

The Honorable Mignon Clyburn, Acting Chair
The Honorable Jessica Rosenworcel
The Honorable Ajit Pai
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

September 16, 2013

Dear Commissioners,

I am writing to commend you for taking this bold step to modernize the E-rate program and respond to the Notice of Proposed Rulemaking for the E-Rate program for schools and libraries. The E-rate program continues to provide critical discounts to assist schools and districts in obtaining affordable telecommunications and internet access. While affordability is important, in the world of emerging and next generation technologies equity of access to increasingly high speeds of connectivity and mobility is also important for all learners. E-Rate needs to help us continue moving forward and encouraging innovation in learning, which is why the actions you take to modernize this program are so critical.

North Carolina utilizes the E-rate program to provide affordable equity of access to all 2,600 of its schools. This was done through developing and expanding MCNC's North Carolina Research and Education Network (NCREN) in a partnership with the state and private providers. It was a strategic effort, well planned and led by a talented team that addressed engineering, funding and policy issues that ensured access to quality education standards. This effort provides an affordable and efficient statewide education backbone through NCREN with adequate speeds to support digital learning in all schools. This investment positions North Carolina to accelerate digital learning, as well as create and take advantage of new models or next generations of learning that are being created daily.

With advancing mobile technology and personal devices we have to shift our view of learning beyond the classroom to what we are seeing in the business world with the mobile office. By this I mean, I often find business meetings and work taking place at locations that offer wireless and mobile connections. This does not lessen the importance of classrooms and teachers, it does however, provide greater access for students to have enriched learning opportunities. Emergent learning technologies provide that same kind of mobility for learners inside or outside the classroom whether it is individually, in a group or teams, or with teachers. As you consider changes to modernizing E-rate, I ask that you keep in mind the progress states, schools and libraries have made with the program and rethink options that will spur students to develop the skills necessary to be productive learners and workers.

I have attached comments that outline North Carolina's story, including specific suggestions for greater flexibility in connectivity innovation, fiber options, regional networks and sustainable funding strategies. Thank you for your consideration of my comments and please know that I stand ready to assist you in achieving your goal to modernize the E-rate program.

Best Regards,

Beverly Eaves Perdue
Founder, Digital Learning Institute
NC Governor, 2009-2012

In the Matter of

Modernizing the E-rate

Program for Schools and Libraries

WC Docket No. 13-184

Submitted by: The Honorable Beverly Eaves Perdue
Governor, North Carolina – 2009-2012
Founder, Digital Learning Institute

Background: From 2005 to 2012, the State of North Carolina implemented a plan to prepare our K-12 public schools for the transition to a digital learning environment. This effort was initiated after the development and implementation of the state's first virtual public school in 2006 which was designed to meet North Carolina's constitutional requirement that every child is entitled to a sound basic education. With obstacles brought about due to poverty, literacy, healthcare and other challenges in large rural areas in North Carolina, technology offered a potential solution to provide every child access to an effective teacher and high quality content for learning regardless of zip code. With the launch of North Carolina's Virtual Public School it was discovered that students in rural areas, who needed the access to education resources, were not able to take advantage of the educational opportunities. They were restricted by limited or no access to broadband connectivity in their schools, libraries and homes. While there were efforts to improve connectivity and to take advantage of technology, there was not a coordinated statewide effort to reshape policy, procedures and rules around the impact of technology infrastructure and its critical role in moving education, health care and overall economic development forward.

The result was a statewide effort to address this challenges, especially in the area of education, by utilizing local, state and federal resources and leveraging them to redefine North Carolina's policy structure to one that recognizes the importance of rapidly advancing technologies. In addition, critical to this effort was a partnership with the state, private providers and MCNC, a non-profit providing the North Carolina Research and Education Network to public and private colleges and universities.

This comprehensive plan was built on existing resources and include:

- Rigorous content development and content evaluation
- Support and adoption of Career and College Ready Common Core standards
- Professional development for teachers and administrators
- Technology tools for learning
- E-Delivery of formative and summative assessments and real-time analysis of results
- A broadband foundation that, by centralizing E-Rate advisory services, E-Rate consortium filing, and using an existing education backbone network, provided a scalable foundation that would provide school districts, public schools and public charter schools affordable bandwidth in an environment where their bandwidth requirements would double every two years.

Collectively, this effort operated under the umbrella name of the North Carolina School Connectivity Initiative. The office of the Lieutenant Governor and beginning in 2009, the Office of the Governor led

the effort.

Documentation describing the initiative is located at these links:

- A. [School Connectivity Web Resources \(control click\)](#): Provides a link to the operational plan [which](#) is focused on achieving six primary goals:
1. Provide “equity of access” for all K12 schools
 - Deliver services that support classroom and online instructional and administrative applications
 - Provide a common shared education network
 2. Provide statewide support to optimize the benefit of the Federal E-rate program
 3. Enable and foster public-private partnerships
 4. Develop a sustainable funding model to build and support a statewide education network
 5. Build the North Carolina Education Network Organization that is centrally coordinated and based on a co-op model
 - Leverage existing state resources and organizations where possible
 - Is funded for efficiency and effectiveness
 6. Achieve steady-state (3 year phase-in) within 3 years
- B. [Clay Christensen Institute Overview](#) (Note: A footnote on page 51 of the Notice of Proposed Rulemaking Modernizing the E-rate Program for Schools and Libraries refers to this publication)

Since 2008, North Carolina has, through, MCNC, the non-profit operator of the North Carolina Research and Education Network (NCREN), bought Internet bandwidth as a bulk purchase for all sectors of public education (K-20), most private education, select non-profit hospitals, public health agencies and research institutions. These institutions share NCREN as their common backbone network.

Since 2006 North Carolina's School Districts have increased their demand for bandwidth over 650% but transport and access costs have remained flat. The North Carolina Department of Public Instruction's E-rate bureau has shared detailed cost figures with the FCC. This cost efficiency is almost solely attributable to four factors:

- 1) An owned NCREN backbone middle mile made up entirely of fiber infrastructure
- 2) Aggregating the purchase of over 300G of commodity Internet bandwidth through the states that buy through the QUILT
- 3) Use of large external connections to Internet2 including commodity peering
- 4) Ability to buy circuits from NCREN PoPs to school district demarcation points via state contract.

In addition, school districts and charter schools benefit from this backbone connection/aggregation of demand strategy because they have:

- Access to a fully owned, 100G capable NCREN backbone that fixes costs for WAN transport capability on the network no matter how much the demand grows.

- The elements of variable cost for broadband connectivity for K-12 public schools and K-12 public charter schools connected to NCREN are last mile circuits from the NCREN backbone to district where there is no direct NCREN owned fiber, in-district WAN and in-school LAN costs, Internet bandwidth – all of these are supplied by private sector service providers.
- A district and/or charter school personalized portal that charts their bandwidth use, support tickets
- A dedicated Network Operations Center that provides a single point of contact into a priority queue when support issues arise
- A dedicated team of engineers housed at MCNC that assists with network health assessments and implantation of cloud based applications
- A network scalable to emerging cloud applications and services which will drive more efficiency and cost savings
- Less jitter and latency in their connections, important in the digital age where synchronous HD video is common

All districts were allotted 100MG connections to the NCREN backbone when initially connected in 2009. As of this writing, over 100 districts have upgraded these connections with the highest connections now being 2 GB. The School Connectivity strategy allows bandwidth growth in demand because of the scalable backbone network—North Carolina has a backbone in place that will scale to the per student and per school standards outlined in the recently announced ConnectEd strategy.

A school district snapshot: Mooresville Graded School District which has been used as a national model for digital conversion provides a good example of the evolving statewide policy strategy for infrastructure. This also means continued investment in use and in advancing technologies at an affordable rate by schools, districts, and the state. However core to all of this effort is having strong leadership and a focused goal on rigorous learning environments. As you review the infrastructure and budget detail below, keep in mind a parallel track of student progress as evidenced by the increase in graduation rates and other student achievement data in Mooresville.

Mooresville Graded School District

From 2007

- Schools connected with copper-based services
- All school connections sub-10 Mbps
- Internet bandwidth to the district 30 Mbps
- Total Annual Cost \$80,000
- After 64% erate discount, out of pocket cost to Mooresville of \$29,000

From 2013

- Schools connected with fiber-based services
- School connections at 1000 Mbps (1 Gbps)
- Total Internet bandwidth to the district of 500 Mbps - that also includes content filtering
- Total Annual Cost \$460,000
- After 67% erate discount, out of pocket cost to State of \$152,000 Total out of pocket cost to Mooresville \$0.

2007-2013 Summary

- 100x increase in bandwidth to schools
- 16x increase in Internet bandwidth to the district
- Internet bandwidth usage monitored centrally and automatically increased twice since initial upgrade
- 95th percentile usage increased from 85 Mbps in September 2010 to 275 Mbps in May 2013
- Mooresville leads the State in bandwidth usage per student at 85 Kbps per student
- 5x increase in cost after erate discount
- Notable that the cost only increased 5x with a 100x increase in WAN bandwidth and a 16x increase in Internet
- Use of technology continues to increase with all out of pocket costs transferred from Mooresville to the State which can afford to sustain its investment due to the aggregation of services via the regional network. Providers, the public, and education all win.

Suggestions:

The following suggestions are offered based on our experience with the erate program and how it has enabled one state to make technology advancements in a way that also allows for sustainability strategies to be developed. The following suggestions encourage increased flexibility so that states continue to advance their use of technology as it rapidly changes and increases demand.

- 1. Flexibility with Connectivity Innovation.** While getting sufficient bandwidth to all districts and schools is needed and foundational, it is important to provide greater flexibility with how funds are used down to the classrooms and learners. Once the “pipe” is to the district or building, schools need to be able to develop internal infrastructures that allow them to take advantage of the bandwidth otherwise, users are not able to take advantage of the bandwidth provided. This includes consideration of the elimination of Priority 2 funding and moving managed services and infrastructure

services to Priority 1 as we shift more and more to a mobile environment. This ensures that the goal is moved beyond to the school to the actual user of the technology.

- 2. Developing Regional/Consortium Networks.** State level consortium applications should be encouraged and incentivized especially to assist those small and rural areas challenged with limited staff and resources. This also includes simplification of the rules and regulations as they are often too cumbersome and prohibit those small schools and districts with limited staff to take advantage of the program. You may want to consider an annual audit process of state consortia which will maintain fidelity of the process.

In North Carolina, the use of its Research and Education backbone networks, operated by the non-profit MCNC continues to be a successful strategy and will help address the last mile to homes due to its investment in the middle mile. As noted in the background, it provides the necessary bandwidth, aggregates costs and demand based on use, provides engineering expertise that is often not found in schools and creates the potential to advance technologies. Enabling or encouraging other states to take advantage of existing resources such as regional networks should be encouraged and is an important part of efficient E-Rate reform. About 40 States have these scalable backbone networks in place but only two of which we are aware (Utah, North Carolina) have developed a statewide initiative to connect all K-12 public school districts to the backbone network using an aggregated buying strategy.

- 3. Allow Fiber Ownership.** Rulemaking should be flexible enough to account for last mile dark fiber ownership by the district. Our work with MCNC has shown that costs of owning fiber cross an inflection point and reduce expense of communication services after a 3 to 5 year period. The rules should allow amortization of the capital costs over that period of time or longer if necessary for some institutions.

Fiber is a 20-25 year asset. A district or library should not continue to pay lit service costs over a 25 year period for an asset it can own with a return after a relatively short period amortization of the capital. One North Carolina example shows a district that was buying lit service through a fiber based district area network at a rate that equated to \$30,000 per school per year for a 100 MG drop at each school under a 3 year contract. At renewal after the 3 year initial term, the \$30,000 per school stayed steady. An alternative bid, to build fiber the district would own showed the 100MG drop costing \$7200 per year for management of the network, equipment lease to own and accumulating refresh of the network if the district built and owned the fiber. With 53 schools this represented a savings of \$1.2 million per year -- the cost of building fiber was in the range of \$2.9 Million dollars -- a less than 3 year return.

Owning fiber is not for every district or library but it should be an option to support the long term, fast growing bandwidth needs of most institutions. There are ways to manage the cost. For instance,

- if there is already a provider prepared to offer priority 1 eligible fiber-based services then State funding will pay no more than the cost of the off the shelf service.
- the district or consortia must meet the same service level agreement we require of private providers.

4. Funding Sustainability. While federal, state and local resources are limited, the move to digital conversions and advancing the use of the technology is a process. It is important to recognize that broader flexibility in how erate funds are utilized is critical to states' redefining their role with funding to sustain the investments made with erate reimbursements. For instance, as NC went through the planning and implementation of its connectivity initiative, the erate funds enabled the state to redefine its role in support to the schools and how to re-purpose funds used for traditional that are no longer needed.

In summary, connectivity is about part of a larger shift in state policy structures, rules and regulations as we advance in a global economy through the progress brought about by rapidly advancing technologies. The focus should shift from broadband connectivity to the building to what happens when you get the connectivity to the classrooms and in the hands of the users and ultimately the homes. The goal should be on actually using the services enabled or accessible due to the connectivity which drives the continued investment in technology.