in March 2011 noted that Alaska's percentage of residential broadband connections was at 87.1 percent, which was lower than comparable percentages in 41 out of 56 states/territories/districts.

GUIDING PRINCIPLES

1. Fiber optic systems offer great capacity advantages at 100 Mbps and above, allowing for expansion to meet future needs. Based on demand alone, fiber solutions become cost effective if total demand is 300 users or more. The Task Force understands that the challenge of deploying and maintaining fiber in many parts of Alaska is difficult due to a combination of population dispersion, terrain, ice scour, vast distances, and permitting challenges.

2. Where fiber is not economically justifiable or for communities with fewer than 300 residents, microwave is typically the most affordable and technically achievable terrestrial alternative.

3. Satellite is a near-term solution for many communities, but will exhibit higher latency, which limits performance capabilities. Satellite can be deployed as a middle mile solution for wireless

or wire line end users. Although satellite technologies deliver a different user experience, such solutions should be included in any final design.

4. Polar fiber projects are encouraged if project financing and deployment is a reality.

5. Support funding for last-mile infrastructure where federal programs are insufficient.

ALASKA'S CHALLENGE: THE NEED FOR BETTER BROADBAND

Alaska ranks near the bottom of all states within the United States in some important broadband categories. It is among the lowest-ranked of all states in terms of high-speed broadband Internet access and the percentage of households with multiple wire line providers, according to a 2011 report by the National Telecommunications and Information Administration (NTIA).
There are reasons why Alaska's communications infrastructure is still developing and has not yet reached the entire population:

1. Geography. The geographic breadth and challenging terrain make much of the state hard to service from an economic perspective and make building, maintaining, and providing communication services at an affordable price for the end user difficult.

2. The Economics of Build Out. Even with the fast-paced change of communications technology, which brings more efficient and cost-effective solutions over time, the economics of statewide broadband infrastructure deployment remain challenging.

3. Lack of a comprehensive strategy. To connect all communities to the level of service required by the FCC in its National Broadband Plan and the Task Force's stated goals, a comprehensive engineering, financing, and deployment plan is needed.

4. Competing demands on public resources for infrastructure projects. Resources to provide for a variety of demands will be stretched.

Alaska's existing middle mile infrastructure is a work in progress. The new Verizon 4G LTE network utilizes the existing backbone infrastructure. The TERRA project was built with the assistance of a one-time federal grant and loan funding. Without the combination of grants and loans, the project might very well not have been undertaken. In the absence of terrestrial network, communities are typically served by satellite.

ECONOMIC OPPORTUNITY

Of course, businesses in Alaska will always have to contend with the physical realities of their operations, but higher-quality access to services through the Internet can have a profound impact on a community's economic opportunities:

- Economic growth can lead to business opportunities through joint venture, individual entrepreneurship, or public-private partnerships. Communication technologies are a key element to any business, especially those involving partnerships. Communities with poor communication links will be at a disadvantage.
- For many communities, postal service, facsimile, and memory sticks are still the main communication modes.

- Higher-quality access to services can positively impact Document/data transmission since Internet service is often inadequate and large file transfer impossible. This can slow the speed of business, frustrate users, and cause disruption to communication on important issues.
- With other areas of the country and the world operating at faster broadband speeds, communities without such access are at a significant disadvantage.
- Internet access also offers a means to purchase supplies and equipment, which can reduce the cost of doing business.

FACTS ABOUT BROADBAND AND JOBS

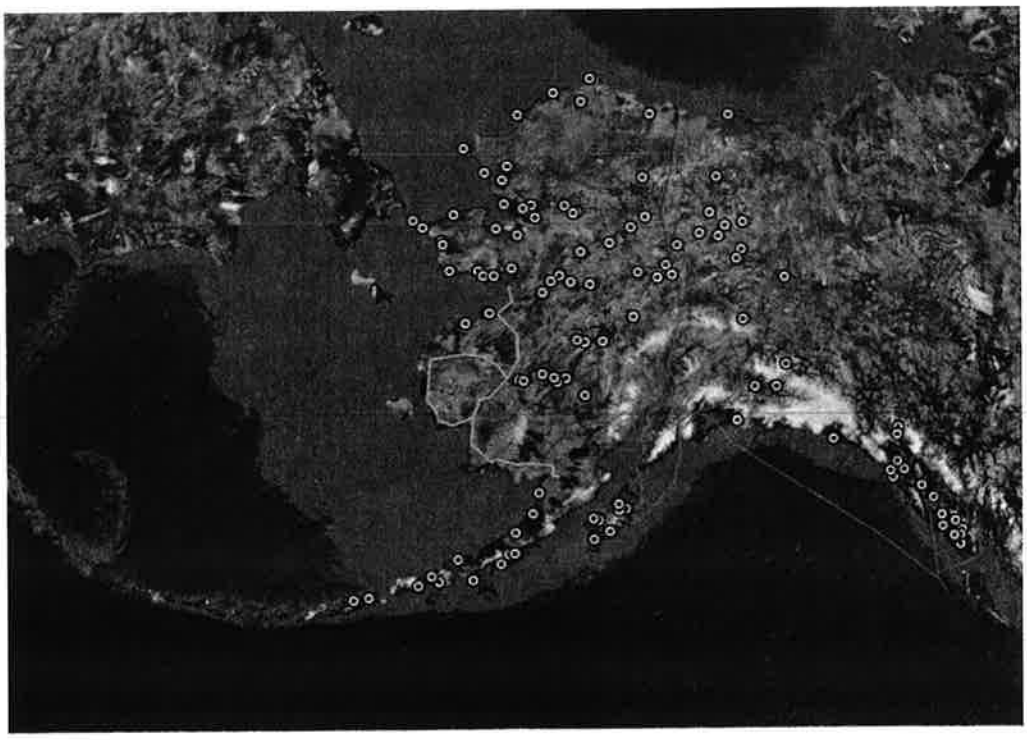
According to Information & Communication Technologies, the effects of broadband on job creation can be significant. For each direct job created because of greater broadband technology, between 1.4 and 3.6 indirect and induced jobs are created. This positive employment also includes the jobs created due to construction of broadband infrastructure and networks.

Yet research conducted in 2011 by Connect Alaska, the state of Alaska's designated entity for the U.S. Department of Commerce's State Broadband Initiative, found that:

- An estimated 6,000 businesses in Alaska are without broadband; and,
- Alaskan businesses that can access and use broadband service report annual revenues $200,000 greater than Alaskan businesses that cannot or do not adopt broadband.

ALASKA'S BROADBAND INFRASTRUCTURE

According to mapping conducted by the Scenario Networks for Alaska and Arctic Planning (SNAP) at the University of Alaska, Fairbanks, communities within Alaska that do not have access to the terrestrial high-speed fiber backbone are numerous. The locations of these places are represented by the white circles on the map below.



TERRESTRIAL OPTIONS TO CONNECT ALASKA COMMUNITIES

SNAP designed its broadband mapping model to connect rural locations to the existing fiber backbone. The white lines below represent the proposed network that would link the communities and villages currently without high- speed fiber. These white lines were then used to calculate the linear distance of each connection in the existing network. The linear distance is one of the variables used to estimate costs of service, along with the number of users at each location.

The cost computation was based on the number of users and the connection distance. The cost model includes providing high-speed broadband using microwave and fiber optic facilities at the 100 Mbps speed recommended by the Task Force.

When there were fewer than 300 users on the entire proposed network, microwave was the most viable economic option. But when there were greater than 300 users, fiber optic cable became a viable option to support a larger number of users. For this reason, fiber is the technology of choice for the majority of the proposed networks. Costs were estimated on the per mile cost incurred by providers to deliver the service multiplied by the number of miles from the mainline fiber to the community. Costs for specific projects will vary based on factors like location, geography, logistics, permitting requirements, and land availability.

NO. OF DOWNSTREAM USERS	M/W COST/MILE	FIBER OPTIC COST/MILE
15	$26,000	
30	$28,400	
45	$29,600	
60	$30,800	
75	$32,000	
90	$33,200	
105	$59,200	$120,000
120	$61,600	$120,000
225	$96,000	$120,000
240	$97,200	$120,000
255	$98,400	$120,000
270	$99,600	$120,000
300		$120,000
500		$120,000

Potential Routes to Connect Rural Communities with 100 Mbps Broadband

Broadband infrastructure cost model provided by the Scenarios Network for Alaska and Arctic Planning, University of Alaska, Fairbanks. 2012

THE SATELLITE OPTION

For purposes of the Task Force analysis, fiber and microwave are the "terrestrial" broadband options. The other broadband option, satellite, was considered separately because so much of the state is off the road system and hard/expensive to reach with terrestrial fiber/microwave options.

In assessing satellite options, the Task Force examined next generation geostationary satellite construction currently being planned by Viasat and Spacenet. However, additional next generation satellites are likely to be launched by others such as SES WorldSkies, EchoStar, Telesat Canada, and Intelsat as their current satellites reach their end of life within the next five to ten years. The Task Force looked specifically at the cost of participating as a customer with one or more transponders dedicated to Alaska on these future satellites. The Task Force also explored with the Alaska Aerospace Corporation the possibility of constructing a series of polar orbiting satellites that would be launched from the Kodiak Launch Complex.

The Alaska Aerospace Corporation proposed a configuration of two polar launches of four satellites (one satellite on the first launch and the final three on the second launch) at an inclination of 63.4°. The satellites would be on two orbital planes (two satellites per plane) and would provide 24/7 coverage to all of Alaska and to latitudes as low as Honolulu, HI. The possibility of reselling transponders to federal agencies, security groups, oil companies, and other states was considered.

In some regions of the state, broadband delivered by satellite is the only practical alternative. Thus, the real question is whether or not the State of Alaska should be merely a customer of satellite broadband services or an actual owner of a next generation broadband satellite serving those regions of Alaska.

MOBILE BROADBAND

Mobile, or wireless broadband, is an attractive option, but an investment in new cell towers and connecting middle mile transport networks would have to be made. According to a recent FCC filing by The Brattle Group on behalf of GCI, there were an estimated 647 cell sites in Alaska as of 2Q 2012, only 134 of which were delivering broadband speed to residents (wireless service of 768 Kbps down / 256 Kbps up). The Brattle Group estimated that providing additional mobile broadband service to the approximately 17,500 unserved Census Blocks in Alaska, serving approximately 122,000 residents, would require upgrading the 511 existing cell sites and building an additional 321 new cell sites. These 832 cell sites (511 upgrades + 321 new sites) are in addition to the existing cell sites that already receive wireless service of 768 Kbps down / 256 Kbps up.

The total number of cell sites in Alaska needed to provide mobile broadband service (excluding those that already provide mobile broadband service) would be 968 (511 upgrades+ 321 new sites+ 136 existing cell sites). Even that deployment would leave about 1,900 residents unserved by wireless broadband. The cost of providing mobile broadband service to all of these targeted areas in Alaska is estimated to be approximately $596 million, including capital costs and the present value of five years of operations, maintenance, and backhaul costs.

The Brattle Group calculated the present value of five years of federal Competitive Eligible Telecommunications Carrier (CETC) and USF High Cost support for wireless carriers in Alaska to be roughly $467 million, assuming continuing support levels. Current FCC rules for providing high cost support for this type of deployment are still in development, and it is uncertain what funding will be provided at this time. Verizon unveiled its new 4G LTE network in July and has invested more than $110 million in its Alaska operations. The network, however, utilizes existing infrastructure, and the coverage area extends from Anchorage to Fairbanks, North Pole, Juneau, Eagle River, and the Matanuska-Susitna region. Additionally, GCI and Alaska Communications have agreed to combine mobile assets in a new, jointly-owned limited liability company, The Alaska Wireless Network, LLC, to reach a vast majority of the state's population.

RECOMMENDATIONS

During 24 months of meetings, the Statewide Broadband Task Force heard about the need for a more robust broadband infrastructure from more than 30 organizations and other stakeholders including small communities, educators, health, officials, providers, and entrepreneurs. Task Force members also examined multiple documents and reports and met with key stakeholders including educators, business leaders, and municipal executives. As such, the Task Force offers the following general recommendations to deliver 100 Megabits per second to every Alaska household as well as specific recommendations in the areas of education, jobs, and public safety.

General Recommendations

Alaska should:

1. Adopt a minimum service objective of access to broadband service of 100 Mbps (up and down) to households and businesses throughout Alaska by 2020, aligning with the FCC's goal for connectivity as outlined in the National Broadband Plan. This objective should:

- Recognize that speeds and deployment would be phased in over time; and,
- Recognize that anchor institutions, (e.g. library, school, hospital, university, public safety, and governments including federal, state, municipal, tribal, and local) should be considered drivers of service to mass market end users and may demand a service objective in excess of 100 Mbps.

2. Establish an Office of Broadband Policy to manage the statewide plan, coordinate future strategy, planning, and policy, and market the importance of broadband adoption at the state and national level. This office would:

- Coordinate with other agencies regarding uniform access methods and procedures for broadband infrastructure placement on state lands and facilities;
- Educate community leaders and key stakeholders about adoption of broadband;
- Coordinate the development of educational, economic, and health programs adaptable to e-platforms in partnership with providers and other e-organizations;
- Pursue programs that provide training for digital literacy and broadband adoption;
- Work to ensure the adequate deployment of broadband initiatives in collaboration with stakeholders;
- Create a vehicle for public input on the topic of establishing and developing broadband policy; and,
- Work with NTIA to facilitate an Arctic communications plan that is in Alaska's best interest to include an emphasis on economic and community development as well as safety/national security interests.

3. Prioritize rapid deployment of broadband access that improves current service levels. This deployment should:

- Negotiate with national satellite providers to consider deploying high-speed spot beams throughout Alaska on planned or deployed next generation satellites;
- Reach all locations as quickly as possible using satellite and terrestrial connections to deliver service at 10 Mbps or greater per household or economic unit. Once built, terrestrial connections can be upgraded to deliver the plan's 100 Mbps service at later dates;
- Implement middle mile connectivity for each community starting with major hub communities based on total demand (number of homes/businesses/anchor institutions), and ensuring that communities can support the speeds offered by any initial middle mile deployment of at least 10 Mbps using all available technologies;
- Support hub community last-mile implementation through grants and loans where new middle mile access is being deployed, such as high bandwidth fiber;
- Encourage each community to develop and implement its own last-mile solution, compatible with the Task Force goal of 100 Mbps to every household and business so that a uniform system is developed;
- Promote/encourage innovations and new wired and wireless technologies in the deployments;

- Explore ways to incent 24-hour Internet access at community centers/meeting places and existing anchor institutions; and,
- Recognize the importance of Arctic telecommunications development and promote sustainable deployment to the region.

4. Establish technical standards to be used for the qualification of proposed construction projects wishing to gain financial support pursuant to the Task Force's recommendations.

5. Establish public-private partnerships with industry innovators and entrepreneurs to rapidly accelerate broadband development and deployment within Alaska.
- Consider public-private partnership models for technology training, production, and adoption in communities at the margins of technology (i.e., rural, low-income, immigrant, senior populations).

6. Encourage public and private advocacy efforts to maximize federal Universal Service Fund (USF) support for Alaska.
- Recognize and document the impacts to Alaska of Universal Service Fund reform;
- Ensure the Alaska Universal Service Fund is targeted to support infrastructure and broadband utilization, furthering all of the Task Force goals; and,
- Examine the Alaska Universal Service Fund (AUSF) to determine if revisions to the fund are necessary.

7. Ensure network diversity through terrestrial (overland) means on the key Alaskan high density backhaul fiber routes. For example, interconnecting with Canadian Telecom networks at key cross border points could provide fiber-ring architecture between Canada and Southeast Alaska.

8. Streamline current state e-government systems and foster improved user access, ease of use, application development, and deployment through MyAlaska.

9. Streamline the permitting process for broadband deployment projects through the Office of Project Management and Permitting (OPMP) within the Department of Natural Resources to improve financial viability and shorten broadband deployment timelines.
- The OPMP would facilitate state, local, tribal, and private permitting/access; champion and aggressively pursue support of accelerated regulatory permitting at the federal level; conduct a broadband review as part of any state-funded project, to associate broadband infrastructure advancement complementary to the primary project; facilitate the laying of fiber in connection with roads, oil or gas pipelines, and other applicable infrastructure projects; and,
- The OPMP would establish an online clearinghouse with links to state, federal, and local agencies involved in the project, along with links to relevant forms for permits to construct infrastructure. Other agencies involved would be asked to continually monitor the site to ensure accurate and complete information.

WHAT WILL IT COST?

In addition to recommending infrastructure solutions, the Task Force evaluated the cost of new broadband infrastructure and reviewed possible funding mechanisms. The Task Force consulted others in the funding discussions, including the Alaska Department of Revenue, the Alaska

Housing Finance Corporation, and the Alaska Industrial Development and Export Authority (AIDEA).

Findings:

1. The Task Force agreed that public resources should not be considered as the only funding source. In fact, it is likely that neither public nor private funding alone will provide the capital necessary to fully achieve the Task Force-defined broadband goal of 100 Mbps to every household by 2020.

2. Public funding, if available, should not impede further infusion of private resources, undermine past private investment, or create unsustainable projects.

3. The Task Force recognized that the future cost of broadband deployment would be different than estimated in this report due to a variety of factors.

4. Understanding the cost of broadband adoption, not just deployment, would be critical to develop public policies that provide for realistic targets based on economic considerations.

With that philosophy in mind, the Task Force also recognized that if private investments could return a profit on infrastructure development, investments would already have been made in rural broadband infrastructure. But because of Alaska's remote landscape and diffused population, a profitable return has been and will continue to be challenging.

Background: The Task Force identified three approaches as it began to review cost calculations:

1. Conventional engineering based on estimating the coverage requirements imposed by the goal and then using those estimates to project the necessary investment to fulfill the goal. This is the methodology followed for the investment estimation of Australia's National Broadband Plan.

2. The "top down approach" based on first determining the amount of financial resources needed and then sizing the amount of coverage that will be achieved given those resources. To some degree, this is the approach that has been followed in the United States with the Broadband Technology Opportunities Program.

3. The "public policy" framework, which defines targets, such as coverage and speeds, but leaves the amount of investment required unaddressed. The objective would not be to provide extremely precise estimates but to gauge the investment in broadband required in order to have a sense of the resultant social and economic returns.

Ultimately, the Task Force adopted the "public policy" framework, focusing its recommendations to meet the target of 100 Mbps (up and down) to every Alaska household by 2020 while utilizing current, conventional engineering methodologies to gauge the investment required for purposes of informing the development of those recommendations. Cost estimates were averaged across the entire state. The Task Force found that whether delivered by fiber,

microwave, or satellite (or a combination) the cost to build out the required infrastructure would be in excess of $1 billion.

Estimated Total Investment Required to Achieve Goal for 2020	
Middle Mile New Construction (fiber & microwave)	$610 million
Add to Existing Microwave System	$30 million
Last Mile (all state households/businesses)	$580 million
Total	$1.2 billion
Additional Alaskans with High Speed Fiber Access	80,000
Additional Alaskans with High Speed Microwave Access	20,000

Every individual segment of the network will have actual costs reflective of the terrain and other environmental characteristics and can vary widely from unit costs derived from these universal estimates.

While agreeing that private sector investment should be the primary funding of broadband development, the Task Force also considered that, to date, private sector investment has been in areas where demand and demographic density would generate an appropriate rate of return on investment. Over time there will be additional broadband facilities constructed by Alaska's telecommunications companies either based solely on market opportunity or with anecdotal economic incentive from any number of sources. The Task Force recognized, however, that there will remain a number of locations for which significant economic support or subsidy will be required to allow for construction and operation of the broadband facilities needed to meet the Task Force objective.

FEDERAL UNIVERSAL SERVICE FUNDING

Created in 1997, the FCC's Universal Service Fund (USF) system has played perhaps the biggest role to date in funding the development of telecommunications and broadband systems/infrastructure throughout Alaska. In 2010 alone, the USF contributed more than $300 million to the state in the form of subsidies for rural health care communications, network deployment in high-cost areas of the state, subsidies to connect schools and libraries, and discounts for basic telephone service for low-income households.

In 2010, the FCC published the National Broadband Plan to fulfill its directive under the American Recovery and Reinvestment Act of 2009 (ARRA). The National Broadband Plan called for a number of initiatives to improve broadband across the United States, including reforming the entire USF system: the first major USF reform since the program was established under the Telecommunications Act of 1996. Toward that end, the FCC issued the USF Reform Order in November 2011, which put in place a process to transition the USF program from a focus on traditional voice telephone service to one that focuses on broadband development (wireless and wireline).

For Alaska, the most significant program change has been the creation of three new universal service funding mechanisms (the Connect America Fund, the Mobility Fund, and the Remote Areas Fund) to gradually replace the old system that distributed funds under the high-cost section of the program. In addition to replacing existing federal universal service support mechanisms, the new funding mechanisms are now designed to extend and maintain broadband service to the

"unserved" portions of the state where only slow, or even no, broadband access is available. The new funds will provide federal support to wire line, wireless, and satellite providers based on a combination of changes to legacy procedures, cost models, and reverse auctions. The new funds all have the slight potential to benefit certain parts of Alaska. However, there is a tradeoff: subsidies slated for these programs are limited and are likely to decline for Alaska in the coming years.

Other portions of the USF program are still under review, but the overall effect is that Alaska recipients of federal USF support are facing increased service obligations while enduring significant decreases to federal USF support levels under the current FCC reform measures. This uncertainty has had a chilling effect on some investment options in Alaska communications infrastructure. The Task Force agrees that funds dedicated to Alaska should not be diverted and that Alaska and its telecommunications industry should continue advocating Alaska's position on the FCC's reform measures by stressing Alaska's unique characteristics in terms of both demographics/ geography (with no comprehensive road system and rural areas characterized by small population centers dispersed across vast geographical expanses) and infrastructure (with no statewide terrestrial communications network). These dynamics should continue to be cited as justification for additional federal USF support to allow expansion of broadband services throughout Alaska and, at the very least, demonstrate that existing funds for Alaska should not be diverted to other locations.

NEXT STEPS

It is the Task Force's fervent hope that this plan does not languish, but becomes a living document that helps guide stakeholders and policymakers as they engage in conversation, consider future broadband development, and make decisions. With that in mind, and to generate further action, we offer the following action items.

- The Task Force shall publicize and seek public comment on the plan in multiple venues including a website, presentations at stakeholder conferences and meetings, and testimony to appropriate legislative committees.
- Establish an Office of Broadband Policy within state government to manage the statewide plan, promote future policy, and market the importance of broadband adoption. Without such an office, the plan languishes.
- The Governor and legislature should review the plan before the next legislative session and consider possible legislation to enact recommendations and funding options that are appropriate at this time.

CONCLUSION

We have reached a point in the development of modern communications wherein the Internet is firmly woven into our fabric of everyday life. America is in a race to the top in order to compete in the globalization of trade and development. In Australia, the government is investing $43 billion over eight years through its National Broadband Network to bring an advanced, fast, and reliable Internet backbone to the entire country that will include 12 Mbps at a minimum to the most rural and remote regions of the country. In Sweden, the government has endorsed a National Broadband Strategy (2009) and committed $34.9 million in public funds to deliver minimum speeds of 100 Mbps to 40 percent of households and businesses by 2015, and to 90

percent of households and businesses by 2020. The French government will spend $27 billion over the next 10 years to bring high speed broadband to the entire country, although exact speeds have not been committed. Meanwhile, the United States, through the FCC, is spending $4.3 billion for broadband deployment and support for rural and remote regions of the country to affect efficient and reliable communication systems. These are signs that the rest of the world is making the investments to ensure their citizens' basic needs are met.

Alaska is part of this race. The same factors that make broadband deployment difficult in Alaska—geographic remoteness, lack of roads, high costs—also mean that Alaska, more so than other states, has the most to gain from making sure that affordable and reliable high-speed broadband is available to all its residents. Very soon, social pressure will be too great for government and civil society not to act, whether collaboratively or alone. A clear plan is in the best interest of the state.