

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

In The Matter of)
)
Modernizing the E-rate) WC Docket No. 13-184
Program for Schools and Libraries)

COMMENTS OF EDUCATIONSUPERHIGHWAY

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SUMMARY

The E-rate Program (“E-rate” or the “Program”) has fostered tremendous progress in bringing new technology to schools and libraries, ushering in the era of digital learning. The Program, which was bipartisan in its creation in Congress and implementation by the Commission, was key to funding the widespread deep deployment and ongoing operation of Internet access for our nation’s schools and libraries.

But E-rate in its current form does not and will not enable America’s K-12 schools and libraries to take advantage of the promise of digital learning. Today, 80% of schools and libraries lack sufficient bandwidth to meet even their current needs. It would cost an estimated \$3 billion *per year* and a 120% increase in the bandwidth available in America’s K-12 schools just to implement the State Educational Technology Directors Association (“SETDA”) 2014-15 digital learning target of 100 Mbps per 1,000 students or staff members. As successful as E-rate has been, it is clear that the Program in its current form will not be able to fund the connectivity and network infrastructure upgrades necessary to support a 21st century, technology-driven transformation of American education.

Accordingly, the Program should be modified to support upgrading both connectivity to the school door and the ability to distribute this connectivity to student devices in the classroom using modern wired and wireless networks. We must also embrace new approaches to broadband procurement.

To do this, the Commission should:

(1) Create a one-time upgrade fund within the E-rate Program to connect every school and library to fiber and a ubiquitous internal Wi-Fi wireless network. This capital investment will enable all schools to meet the connectivity goals proposed by the President's ConnectED Plan and will put in place the underlying infrastructure required to meet America's K-12 broadband needs for a generation. At the same time, this investment in fiber will dramatically lower the ongoing cost of bandwidth for schools and libraries by limiting recurring costs to maintenance and incremental upgrades – an approach which can reduce the cost-per-megabit from a median of \$40 to less than a dime.

(2) Focus the E-rate Program on broadband connectivity and infrastructure to ensure that we maximize the impact of E-rate on learning. Today, approximately 42% of all Priority 1 support is for telephony, mobile service, and applications such as web-hosting and email. Those priorities must be changed to keep pace with technological developments and adapt to current educational needs. By redirecting these funds to broadband infrastructure, we can provide a significant portion of the capital needed for the one-time upgrade fund and ensure that network deficiency is never a bottleneck to learning.

(3) Reform the way the Program is managed to reduce costs, improve efficiency, and ensure that all students have access to the connectivity they need. By reforming procurement processes, updating and simplifying filing requirements, and collecting – and making public – spending, pricing, and network utilization data, we can reduce costs and better equip the Commission, applicants, and others to evaluate broadband deployment and E-rate's success. In turn, this will help the FCC ensure the efficiency, effectiveness, and fairness of the Program.

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I. INTRODUCTION

A. About EducationSuperHighway.

EducationSuperHighway is the leading non-profit organization focused on upgrading the Internet infrastructure in America’s K-12 schools. Our data-driven programs help superintendents and policy makers identify which schools need to upgrade their Internet infrastructure, what specific infrastructure equipment needs to be upgraded in each school, and how to reduce these upgrade costs. We have worked extensively with the FCC, the U.S. Department of Education, more than 25 state Departments of Education, and over 50 corporations, non-profits, and associations in our efforts to prepare schools for digital learning and Next Generation assessments. We are very pleased to be able to submit these comments in support of the FCC’s efforts to modernize the E-rate Program and to help schools and libraries better prepare themselves to deliver a cutting-edge education to our nation’s schoolchildren.

E-rate is critical to ushering in the era of digital learning in America’s K-12 schools and libraries, but in its current form the Program cannot meet the growing connectivity and infrastructure needs of schools. Accordingly, we need to (i) create a one-time upgrade fund within the E-rate Program to connect every school and library to fiber and a ubiquitous internal Wi-Fi network; (ii) focus the Program on broadband connectivity and infrastructure to ensure

that we maximize the impact of E-rate on learning; and (iii) reform the way the Program is managed to reduce costs, improve efficiency, and ensure that all students have access to the connectivity they need.

B. E-rate Reform Is Crucial to Support Digital Education Transformation.

1. E-rate Can Provide Vital Support in a Broadband-Critical Era.

E-rate has fostered tremendous progress in bringing new technology to schools and libraries. As the Commission notes, when Congress enacted the 1996 Act with overwhelming bipartisan majorities of the House and Senate, just 14% of classrooms had access to the Internet. By 2005, 94% of all instructional classrooms had Internet access.¹ The nation's libraries likewise have been transformed – with 98% offering public Internet access by 2006.² The E-rate Program, which was bipartisan in its legislative creation and in its implementation by the Commission, was key to funding widespread deep deployment and operation of Internet access for our nation's schools and libraries.

Over its existence, E-rate has connected the nation's most remote schools and libraries to the world. Children in remote, rural Alaska, the hills of West Virginia, or a small town in Kansas can have access to master teachers and advanced subjects that they would not otherwise have been able to access in their communities. Similarly, E-rate has allowed children in inner cities to work in small groups or one-on-one with content-rich applications that their under-funded school districts previously would not have been able to provide.

However, there is much more that can be accomplished to harness technology to further improve education. Robust connectivity in the classroom enables more individualized

¹ *Modernizing the E-Rate Program for Schools and Libraries*, Notice of Proposed Rulemaking, FCC 13-100, 28 FCC Rcd. 11,304, 11,306 ¶ 2 (“NPRM”).

² *Id.*

instruction and real-time learning assessments for teachers, students, and parents, and will facilitate innovative educational uses of technology.³ For example:

- In Mooresville, North Carolina, incorporating laptops and individual instructional tools in classrooms helped the school district improve its pass rate on state tests in reading, math, and science from 73% to 88%.⁴
- In Paradise Valley, Arizona, a combination of a microwave WAN, video conferencing, and an Internet-based education program connecting far-flung schools over the WAN have saved the district over \$500,000 annually, permitting it to create remote classrooms and provide greater access to educational content.⁵
- Aspire ERES Academy in Oakland, California, uses blended learning to dramatically increase the time teachers have available for one-on-one and small group instruction.⁶
- The Utica Community Schools District, in Michigan, has implemented digital learning across all kindergarten classes to personalize learning for each child.⁷

In each case above, robust Internet access was a pre-requisite to educational progress.

Unfortunately, the majority of America's K-12 schools and libraries are not in position to take advantage of the promise of digital learning. According to the FCC's own survey, 80% of schools and libraries lack sufficient bandwidth to meet even their current needs.⁸ This is

³ See, e.g., Margaret Spellings and James P. Steyer, Co-Chairs, LEAD Comm'n, Presentation at Federal Communications Commission Open Commission Meeting: Paving the Way Forward for Digital Learning in the United States, at 1-2 (July 19, 2013), available at http://www.leadcommission.org/sites/default/files/LEAD%20Statement.FCC%20Meeting%2007-19-13.final_0.pdf ("LEAD Commission Presentation").

⁴ *Id.* at 2.

⁵ See Cisco, *High-Speed Broadband in Every Classroom: The Promise of a Modernized E-rate Program*, White Paper, at 12 (September 2013), available at http://www.cisco.com/web/strategy/docs/education/e_rate_connected_wp.pdf ("Cisco White Paper").

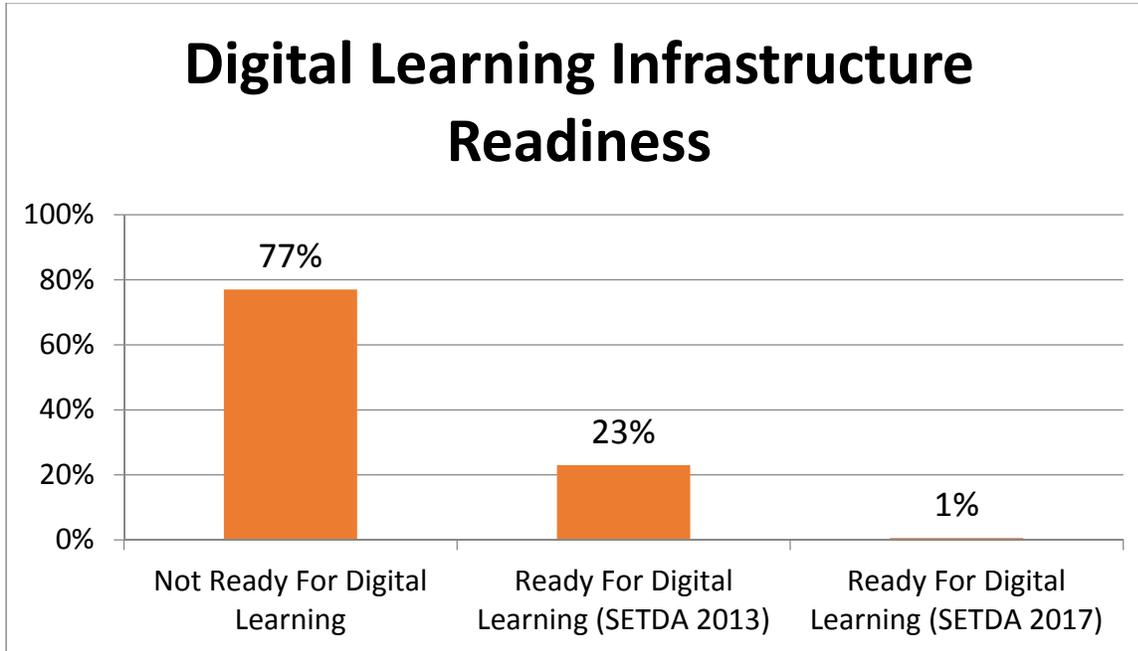
⁶ See Jennifer Carolan, *Blended Learning at Aspire*, NewSchools Venture Fund Blog (Mar. 22, 2103), <http://www.newschools.org/blog/blended-learning-at-aspire>.

⁷ See *A Story of Student Achievement: Utica Community Schools District's Success with eSpark*, eSpark, <http://www.esparklearning.com/espark-personalized-learning-documentary/>.

⁸ Press Release, Fed. Commc'ns Comm'n, FCC Releases Data From E-Rate Program And Broadband Usage Survey (Jan. 6, 2011), available at <http://www.fcc.gov/document/fcc->

confirmed by data from EducationSuperHighway’s National SchoolSpeedTest – in which the results of over 350,000 tests in 15% of America’s K-12 schools show 77% of those schools lack the Internet infrastructure needed for digital learning today, and fewer than 1% have the infrastructure they will need in the future.⁹

Figure 1.



Source: EducationSuperHighway National SchoolSpeedTest – Interim Results as of 6-20-13 (Digital Learning Readiness Based on SETDA Standards)

The problem is not just in delivering bandwidth to the schoolhouse or library door.

EducationSuperHighway’s technical work with over 75 school districts across 4 states to assess the current state of their network infrastructures indicates that most schools also are without the

[releases-data-E-rate-program-and-broadband-usage-survey](#); see also 2010 E-Rate Program and Broadband Usage Survey: Report, DA 10-2414, 26 FCC Rcd. 1, 2 (2010), available at http://transition.fcc.gov/010511_Eratereport.pdf.

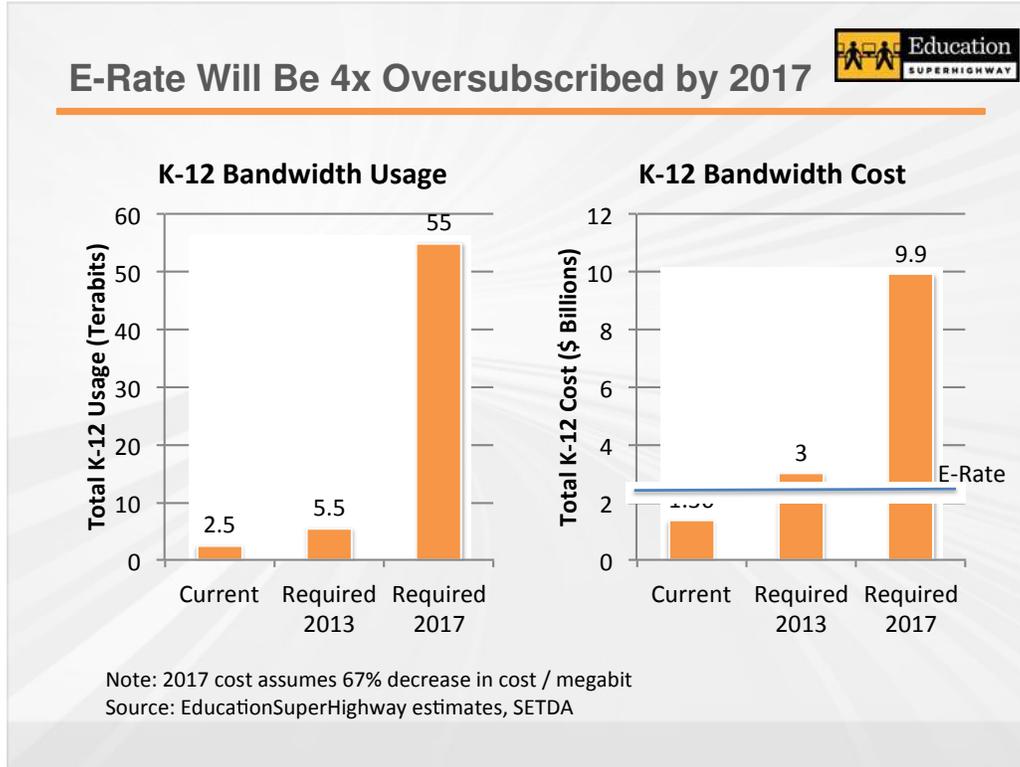
⁹ See SETDA, *The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs* (2012), available at http://www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1517.pdf (“SETDA Broadband Recommendations”).

ubiquitous internal Wi-Fi networks needed for digital learning. Whether they lack sufficient wireless (“Wi-Fi”) coverage, are unable to support a sufficient number of student devices, or are hampered by congestion on the wired (“LAN”) networks to which the Wi-Fi access points connect, school Wi-Fi networks are as great a constraint on digital learning as the lack of Internet connectivity to the building.

As successful as E-rate has been, it is clear that the current Program will not be able to fund the connectivity and network infrastructure upgrades necessary to support a 21st-century, technology-driven transformation of America’s schools. Today, requests for telecommunications and Internet access connectivity alone are likely to exhaust the entire Program – leaving little money to upgrade connectivity to levels required for digital learning and virtually no money to upgrade Wi-Fi infrastructure.¹⁰ Simply implementing the SETDA digital learning target for 2014-15 – 100 kbps per student or staff member (100 Mbps per 1,000 students or staff) – would cost an estimated \$3 billion per year and require a 120% increase in the bandwidth available in America’s K-12 schools to 5.5 terabits per second (Tbps). EducationSuperHighway estimates that if schools are to reach the 2017 goal set by SETDA of 1 Mbps per student or staff member (1 Gbps per 1,000 students or staff), E-rate would need to fund a total of 55 Tbps of bandwidth at an estimated cost of \$9.9 billion per year, even assuming a 67% decrease in bandwidth cost per-megabit by 2017. At that level, E-rate would be oversubscribed by 400%.

¹⁰ Separately, USAC has indicated that Priority 1 requests for telecommunications services and Internet access exceed \$2.7 billion. See Letter of Mel Blackwell, Vice President, Universal Serv. Admin. Co., to Julie Veach, Chief, Wireline Competition Bureau, FCC, CC Docket No. 02-6 (filed April 22, 2013). This exceeds the current \$2.38 billion cap on FY 2013 E-rate support.

Figure 2.



Meeting the current and future educational technology needs of teachers and students will require prioritizing broadband access and deploying broadband infrastructure that can evolve as bandwidth needs continue to grow. In the near term, this means getting every school – rural, suburban, or urban – bandwidth of 100 kbps for every student or staff member, as Commissioner Rosenworcel and SETDA have suggested.¹¹ But that too will quickly prove inadequate. Bandwidth needs at school districts and libraries that are integrating technology into their

¹¹ See Jessica Rosenworcel, Comm’r, Fed. Commc’ns Comm’n, Remarks at Washington Education Technology Policy Summit, at 4 (Apr. 11, 2013), available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0411/DOC-320122A1.pdf (“By the 2015 school year, every school should have access to 100 Megabits per 1000 students. Before the end of the decade, every school should have access to 1 Gigabit per 1000 students. Libraries, too, will need access on par with these capacity goals.”).

classrooms and learning environments, for example, are growing rapidly.¹² The only way to accommodate schools' and libraries' ever-growing need for bandwidth is to ensure that each school and library with more than 100 students/patrons has a fiber connection, and that smaller schools and libraries have either fiber or some other connection of sufficient capacity to meet their needs.

2. EducationSuperHighway's Vision for Reform.

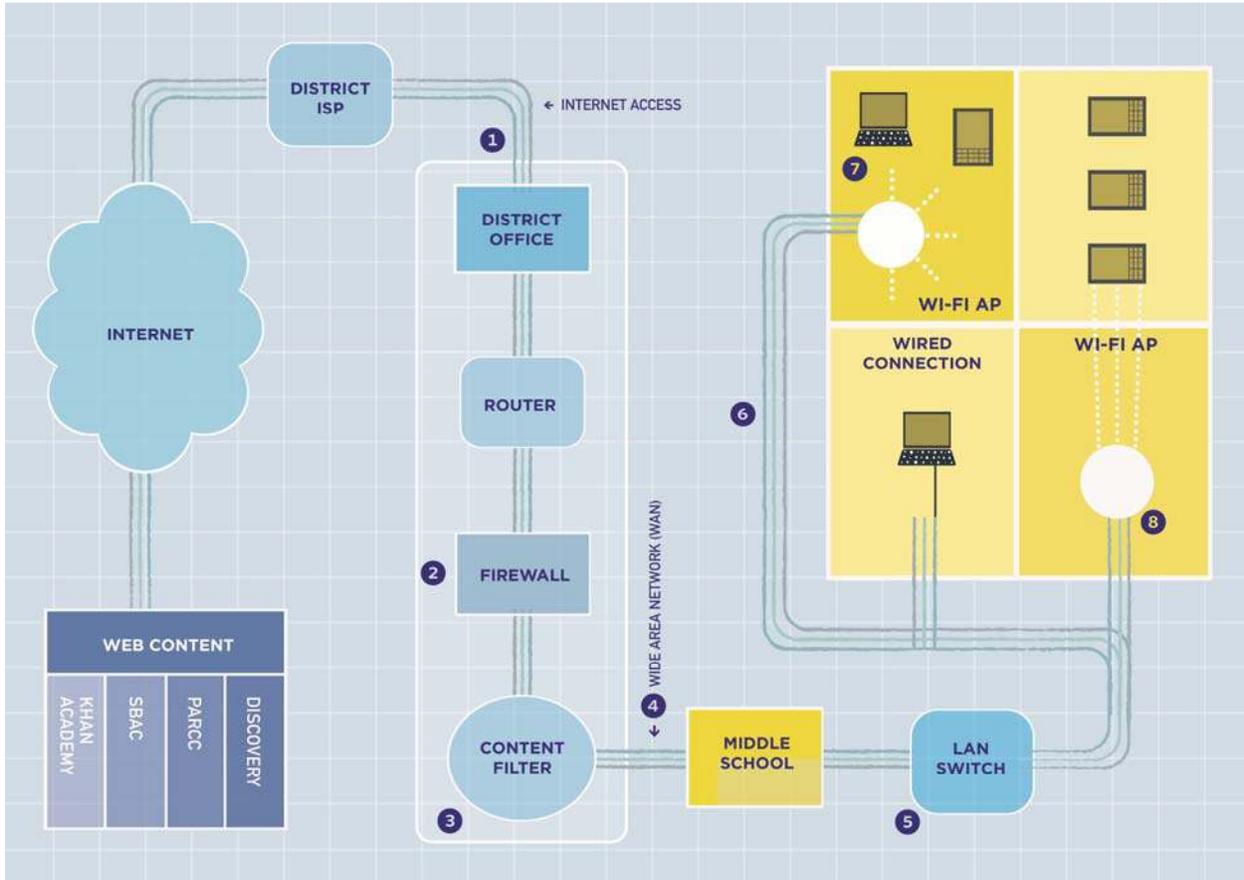
In order to remain competitive with America's peers worldwide, we must dramatically accelerate the deployment of the broadband connectivity and infrastructure that schools and libraries need to support digital learning. We can and must work faster, smarter, and more efficiently by changing the model for deploying K-12 and library broadband networks. Continuing with the status quo is not the answer: our country cannot afford to move slowly while other nations are making these infrastructure investments; our students and library patrons cannot afford any delay that will affect their ability to compete in the global employment market; and taxpayers cannot afford to spend billions of dollars per year buying broadband the old-fashioned way.

A typical K-12 network, shown below, consists of three main components: (1) a connection from the Internet to the district office; (2) a wide area network ("WAN") which connects schools to the district office; and (3) LAN and Wi-Fi networks inside each school that distribute bandwidth to classrooms and student devices. Within each of these components, a variety of wiring, hardware, and software – such as fiber, routers, firewalls, content filters, switches, and Wi-Fi access points – ensure that the network functions as planned. Providing our

¹² See Ian Quillen, *Bandwidth Demands Rise as Schools Move to the Common Core*, Education Week (Oct. 15, 2012), <http://www.edweek.org/dd/articles/2012/10/17/01bandwidth.h06.html>.

schools with the broadband networks they need for digital learning will require that E-rate support the upgrade of all three of these components.

Figure 3.



Source: EducationSuperHighway¹³

EducationSuperHighway has spent the past two years deeply immersed in the challenge of upgrading America's K-12 broadband infrastructure. Based on our work, we believe that E-

¹³ The numbered items are key potential constraints on available bandwidth:

1. Insufficient Internet access capacity
2. Firewall processing speed too slow
3. Content filter processing speed too slow
4. Insufficient WAN capacity
5. <1 Gigabit LAN switch or too few LAN ports
6. Insufficient or outdated LAN wiring
7. Too few Wi-Fi access points
8. Incorrect Wi-Fi access point placement

rate can provide the connectivity and infrastructure that schools need through a combination of (1) providing a targeted, one-time investment to fund both a fiber connection to every school and the networks (wired and wireless) needed to distribute bandwidth within the school, (2) refocusing recurring support to fund broadband connectivity and equipment rather than voice and other eligible services, and (3) empowering schools and libraries to engage in smarter procurement through greater transparency and information.

a) Establish an Upgrade Investment Fund for One-Time Capital Investment in Network Upgrades.

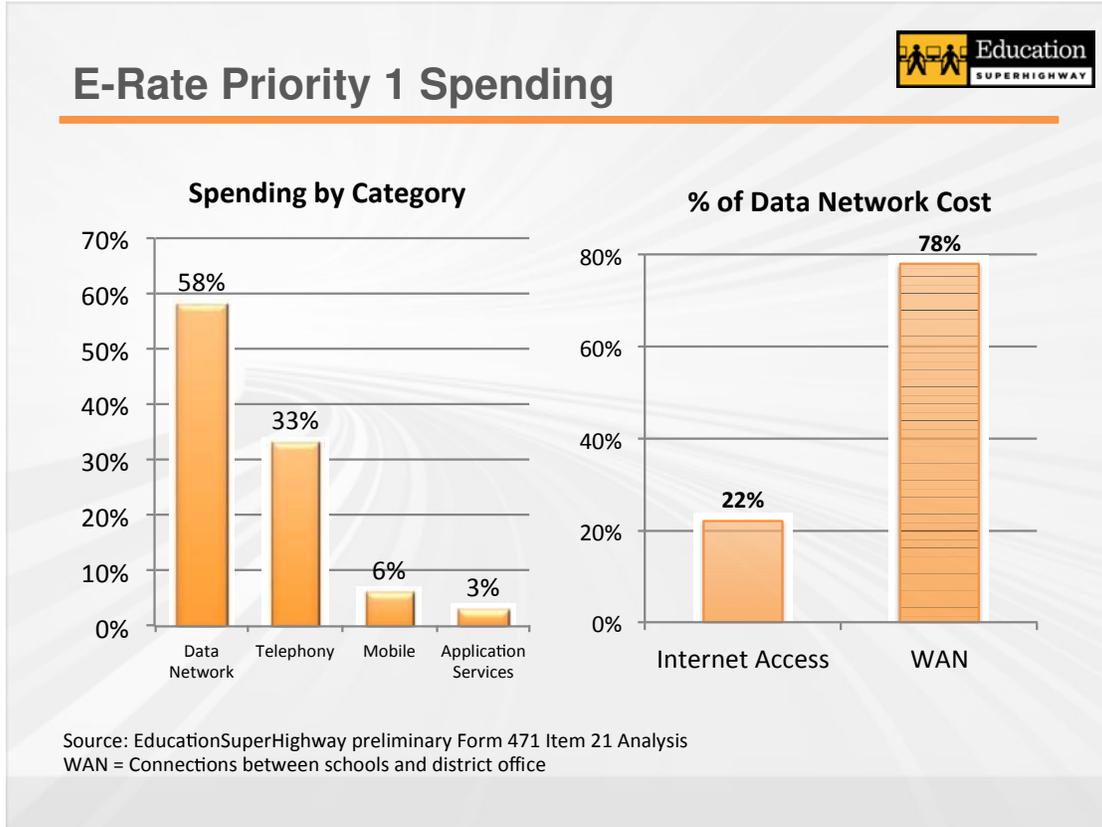
The FCC should create a one-time, multi-year Upgrade Investment Fund (“Upgrade Fund”) to provide the capital for the installation of a fiber connection to every school and library and the upgrade of every school’s or library’s LAN and Wi-Fi networks so they are ubiquitous and capable of supporting 1:1 digital learning. This investment will enable all schools and libraries to meet the connectivity goals proposed by the President’s ConnectED Plan and install the underlying infrastructure required to meet America’s K-12 and library broadband needs for a generation. At the same time, this investment will dramatically lower the recurring cost of bandwidth for schools and libraries, thereby enabling E-rate to meet its statutory goals without a dramatic increase in the size of the Program.

Fiber deployment has powered the information and Internet transformation of the last two decades and led to rapid declines in market prices for bandwidth. It has accomplished this by enabling broadband providers to repeatedly, dramatically increase the amount of bandwidth they can deliver to a location with only modest incremental capital investments and little to no increase in ongoing operating costs. The greatest cost with respect to fiber is getting it in place. As long as sufficient fiber is installed initially, adding capacity to accommodate bandwidth growth can be a simple matter of either changing multiplexing equipment or lighting additional

dark fibers. With fiber, a 100 Mbps capacity facility and a 10 Gbps capacity facility can be deployed today for largely the same upfront cost, with virtually no ongoing operating cost difference.

Fiber deployment will be equally transformative for schools, libraries, and the E-rate Program. By connecting every school and library to fiber, we can provide schools with virtually unlimited ability to increase the bandwidth available in their classrooms by making only occasional modest capital outlays. In addition, connecting every school to fiber will dramatically reduce the annual support that E-rate must provide for the WAN infrastructure connecting schools to the district office. Fiber WANs can reduce the cost-per-megabit from a median of \$40 to less than a dime. Because WAN support today comprises approximately 45% of all Priority 1 spending – and over 75% of all the Priority 1 funding spent on data networks – modernizing E-rate to provide the one-time capital required to deploy fiber WANs is critical to ensuring financial viability of the Program.

Figure 4.



Without investing in widespread fiber deployment, EducationSuperHighway estimates that the annual cost of WAN connectivity for E-rate will have to rise by 400% just to meet the bandwidth needs of schools. With a one-time investment in fiber, however, the annual WAN cost could drop by over 40%.

Of course, to be beneficial, broadband must be connected to students in the classroom and patrons in the library. Fortunately, over the past 13 years since E-rate was enacted, Wi-Fi has transformed computing – creating the possibility for 1:1 learning in America’s classrooms and libraries without running cabling to every student’s or patron’s desk. Virtually every new device being brought into classrooms and libraries assumes and relies on Wi-Fi as its means of connecting to the network. Unfortunately, EducationSuperHighway’s technical-assessment work in districts across the country has shown that most schools lack the gigabit LANs and ubiquitous

Wi-Fi networks required for 1:1 digital learning to be feasible. Schools need capital to invest in upgrading their LANs to 1 Gbps capacity and to deploy a sufficient number of Wi-Fi access points to support a 1:1 student-to-device ratio. Otherwise, our students will be waiting to learn while they experience the delays and dropped connections that an overburdened Wi-Fi network causes.

The Upgrade Fund can supply the capital investment needed to ensure that every school and library has a ubiquitous, high-speed wireless network and to address the digital divide that has been created by insufficient Priority 2 funding. A one-time investment in internal switches, wiring, and access points will ensure that the enhanced bandwidth delivered by fiber WANs reaches students and library patrons. In addition, like an investment in fiber, funding a one-time upgrade in LAN and Wi-Fi networks will reduce the ongoing burden on E-rate by limiting future costs to periodic enhancements that are needed to add capacity or replace equipment that has reached the end of its useful life.

An Upgrade Fund is the most effective and fiscally responsible way for the FCC to meet the Act's objective of ensuring that all elementary and secondary schools and libraries "have access to advanced telecommunications services"¹⁴ and the connectivity goals proposed by ConnectED. No other approach will ensure that all schools and libraries are rapidly upgraded, with the resulting infrastructure scalable to meet their future bandwidth needs. Equally important, no other approach is as likely to ensure that these critical upgrades to WAN, LAN, and Wi-Fi infrastructure will be completed as cost-effectively as possible while having a transformative impact on E-rate's long-term financial viability.

¹⁴ 47 U.S.C. § 254(b)(6).

b) *Refocus the Traditional E-rate Program to Support Ongoing Costs of Broadband Connectivity to the Classroom or Library.*

Even if an Upgrade Fund is established to support the one-time WAN and LAN/Wi-Fi deployment costs needed to connect every school and library in the nation to fiber and a ubiquitous, internal high-speed Wi-Fi network, E-rate may still lack sufficient resources to support all of the current eligible services. EducationSuperHighway's preliminary analysis of Form 471 Item 21 data shows that today, approximately 42% of all Priority 1 support is for telephony, mobile service, and applications such as web-hosting and email.

In order to ensure that schools and libraries can take advantage of the promise of digital learning, the FCC must refocus the E-rate Program on supporting services and equipment that are required for robust broadband infrastructure. These include Internet access (including middle-mile connectivity to reach from a community to an Internet point of presence), WAN operating and maintenance costs, incremental upgrades to WAN optical equipment, LAN/Wi-Fi upgrades to enhance capacity on a 5-7 year timeline, and other key broadband infrastructure such as firewalls and content filters. This is the only way to ensure that as schools' and libraries' bandwidth needs expand, the E-rate Program will be able to meet its statutory objective of providing all students and library patrons with access to advanced telecommunications services.

c) *Reform Procurement Processes and Increase Transparency to Reduce Costs and Improve Efficiency and Fairness.*

In an era of scarce resources, it is critical that every dollar of E-rate funding is spent effectively. By reforming procurement processes, updating and simplifying filing requirements, and collecting – and making public – spending, pricing, and network utilization data, the FCC can reduce costs and better equip itself, applicants, and others to evaluate broadband deployment and E-rate's success. In turn, this will help the FCC ensure the efficiency, effectiveness, and fairness of the Program.

II. CREATE A MULTI-YEAR UPGRADE INVESTMENT FUND FOR ONE-TIME WAN AND LAN/WI-FI DEPLOYMENT AND UPGRADES.

Bandwidth demands for education are escalating: deployment of devices will “dramatically accelerate” the development of educational content and applications,¹⁵ which in turn will drive the demand for broadband. Both wired networks and wireless networks must provide sufficient bandwidth so that students do not end up “spending the majority of the class time waiting for web pages to load” in classrooms where each student is using a device of some kind.¹⁶ The same is true for libraries and library patrons. Current network deployments do not meet current needs and are utterly underprepared for the coming explosion in bandwidth demand. Our broadband infrastructure needs an upgrade, and the FCC should create a one-time multiyear Upgrade Investment Fund within E-rate to accelerate these upgrades for all schools and libraries, ensure they are completed as cost-effectively as possible, and secure the long-term financial viability of the Program.

SETDA recommends a goal of 100 kbps for each student or staff member for 2014-2015, increasing to 1 Mbps for each student or staff member by 2017-2018.¹⁷ It is unlikely that bandwidth demand growth will stop there. Delivering bandwidth of this magnitude affordably and scalable into the future requires embracing new approaches.

¹⁵ See, e.g., LEAD Commission, *Paving a Path Forward for Digital Learning in the United States*, Blueprint, at 2, available at http://www.leadcommission.org/sites/default/files/LEAD%20Commission%20Blueprint_0.pdf (“Our study indicates that schools will require 100 Mbps of bandwidth for every 1,000 students/staff members by the 2014-2015 school year. By 2017-2018, the required bandwidth increases to 1Gpbs.”) (“Lead Commission Blueprint”); see also SETDA Broadband Recommendations at 10-15.

¹⁶ Cisco White Paper at 23.

¹⁷ SETDA Broadband Recommendations at 25.

E-rate 2.0 should build on the Commission's 2010 decision to permit schools and libraries to lease and light dark fiber, as well as lease lit fiber. By supporting the upfront construction and deployment of fiber – regardless of ownership – the Commission can rapidly bring all schools and libraries up to a minimum broadband infrastructure threshold required to support digital learning. By moving the bulk of the costs for the fiber to a one-time, up-front investment, this approach will limit recurring costs to maintenance and periodic incremental investment to light additional capacity.

This evolution toward dedicated fiber follows the wireless industry's path as it has had to upgrade the backhaul to its towers to support advanced wireless services such as LTE. When wireless service was almost entirely made up of voice calls, bandwidth was delivered to and from towers by one or two expensive T1 lines that were almost always purchased from the ILEC. As cell phone usage grew and data was introduced, the number of T1 lines required rose rapidly, increasing wireless operators' costs. In 2008-2010, wireless operators started to switch from T1s to Ethernet, driven by the need to dramatically increase capacity and reduce costs. Alternative network providers emerged to compete with the ILECs to provide backhaul and, in 2010 and 2011, price points fell to levels that were unimaginable just a few years earlier. Over the last two years, the larger wireless providers have started to look ahead to the next iteration of their backhaul architecture and commercial agreements. As the demand for wireless data has exploded, the largest operators have increasingly looked at dark fiber as the preferred medium for backhaul: fiber provides almost limitless potential capacity, simplicity, and reliability; and because dark fiber is charged per connection, rather than per-megabit, activating increased capacity does not require incurring substantial additional operating costs. This is a major concern for carriers realizing they have limited ability to charge their customers for additional

bandwidth, and the wireless carriers recognize that this is the only economically viable way to meet the exploding bandwidth demands from smartphones.¹⁸ The same logic applies to meeting the exploding demands for bandwidth from devices in the classroom or library in a cost-effective way.

The Upgrade Fund provides a way, within E-rate, to manage these one-time capital investments in a manner that matches the way the costs would be incurred, rather than trying to fit them into a system of annual recurring costs, as is required today. The Upgrade Fund would also eliminate the current rules' distinctions between "owned" and "leased" dark fiber, between dark and lit fiber with respect to the costs to put the dedicated fiber facilities in place, and between the fiber and the electronics necessary to use the fiber. It would also avoid the requirement to amortize capital investment costs over at least three years, as the entire Upgrade Fund would be focused on one-time non-recurring expenditures, rather than recurring fees. And it would cover all parts of the network – from the district office to the internal Wi-Fi access point, including dedicated links between the district office and the school, between buildings on

¹⁸ See Patrick Minogue, *Wireless Backhaul Strategies: Dark Fiber vs. Managed Services*, Sunlight (July 2, 2013), <http://sunlight.sunesys.com/2013/07/02/wireless-backhaul-strategies-dark-fiber-vs-managed-services/>; see also *AT&T, Verizon, others hone their wireless backhaul skills*, FierceTelecom (June 11, 2013), <http://www.fiercetelecom.com/special-reports/att-verizon-others-hone-their-wireless-backhaul-skills> (“[M]any Wireless Carriers have turned to acquiring Dark Fiber from the underlying Landline Carrier, rather than Lit Managed Ethernet services, in part because of many of the following benefits of the Dark Fiber solution:

- Cost Efficiency: May be less to acquire, operate and maintain versus a lit managed service solution
- Flexibility: Ability to add or decommission sites when needed, without permission
- Scalability: Process bandwidth upgrades on their own timeline, with unlimited growth
- Control: Manage internal timelines, capacity demands and network migrations, usually at a lower operating expense.”).

a school campus or set of campuses, and within a school. The same would be true for libraries connected through a WAN.

Recurring costs would of course remain a part of the annual E-rate Program support mechanism. Those costs would include ongoing operating costs and network management services, as well as monthly Internet connectivity charges and transport between the school district's (or library's) WAN and the Internet (usually over middle-mile facilities that are shared with other users). The annual E-rate support mechanism would also cover the lesser ongoing incremental capital investments for increasing WAN or LAN/Wi-Fi capacity as justified by usage.

By eliminating what is essentially the amortization of and return on capital on initial construction, however, these recurring costs would be much lower than they have been in the past. This can be seen in the structure of widely used indefeasible-right-of-use arrangements ("IRUs"). When a carrier purchases an IRU in a facility, it pays a typically one-time fee to acquire a property interest in a dedicated facility, such as a fiber. This is akin to what would be supported through the Upgrade Fund. The carrier also usually also enters into a contract for ongoing operations and maintenance ("O&M") of the fiber, with occasional incremental costs for the electronics needed to increase capacity – analogous to the ongoing support through the annual E-rate Program. As a result, the ongoing costs are lower than if the carrier simply leased the facility, as the lease payments would have to cover the costs of creating the facility, ongoing return on those capital costs, and O&M.

From a different perspective, an analogy also can be drawn from grant funding under rate-of-return regulation. When a rate-of-return carrier receives a grant, the grant offsets the associated capital investment such that it does not become a part of the ratebase on which the

carrier's return is computed. With the Upgrade Fund, the annual E-rate Program will no longer have to pay an ongoing amortization and return on the capital associated with constructing the dedicated WAN facilities because the payment will cover the capital costs of construction.

Notably, because the school or library using the Upgrade Fund essentially purchases the long-term use of an entire fiber, those costs become essentially fixed, and do not scale per-megabit or gigabit. Moreover, recurring O&M for these dedicated WAN facilities would also be essentially fixed, and would be unrelated to the amount of bandwidth on the network. Thus, the Upgrade Fund's capital investment could lead to flat-rate, rather than capacity-based, pricing for the WAN connection – a transition that will ensure the long-term ability of E-rate to meet its statutory requirements without a dramatic increase in the size of the Program.

A. Network Scope and Benchmark Local Connectivity Targets.

The Upgrade Fund should set minimum infrastructure benchmarks, both for WAN and LAN/Wi-Fi capacity and for equipment and cabling, that participating school districts and libraries would have to install.¹⁹ These benchmark targets for the Upgrade Fund should require participants to connect every school and library to multiple strands of fiber (including additional strands for future growth);²⁰ deploy a WAN of at least 1 Gbps lit capacity;²¹ and deploy

¹⁹ See, e.g., SECA's E-rate Reform 2.0 White Paper at 4-8, CC Docket No. 02-6 (filed June 24, 2013) ("SECA White Paper"); see also Cisco White Paper at 21-27.

²⁰ In certain situations, such as very remote, hard to reach or high-construction-cost areas (lots of rock) the use of point-to-point wireless should be an acceptable alternative to fiber.

²¹ By the time funding becomes available, it may make more sense to actually deploy a 10 GB WAN as Moore's law drives down the cost of the optical equipment.

sufficient internal LAN and Wi-Fi capacity to support a minimum 1:1 device-to-student deployment.²²

The Upgrade Fund should also encourage and support the deployment of WAN networks on a district-wide or area-wide basis where appropriate, including a dedicated fiber connection to the district office in addition to the WAN connections to individual schools (or any libraries connected via a WAN).²³ A district-wide or area-wide WAN network will allow all schools on that WAN to offer applications, such as voice and video, through the WAN and to reduce costs to individual schools, or to all buildings located on a single campus (e.g., multiple schools on a single campus and multiple buildings for a single school).

B. Reduce Other Barriers.

The FCC should consider implementing incentives for state commissions and local permitting and rights-of-way managers to reduce impediments to and the costs of deploying the fiber necessary for WANs. This might take the form of additional discounts or credits toward a school's or library's share for entities that reduce the rights-of-way costs that the Upgrade Fund would otherwise have borne or accelerate the necessary permitting – or, alternatively, reduced discounts for those that do not take such actions.

C. Sources of Upgrade Fund Resources.

Some additional E-rate support likely will be necessary for the period that the Upgrade Fund is in existence. By its nature, however, this will be limited in duration. Moreover, the

²² Cisco White Paper at 24 (In the near future, “[i]t is likely that students at times will have more than one wireless device active in the classroom. This is leading to a 1:2 student-to-device ratio or greater, especially in higher grade levels.”). Some provision for districts in which deploying fiber would not be possible due to unique local conditions may be necessary. However, this is expected to be a rare case.

²³ An area-wide network might be, for example, a consortium of both public and private schools in a particular city or county, or include multiple districts.

amount of additional E-rate support necessary can be minimized by recapturing rollover funds from prior unexpended commitments and by redirecting support away from non-broadband services. In this regard, it is important to note both that WANs account for approximately 45% of E-rate support, a portion of which would now be covered by the Upgrade Fund rather than the recurring fund, and that E-rate expends approximately \$1 billion (42% of \$2.35 billion) for non-broadband services.

Delaying the creation of an Upgrade Fund will cost, rather than save, money over the long term. Bandwidth costs can and will come down dramatically through investment in fiber capacity for dedicated WAN facilities. This is especially true in areas in which local facilities-based competition is not already robust. The dedicated fiber will have to be deployed eventually; it is just a matter of how much time will pass before getting started and how many billions of dollars will be wasted by continuing to procure bandwidth in the current uneconomical fashion.

III. REFOCUS THE ANNUAL E-RATE PROGRAM ON BROADBAND.

EducationSuperHighway applauds the Commission's proposal to "focus E-rate funds on supporting high-capacity broadband to and within schools and libraries."²⁴ Access to high-capacity broadband and ubiquitous wireless networks is essential to support schools and libraries going forward. As discussed above, estimates show that to support digital learning, bandwidth usage will need to increase from 2.5 terabits to 5.5 terabits immediately and to a staggering 55 terabits by 2017.²⁵ Similarly, we must address the network bottlenecks that have been created by the historic lack of Priority 2 funding for LAN and Wi-Fi networks and the absence of support for critical network management tools. Our schools and libraries do not have the broadband

²⁴ NPRM at 11,321 ¶ 56.

²⁵ This assumes implementation of SETDA's recommendation of 1 Mbps per student or staff member.

infrastructure they need, and it is imperative that we focus every resource possible on addressing this bottleneck to digital learning.

A. Focus on Broadband Infrastructure.

The Commission should establish specific goals to address the bandwidth gap, an approach that will necessitate several key reforms. As noted in the NPRM, significant changes must be made to the priority schedule to re-focus on supporting broadband.²⁶ Over one-third of available Priority 1 funds currently are being spent on voice and mobile services. Those funds could be better deployed to support broadband, either through the one-time spending proposed for the Upgrade Fund or in supporting recurring costs for transport and middle-mile connectivity that are needed to meet the growing broadband needs of schools and libraries.

Regardless of whether it creates an Upgrade Fund, the Commission should prioritize funding for broadband infrastructure (equipment & services), including Internet access, WAN connections, LAN and Wi-Fi infrastructure, and firewalls. The Eligible Services List should be expanded to include broadband-specific equipment and services such as content filters, fiber maintenance, outsourced network monitoring services, and infrastructure planning services. Although the necessary upfront capital investments for these networks and the LAN and Wi-Fi connectivity to the student/library patron should be drawn from the Upgrade Fund, the annual E-rate Program should address ongoing operational expenses for those capital facilities supported by the Upgrade Fund and other ongoing expenses. The FCC should also prioritize services that are not covered by the Upgrade Fund but are still necessary to support broadband delivery to the classroom, such as transport to rural areas where Internet access is one of the greatest challenges.

²⁶ NPRM at 11,329 ¶ 85 (seeking comment on “which of the internal connection services listed as priority two services on the current ESL are necessary for providing high-capacity broadband connectivity within schools or libraries”).

At the same time, the Commission should de-prioritize funding for all other currently eligible services, including telephony.

B. Reduce Costs over Time.

The FCC should set a goal of reducing recurring broadband costs over time.

Transitioning the cost structure for dedicated local WAN and LAN connectivity to a per-connection basis, as discussed above, rather than a per-megabit basis will facilitate this cost reduction; it will also enable schools and libraries to easily and efficiently scale their networks to meet future broadband needs. EducationSuperHighway preliminarily estimates that most districts should be able to achieve local WAN connectivity to the district office (after the initial infrastructure investment) for \$750 per month per connection – although this may need further refinement for rural settings. This monthly cost estimate does not include middle-mile transport to the Internet Tier 1 backbone, which of course can vary greatly depending on geography. Fixing connection costs at a reasonable target level, however, will reduce ongoing costs in the long term and establish readily scalable networks – easily achieving the Commission’s goal of reducing recurring per-megabit costs over time.²⁷

C. Increase Flexibility for Districts and Vendors With or Without a K-12 Infrastructure Upgrade Fund.

1. Support Self-Provisioning or Alternative Contracting (Evergreen Contracts) and Other Methods of Creating Flexibility in Funding.

The Commission should eliminate the prohibition on self-provisioning for WAN connections. As the FCC has acknowledged, self-provisioning is more cost-effective than obtaining service from a carrier in some cases.²⁸ Self-provisioned networks may also be more

²⁷ See *id.* at 11,330 ¶¶ 88-89.

²⁸ See *id.* at 11,328-29 ¶¶ 79-81.

sustainable in terms of upgrade flexibility (i.e., scalability for increased educational needs), robustness, and sustainability,²⁹ especially if the Commission does not decide to move to a per-connection cost structure for telecommunications services. Self-provisioning may also provide schools with more control over their network architecture and monitoring. To that end, the Commission should update the E-rate rules to make all elements of a dark fiber deployment eligible for Priority 1 E-rate subsidies, including special construction charges, IRUs, and optical equipment needed to light dark fiber.³⁰

EducationSuperHighway supports the Commission's proposal to modify the E-rate rules to allow multi-year contracts for Internet and WAN connectivity, and to align the Program with the recently reformed Rural Health Care program to allow E-rate applicants "more flexibility in renewing multi-year contracts."³¹ Multi-year contracts help reduce program costs and provide better long-term predictability for schools for financial planning purposes; they also provide greater stability for the vendor (which can predict future demand more easily and provide better pricing on a multi-year basis).³²

Another way to give schools and libraries more control over their budgets and create more room in the E-rate fund would be to create a mechanism allowing applicants to get increased support in one year in exchange for an overall reduction in future subsidies.

²⁹ See, e.g., Comments of Southwest Telehealth Access Grid at 8, CC Docket No. 02-60 (filed Aug. 20, 2012).

³⁰ See NPRM at 11,325-26 ¶¶ 71-72.

³¹ *Id.* at 11,350 ¶ 172.

³² See, e.g., SECA White Paper at 5 ("Leased high speed telecommunications circuits and Internet access commodity service are frequently purchased on a multi-year basis in order to obtain the most competitive prices possible. The prices for these services on a single year basis typically are exorbitant compared to a multi-year contract.").

2. Consolidating Build-Out Costs.

The Commission can also create long-term efficiencies in E-rate funding by allowing vendors to pull additional fiber as part of E-rate builds with the only cost allocation being for the additional fiber cost. Just as municipalities encourage joint trenching practices to coordinate construction of utility trenches and minimize the number of utility trenches in public and private rights-of-way, allowing vendors to pull additional fiber as part of E-rate construction will reduce long-term fiber construction costs and provide the necessary fiber to make networks more easily scalable. The FCC should also transition the cap on dark fiber special construction charges from a fixed amount to an amount based on distance and construction method (aerial vs. underground) used in deploying the fiber so as to give applicants and vendors the flexibility to design construction in the most beneficial and efficient way.

IV. RULES GOVERNING ELIGIBILITY FOR FUNDING THE UPGRADE INVESTMENT FUND AND THE TRADITIONAL E-RATE PROGRAM.

Demand for the Upgrade Fund and the annual E-rate Program is likely to be extremely high as schools and libraries seek to upgrade infrastructure to meet their burgeoning bandwidth needs. The FCC should establish and apply data-driven rules for both the Upgrade Fund and the annual E-rate Program to determine if a school, district, or library is eligible for funding. To start, the Commission should establish a set of minimum thresholds (such as having a fiber connection, access to a specified amount of WAN bandwidth and Internet access, and a specified number of LAN ports and Wi-Fi access points) below which all schools and libraries are eligible for upgrades. Once a school, district, or library has been upgraded to the minimum thresholds, any expansion in capacity should be governed by data showing that existing capacity is being utilized to an extent that warrants an increase. The Commission should also establish rules addressing network monitoring requirements as a pre-requisite for capacity upgrades.

In some cases, exceptions will need to be made to the formulaic approach to upgrade eligibility. Some schools and libraries may find themselves unable to meet the upgrade requirements described above, and the FCC should create a rigorous, case-by-case review process for such exceptional cases. For example, any applicant that cannot show that it meets the relevant upgrade eligibility requirements should be required to demonstrate that a planned education technology implementation requires funding for a specific infrastructure upgrade. The applicant should also be required to provide detailed information regarding the infrastructure upgrade, the equipment required, and why the applicant's existing configuration is insufficient for its needs. All such cases should be reviewed and approved by the FCC in a timely manner.

The FCC should structure the rules for the Upgrade Fund and the annual E-rate Program so that all applicants – including smaller, rural, or poorer districts or libraries– have access to funding for equipment upgrades. To that end, the Commission should base funding determinations for all equipment upgrades for eligible applicants at least in part on the time since an applicant's last upgrade. That is, applicants who have already upgraded will not be eligible for repeat upgrades until all applicants seeking upgrade support have been funded. To ensure that these rules evolve as program and technology needs change, the Commission and USAC should review the upgrade eligibility rules every 3-5 years, at the same time they review the E-rate Program rules.

V. PROCUREMENT REFORMS AND TRANSPARENCY INITIATIVES TO IMPROVE EFFICIENCY.

EducationSuperHighway supports the Commission's efforts to reform E-rate to simplify participation in the Program,³³ maximize cost-effectiveness,³⁴ and improve efficiency.³⁵ The reforms discussed below will be especially effective in promoting the Commission's goals.

A. Administration and Implementation.

The Commission should create a single, integrated web portal for use by USAC, applicants, and vendors, as promoted by the State E-rate Coordinators Alliance ("SECA").³⁶ A unified portal system, coupled with a single national K-12/Library broadband infrastructure database in which applicants must document the broadband infrastructure installed in every school or district, will serve myriad functions for the Commission, applicants, and vendors. Making this information public and easily searchable will facilitate data analysis, allowing the Commission to track funding and deployment and providing accountability and examples to applicants and vendors. USAC's own reporting and disclosure requirements should be updated as a part of this reform and can be aggregated and disseminated through the integrated web portal. As SECA has suggested, a portal solution will reduce costs, simplify and streamline the application process, and provide a sound basis for analysis.³⁷

Easier analysis of broadband infrastructure data will promote innovation in the use of funding and deployment of broadband and communications facilities to schools and libraries. In addition, a unified web portal and application process will encourage schools and libraries to

³³ See NPRM at 11,336-48 ¶¶ 115-162.

³⁴ See *id.* at 11,352-62 ¶¶ 179-223.

³⁵ See *id.* at 11,362-77 ¶¶ 224-269.

³⁶ See *id.* at 11,364 ¶ 229.

³⁷ See SECA White Paper at 17-19.

participate in the Program. Importantly, as SECA points out, the unified web portal will minimize the potential for costly mistakes on E-rate forms that can result in denial or delay of funding and increased costs of review and appeal for both applicants and USAC.³⁸ Instituting necessary reforms to simplify the E-rate application and appeal processes will improve fairness, reduce costs, and ensure that applicants receive funding for all eligible services.³⁹

1. Update Requirements for Schools and Libraries Receiving E-rate Funds.

EducationSuperHighway supports the Commission’s proposal to transition to electronic submission of forms and supporting documents.⁴⁰ The Commission should require applicants to submit all forms electronically in machine-readable form using a standard web portal, as suggested by SECA⁴¹ and required by the Office of Management and Budget’s (“OMB”) recent open data directive, *Open Data Policy – Managing Information as an Asset*.⁴² Collecting this data in machine-readable format “supports downstream information processing and

³⁸ See, e.g., *Request for Review of the Decision of the Universal Service Administrator by Bishop Perry Middle School, New Orleans, LA, et al.; Schools and Libraries Universal Service Support Mechanism*, Order, FCC 06-54, 21 FCC Rcd. 5316, 5316 ¶ 2 (2006) (noting that the “application process is complicated, resulting in a significant number of applications for E-rate support being denied for ministerial, clerical or procedural errors”).

³⁹ See Cisco White Paper at 40 (arguing that the complex E-rate application process prevents schools without the resources to hire dedicated staff or consultants to obtain E-rate funding from achieving a fair allocation of E-rate support for much-needed networks and services).

⁴⁰ See NPRM at 11,363 ¶ 227.

⁴¹ See SECA White Paper at 17-19.

⁴² Office of Mgmt. & Budget, Exec. Office of the President, M-13-13, *Open Data Policy – Managing Information as an Asset*, at 6 (May 9, 2013), available at <http://www.whitehouse.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf> (“Agencies must use machine-readable and open formats for information as it is collected or created. While information should be collected electronically by default, machine-readable and open formats must be used in conjunction with both electronic and telephone or paper-based information collection efforts.”) (“OMB May 9, 2013 Directive”).

dissemination activities”⁴³ and will “enhance the accessibility and usefulness of the data,” as the Commission has noted,⁴⁴ and will enable the school districts, libraries, states, and the Commission to more easily evaluate the effectiveness of E-rate funding. Specifically, applicants should be required to provide in machine-readable format submissions responsive to Form 471, Item 21, which asks applicants to provide a description of the service being supported, “including a breakdown of components, costs, manufacturer name, make and model number.”⁴⁵ This should, for example, include for a data circuit the number of megabits of Internet access purchased both upstream and downstream, whether the segment covered is school to district office or district office to Internet (or the equivalent for a library on a WAN), and whether these services were part of a bundle and the amount of the bundle discount. Similarly, the information for switches/router/Wi-Fi access points should include the model purchased and the ports and port capacities.⁴⁶

The Commission should require applicants to deploy passive broadband monitoring solutions and report broadband utilization as a condition of receiving E-rate funding. An analogy to the Measuring Broadband America program is apt. That program provides a useful

⁴³ *Id.* at 1.

⁴⁴ NPRM at 11,320 ¶ 52.

⁴⁵ Description of Services Ordered and Certification Form, FCC Form 471 at 5, Line 21 (Oct. 2010), available at http://www.usac.org/_res/documents/sl/pdf/forms/471_fy05.pdf.

⁴⁶ The Commission should separately request confidential information, such as account numbers or phone numbers, to more easily protect confidential or sensitive information separately from the Item 21 data on services procured, which would enable the Commission to “ensure that privacy and confidentiality” of E-rate applicants are fully protected, in line with OMB’s recent directive. OMB May 9, 2013 Directive at 9; *see also id.* at 2 (agencies should be “building or modernizing information systems in a way that maximizes interoperability and information accessibility, maintains internal and external data asset inventories, enhances information safeguards, and clarifies information management responsibilities.”); *see also* NPRM at 11,320 ¶ 52.

model: measurement hardware and software deployed on location “conduct automated, direct measurements of broadband performance throughout the year.”⁴⁷ Here, though, the purpose of monitoring is different: rather than monitoring actual-vs.-advertised speeds, this monitoring holds schools and libraries accountable for actually utilizing the bandwidth that they secured E-rate support to procure. This monitoring will give the FCC and others the ability to track how much bandwidth schools and libraries have available and how much they actually are using, which will enable better assessment of digital learning readiness at the school and district level. Usage information will allow applicants to plan for future bandwidth needs and inform FCC decision-making on how to allocate E-rate funding, such as ensuring that additional funding only flows to where it is needed. More broadly, usage information will provide additional information regarding participating institutions’ progress towards greater adoption of digital learning tools. Similarly, applicants should be required to file standard usage reports for other E-rate eligible services.

2. Update Requirements for Vendors Receiving E-rate Funds.

Some reporting requirements must be imposed on vendors to ensure efficient use of E-rate funding. The Commission should require all vendors to submit annual reports to USAC, detailing equipment or services provided to applicants and relevant pricing data. This information will provide a backstop to applicant-submitted information and supplement the K-12/Library broadband infrastructure database. It will also ensure vendor compliance with the lowest corresponding price rules of the E-rate Program. Vendors are already required to

⁴⁷ Office of Eng’g and Tech. and Consumer and Gov’tal Affairs Bureau, Fed. Commc’ns Comm’n, *2013 Measuring Broadband America, A Report on Consumer Wireline Broadband Performance in the U.S.*, Report, at 7-8, available at <http://transition.fcc.gov/cgb/measuringbroadbandreport/2013/Measuring-Broadband-America-feb-2013.pdf>.

maintain this information, so an additional requirement that it be reported to USAC in a standard format through the integrated web portal will not appreciably increase their regulatory burden.

3. Update USAC’s Reporting and Disclosure Requirements.

The comprehensive web portal and related database will also provide a platform for USAC to analyze and make public information regarding the E-rate Program.⁴⁸ The Commission should require USAC to make all E-rate data and reports available for download through the web portal, and to generally disclose all information submitted as part of the E-rate Program. This data release must be structured to minimize the potential for this data to facilitate collusion or parallel pricing behavior. A delay between the collection and disclosure of pricing information – the natural one-year lag between getting bids and obtaining funding – likely will be sufficient to mitigate these issues.

The Commission should also revise USAC’s reporting requirements to include collecting and providing detailed E-rate spending information, providing benchmark pricing for all E-rate eligible services, and reporting data showing progress toward each goal established for the E-rate Program in Part II above.

B. Encourage Consortia Participation for Small- and Medium-Size Districts.

The Commission should encourage small- and medium-size districts to “recognize efficiencies and lower costs”⁴⁹ by forming purchasing consortia.⁵⁰ This could be accomplished by crafting incentives for smaller districts to participate in consortia, such as funding consortia

⁴⁸ See, e.g., OMB May 9, 2013 Directive at 5 (“Consistent with OMB’s *Open Government Directive*, agencies must adopt a presumption in favor of openness to the extent permitted by law and subject to privacy, confidentiality, security, or other valid restrictions.”).

⁴⁹ *Rural Health Care Support Mechanism*, Report and Order, FCC 12-150, 27 FCC Rcd. 16,678, 16,767 ¶ 197 (2012) (“RHC R&O”).

⁵⁰ See NPRM at 11,352 ¶¶ 179-80.

applications first at each priority level. Schools and districts should be permitted to retain their individual discount levels, even when purchasing as part of a consortium, to further encourage consortia formation.

At least for higher education institutions, the Commission should permit state organizations, public entities, non-profits, and other community anchor institutions to join with schools and libraries in consortia to increase buying power and provide access to expertise, similar to the practices employed in the Rural Health Care Program.⁵¹ Any shared facilities between eligible and ineligible organizations in such a consortia, such as connections from a consortia WAN to the commercial Internet, should be eligible for E-rate subsidies on a pro-rata basis.

C. Issue Annual Equipment RFPs.

EducationSuperHighway supports the Commission's efforts to develop and encourage bulk-buying opportunities in addition to consortia.⁵² Simplifying these opportunities in a top-down manner will facilitate participation by even the smallest schools and libraries. To that end, USAC should engage a third-party procurement specialist firm to assist applicants in reducing the costs of eligible services. The procurement specialist should conduct an annual national RFP for any equipment or services that lend themselves to scale purchasing and negotiate national K-12 pricing for equipment maintenance contracts. Participation by applicants should be voluntary. The procurement specialist should also develop or update standard RFP documents, processes, and systems that can be used by districts or libraries for their own RFPs, as well as template contracts that can be adopted by districts or libraries. The information provided by applicants

⁵¹ See *id.* at 11,353 ¶ 184; see also RHC R&O at 16,767-68 ¶¶ 199-204.

⁵² See NPRM at 11,353-54 ¶¶ 186-88.

and vendors through the integrated web portal may also suggest new ways of aggregating buying power; for example, USAC may be able to match applicants to the lowest-cost RFP response for certain equipment or categories of service and allow applicants to join existing consortia to obtain the favorable pricing.

VI. CONCLUSION

EducationSuperHighway appreciates this opportunity to participate in the crafting of a modern, more efficient E-rate Program. EducationSuperHighway urges the Commission to adopt its proposals to enhance E-rate and expand it to fund much needed infrastructure in the nation's schools and libraries, to further support the future of technology in education.

Respectfully submitted,

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