**Webinar Transcript - Sustainable Wireless Strategies for Keeping Students Connected and Learning**

**June 9, 2021**

- [Sara] Hello, everyone. Good afternoon and welcome to our webinar on Sustainable Wireless Strategies for Keeping Students Connected and Learning. Thank you for joining us. My name is Sara Trettin and I am a senior policy advisor in the Office of Ed Tech at the U.S. Department of Education. Before we get started, I do have a few housekeeping items that I wanted to run through quickly.

So first, you can turn on or off the live closed captioning. If you're watching via WebEx, you should see a closed captioning button at the bottom left of your screen which you can click to turn on or off. If you're watching via the live stream on YouTube, you can access the closed captioning button on the bottom right of the screen.

Next slide. In the second half of the webinar, our state and district technology leaders are going to be answering your questions. And so there are a couple ways that you can submit your questions or comments during the webinar. So the first is through Twitter. You can share your questions using the hashtag #EDWirelessBrief. If you're watching on WebEx, you can post your questions in the chat box or if you're watching on YouTube, you can log in to YouTube to both see the questions and also post the question in the chatbox.

So we are going to be monitoring all three locations during the webinar and we really encourage you to share your questions. We might not get to all questions during the webinar, but we will make sure to follow up after. All right. So for our agenda today after a really brief introduction, each of the technology leaders that are featured in the wireless brief will discuss their off-campus network projects and then our plan is to open it up for a Q&A panel discussion to answer your questions and go more in-depth there.

So I'm Sara Trettin. I'm joined today by Lisa Palacios, the director of technical assistance for broadband at the Manhattan Strategy Group. I'm also joined by Christopher Mitchell, who's going to service our panel monitor today. Chris is the director of community broadband networks at the Institute for Local Self-Reliance.

We are also joined by six state and district technology leaders from across the country and we plan to introduce them as we go. All right. So why are we here today? So last week the department published a new resource for school districts that present strategies for deploying off-campus wireless networks as a sustainable solution to provide home connectivity to students and educators.

Deploying an off-campus wireless network won't be the right solution for all school districts, but as more states and districts are investing in home access solutions for students, we wanted to highlight six projects that have taken different approaches to deploying these types of networks. So the projects we're going to hear from today were implemented in different geographies, so representing large rural school districts to suburban and urban communities.

They used slightly different technologies across all three projects, have different partnership models that they've used to get their projects up and running, and they've been in operation for different periods of time. So some of the projects you'll hear from today have been in operation for over 10 years, others were deployed just last year, you know, in response to the pandemic.

So we hope that districts considering this approach will be able to learn from the leaders we have on our webinar today. So with that, I'm going to turn it over to you, Lisa, to get us started.

- [Lisa] Hi. So we're going to talk about three different types of wireless strategies. Most of our strategies are in the sustainable category, but with the pandemic and sudden school closings, districts were forced to implement immediate solutions to keep students learning from home.

These immediate strategies including, providing devices and hotspots, places within the community to drive up and pick up a Wi-Fi signal, and equipping school buses with Wi-Fi, and driving those to different neighborhoods. There were districts who were already providing off-campus solutions. You'll hear about these today in the form of using Educational Broadband Service, Citizens Broadband Radio Service, and one example of a district partnering with an ISP.

There are other ways to provide broadband out of school that are sustainable and they are mentioned in the brief and in an upcoming playbook from the Office of Educational Technology. There are also other emerging solutions that districts are looking into. Using TV white space for broadband is a viable if uncommon solution and low Earth orbiting satellites such as the one that we'll provide.

5G will become very prevalent, but also expensive in the near future. And we now should have a poll up and the poll is, which is the most significant connectivity challenge in your state or community? So it looks like of the ones that were chosen, internet access is available, but bandwidth isn't high enough or it is unaffordable were the two top answers other than no answer, whatsoever.

So believe me, we understand that and that is something that we have been looking at and studying for quite some time. Now let's go to the case studies and our first case study is going to be presented by Dr. Christine Diggs from Albemarle County in Virginia.

- [Dr. Diggs] Thank you, Lisa. Good afternoon. I'm happy to be here today to talk about connecting our students to the internet. Albemarle County Public School is a school district comprised of 26 buildings within Albemarle County which surrounds Charlottesville in Central Virginia.

We have a mix of rural, urban, and suburban schools serving about 14,000 students, 30% of which participate in the free and reduced lunch program, and 10% report as being English language learners. Our plan for ACPS@Home is to take a multi-pronged approach to connecting our students by providing hotspots and broadband to them, while at the same time partnering with our county government IT department to support their efforts to improve internet connectivity throughout our county which spans over 700 square miles.

We assist the county by having developed the connection speed test they use as part of their connectivity survey tool and by mapping the connectivity results by student address for them at an aggregate level. For this multi-pronged approach, we've connected almost 1,400 students and families. And our county has connected over 200 of our students and families so far through the Virginia Telecom Initiative grant program.

Albemarle County public schools actually started developing an LTE network over seven years ago. Thank you. Utilizing our existing EBS spectrum, but they experienced several challenges only connecting about 100 students during that time period. While we still have those students connected via a rooftop signal powered by Comcast, most rooftops are not tall enough for providing an optimal signal.

ACPS also had challenges getting towers approved and constructed around the county. So in December 2019, we switched to leasing our EBS spectrum in order to fund the current multi-pronged approach I described. And for our latest developments moving forward, our county has just opened a broadband office to more closely focus on expanding broadband throughout the county.

Our school division is planning a virtual school pilot for next school year and we will continue to service the financial sponsor for connecting our students. Thank you.

- [Lisa] Thanks, Christine. Our second model is going to be presented by Tom Rolfes about Nebraska.

- [Tom] Thanks, Lisa. So unlike my fellow project leads, I worked as a catalyst at the statewide level to help connect the Northeast Nebraska tribal educational broadband services team members with the appropriate expertise and resources to help make their project successful.

The five public school superintendents and our technology coordinators joined with the president of the Nebraska Indian Community College and its technology director in taking this project from concept to implementation in only six months which was March to October 2020. And that included the FCC Licensing of EBS spectrum and all of their fundraising.

Once the project was implemented in the fall of 2020, the private LTE wireless network broadcasted a single network ID which was available to all the students and their staff devices from all six institutions. This 580-square mile area on tribal land previously had one of the lowest student connectivity rates of anywhere in Nebraska.

Next slide. Although a little difficult to discern, this diagram shows that the project internet was provided by Network Nebraska which is our statewide network. It went out to all five school districts and in each school district in turn shared their internet using point-to-point microwave with the closest highest vertical asset, which include water towers, radio towers, and a school rooftop.

Elsewhere in Nebraska, we would think of that also as a grain elevator. The LTE base stations then broadcasted their wireless signals in all directions to student homes. The project team's next steps are to set up additional towers to improve coverage, test out more powerful student household antennas, and to hire a full-time project technician to help perform system maintenance and make house calls.

The project provided many student households with their first internet ever outside of school and the bandwidth experience under optimal conditions was up to 25 megs down, 5 megs up. For the E-Rate folks watching this presentation, this LTE wireless internet reaching student homes is not eligible for E-rate support, so is cost allocated out of the statewide E-rate application.

Thank you.

- [Lisa] Thanks, Tom. Our next model is going to be presented by Luis Wong and he's from Imperial County, California.

- [Luis] Thank you, Lisa. And good afternoon, everyone. So Imperial County is tucked in the southeastern corner of California. We border with Mexico and the State of Arizona. And so we've taken a different approach in terms of implementation of broadband in the community. We actually got the 30 community anchor institutions working together in a collaborative and one of the interesting things about this model is it's a shared governance model.

So it really has allowed us to spread the risk of implementing broadband in the county and we've been very successful. What's helped us is we've allowed to leverage a lot of assets that are currently available such as vertical assets, towers, tall buildings, fiber communication, power generators, and those sorts of things.

So that really has allowed us to expand our network into the wireless space. We started our network about 20 years ago building mostly fiber-optic throughout the county and for us back in 2008, going into the wireless space using EBS assets was really a natural extension of progression of our network.

We have never envisioned that there was a pandemic in the horizon. So that really helped us put up a proof of concept back in 2018 with 13 cell sites. Next slide, please. And, you know, that really came very helpful to inform the community about what we could do with this kind of infrastructure. So we have about 100 megahertz of spectrum on the EBS license. All this network is done outside of E-rate support recognizing that we have knowledgeable entities and so we basically do the fiber network and all the wireless network outside of E-rate support.

We leverage existing tall buildings for the most part, they're already connected to our extensive backbone. We have expanded our network since to 19 cell sites and that's in thanks to the support from the districts and recognizing that we needed more capacity as our students went into remote learning.

And so all that traffic gets backhauled and one of the important notes to have here is us having fiber-optic access or access to fiber-optic systems throughout the county has really allowed us to strategically place towers in places to backhaul that traffic, and then into the state network.

So with that, thank you.

- [Lisa] Thanks, Luis. Model 4, Peter Sonksen, and he's from Lindsay Unified in California.

- [Peter] Hi, Lisa, thank you for that introduction. Again, I'm Peter Sonksen. I'm with Lindsay Unified School District. We're a rural school district in Central California. We have approximately 4,300 students in our school district. The important thing to understand about our network that we deployed with our multiple solutions is we didn't do it just because we wanted to.

It's part of our strategic design. One of our visions being, to ensure 24/7 internet access to high quality online curriculum for all of our students. Once we established many years ago sustainable one-to-one device program for our students, we are able to identify a lack of internet service and access in excess of 60% of our students and families in our school district.

And those were the ones that responded to us. Those families that had internet access were restricted largely to DSL, with speeds often not exceeding 1.5 megabits per second, far below what we required for educational needs. Our goal is aimed at not just providing basic access to our students, but quality connections to support our demand of high quality content learning.

Our project began by trying to work with major wireless ISPs. We have no infrastructure, but they were not able to provide adequate data speeds that we required in our area. So we opted to implement our own network in performing multiple real-world proof of concepts for all of our families via low-income housing, apartments, or residential areas. We found that no one solution met our students' needs.

Next slide, please. We realize that the best approach for our students was to provide multiple means of connectivity, be that LTE hotspots utilizing EBS spectrum or providing 5 gigahertz. Not necessarily 5G in case of any confusion there, point-to-multipoint CPE installs on homes themselves.

These various means of connectivity allowed us to leverage limited EBS spectrum available to us as a school district for apartments and low-income families, and maintain higher bandwidth needs by having a majority of our students' homes on our wireless point-to-multipoint CPE infrastructure. Upon facility closure during COVID-19, we became aware of an even greater density of our students needing internet access beyond that which just our EBS network was able to provide us.

So we began to leverage CBRS systems. There's now a multitier system in place to ensure service to every student whatever the technology need is to provide them the best service whatever their location or situation. You could see our model in the slide on the screen that our system is best described as having a macro EBS coverage ensuring 100% connectivity to all students while still supporting a multitude of microcell coverage areas to achieve the highest possible bandwidth for all of our students.

Thank you.

- [Lisa] Thanks. And our fifth model is going to be Dr. Phil Neufeld and he's from Fresno, California.

- [Dr. Neufeld] Thanks, Lisa. Fresno Unified is an urban school district with 74,000 students. We have almost 90% free and reduced lunch. From an asset perspective though, our students excel when we create the right conditions for their learning and growth.

Our story is a reminder that many urban neighborhoods do not have adequate or affordable cellular or broadband internet services. Six years ago, we began rolling out personalized blended teaching practices. The goal was to better prepare our students for their futures, preparing students with the necessary knowledge, skills, competencies, and dispositions to navigate a dynamic technology-infused and interconnected world, and provide a professional learning.

Over a thousand teachers participate in cohorts in their school-level designed rollouts of blended learning. We put in place the necessary conditions for modern learning like computers in classrooms, working Wi-Fi, Wi-Fi on buses and made moves towards leased fiber yet rich digital learning beyond the classroom often remain beyond the reach of students.

So we begin to learn more about families' challenges getting affordable or available access to the internet. We issued take-home devices and hotspots, and then in response to the COVID-19 pandemic, we pivoted to one-to-one devices and issued more hotspots. However, hotspots are at best weak when the cellular capacity in a neighborhood is not strong. So we moved in the fall of 2020 to build a private LTE network.

Let's look at that in the next slide. We used a two-stage RFP process and award a $1.4 million contract. We leveraged our existing district network, and we used buildings as towers at 15 school locations to cover a broad area. You'll see that on the bottom right of the slide there.

The CBRS frequency is expected to reach a half mile to a mile from the radius of where those cells are at. The networks can support about 6,500 concurrent student connections with the speeds that meet those requirements for richer learning experiences. These sorts of projects normally take multiple years.

So I'm glad to report that we're just a few weeks from lighting up the private LTE network. We've also developed a Windows app, My Quality of Internet, to check students' internet quality. Happy to share that with others. Our goal is to ensure internet access for all students, world class Wi-Fi in the schools and broadband cable, or LTE hotspots in the home.

I would suggest we reimagine equitable access to include mobile connectivity at the in-between places like buses, parks, and community centers. We are now collaborating with local anchor institutions to improve our city's digital infrastructure, working with community-based organizations to support household connectivity and digital literacy, all the while advocating as I ask all of us to do for more affordable and adequate services from broadband and content providers.

Working together, we can build and ensure digital access across all of our neighborhoods. Wish you all well on our shared journey to improve connectivity for all. Thanks.

- [Lisa] Thanks, Phil. And our final model is going to be presented by Andrew Moore from Boulder, Colorado.

- [Andrew] All right. Thanks, Lisa. Hey, I'd like to remind everybody that if you have questions for us, I'm the last presenter and so drop your questions into the chat. We'll do our best to try to answer those. So I'm the CIO for Boulder Valley School District for about 30,000 students, 55 buildings that serve both Boulder and the surrounding suburbs of Boulder.

We actually embarked on an effort to close the digital divide back in 2018 when we found an ISP that was willing to partner with us. That partnership started out as just a proof of concept, three different schools where we put their equipment on our schools, we backhauled them on our dark fiber, and with that, they were able to sell internet to anybody they would like.

But they also had to provide free internet to any of our students who were free and reduced lunch qualified. And so it was a unique partnership. We were just... In all honesty, it was kind of like a dance with the ISP to see if it would work for them and whether it would work for us, and it worked. And we started to get kids connected during that period.

Of course, the pandemic hit and when the pandemic hit, it just put the spotlight on the program that was progressing but at a pretty slow pace. So in April of 2020, our board of education agreed to a contract with our partner, Livewire, and they are now in the middle of rolling this out across our entire district.

We're still about a year out until all 55 schools will have the technology. By the way, it's used in CBRS spectrum as well and so we're excited for this. A couple other positives for the school district. We received 25% of their gross revenue for any internet that they sell to others in our community and then on top of that, their prices are less expensive than our incumbent providers in this area as well.

So we never set out to create a competitor for the incumbents, but an unintended good consequence for our entire community was that we do have now a third ISP in this area. All right, next slide. Thank you.

So just a couple things about the assets of this. So Livewire owns the antennas, they also own the equipment that has to be installed at the students' homes to be able to receive and send the internet. What we own are, obviously, the school facilities. We also own a single strand of dark fiber that we backhaul to them.

Livewire also has their own non-E-rated internet that comes into our facility and they're able to connect that backhaul into that. This allows us to stay clear of any E-rate rules that we do not want to violate bringing internet into the homes of students in need.

And so that is still one of those open issues that I'm hopeful the FCC will eventually change some of those rules, so that more school districts can do what we're doing. Last thing I'll say is that our fiber ring, we've got 100 miles of private fiber that powers this. That was all funded through a bond, which also was free and clear of the E-rate program. Thank you.

- [Lisa] Thanks, Andrew. So now I'm going to ask you another poll and that is, where are you on the continuum of wireless network implementation? While you're voting, I'll take the opportunity to let you know that in the brief, we do have some key considerations and as you walk yourself through those key considerations, it will help you determine where you are and what possible next steps would be for you to take to start building out an LTE network for your particular community.

I'm just waiting for the results. Okay, so the vast majority of you are exploring. Sorry, I'm moving things around. A possible solution for your community and you are in the right spot because you've got six experts to talk to and questions...you know, we're moving now to a panel discussion where we are going to answer some questions and allow you to put your questions in.

And I'm going to turn it over to Chris Mitchell, who is going to moderate this particular part of our program. Thank you.

- [Christopher] Thank you very much, Lisa, and I'm excited to be a part of this to help share the excellent lessons, important lessons our trailblazers have created. And the first question is one of lessons learned, which is what did you learn? What went differently than expected when you were implementing your project?

And I'm going to start by asking Christine and then we'll see who else wants to jump in.

- [Christine] Thanks, Chris. For Albemarle County Public Schools, we found that the project team did not have the time to work on the project on top of their regular responsibilities. That was a big challenge. We also encountered challenges with getting towers constructed for some of the reasons detailed in the brief.

For instance, getting county permits and the height of the towers became a real challenge as well because you benefit from having taller towers and our community did not want tall towers.

- Yes. One of the often cited challenges of wireless in general, people want the access, but not the towers necessarily. Luis, did you want to jump in on that?

- [Luis] Absolutely, Chris. Thank you. So you know, I think for us, one of the things we... When we were in the pilot phase back in 2018, early... Well, late '18 and 2019, we actually had a difficult time in districts adopting the devices. We're trying to push them and, you know, giving the offer at no cost to them.

And what was interesting, the uptick was really low and we suspect that schools really weren't ready at the time. Come the pandemic, you know, that need really surged and we were actually kind of worried about, well, you know, maybe the homework gap isn't as pervasive as we think. Come at the stay-at-home order in California, March 2020, and that changed dramatically, you know, and the need was really out there.

So in fact the growth of our network, you know, in terms of demand and usage grew 15 times, you know, from when the pandemic hit to, you know, the start of that following school year. So that reassured us that, you know, we were doing the right thing and I think another lesson learned for us was, you know, from the get-go, we now learned that when we're upgrading or putting antennas up in these locations, we want to get the most capacity we can get help there because, you know, going out there to buildings and trying to upgrade subsequently to that is a costly endeavor trying to get crews back in there and lifts and those sorts of things.

So you want to try to get it done right as best you can from the beginning.

- [Chris] Excellent. Is there anyone else who wants to jump in?

- Yeah. I'll definitely jump in on this one. I think similar to both the folks have spoken ahead of me, it was the speed of deployment, right? We have these great visions of moving much faster but ran into two problems. One, the vendor only being able to go so fast. So we learned you just have to have patience with this.

There's lots of detailed steps to getting the towers up, getting the permits, getting the wires run, and then going out and getting the receivers, transmitters put into the homes of students in need. But the other thing was actually finding the students as well. You know, we found that there are some families that really don't want to self-identify and it really takes a partnership with the schools, trust has to be built, and, you know, honestly, I think when we first started to roll it out and we were saying, "Hey, this is free internet if you qualify," I think there are families that really didn't believe us.

They were, you know, thinking, you know, "There's nothing for free. What's the real thing behind this?" And once the first few families got connected, then they start to talk to other people and now, you know, you start to build momentum and so things were moving much faster as the rollout continues.

- I was just going to add just one more piece. So we discovered as we were doing some of the initial design considerations, I'll repeat, that our educational broadband spectrum had been leased out quite a while ago to private companies and we talked to the private company that owns those, and they are not willing to give them back at this point.

So if you're an educational agency and you've got any kind of spectrum like educational broadband spectrum, hold on to it because it does matter. If you're a policy maker, let's make sure some of those community assets remain in the public space so that we can leverage it for our citizens or our students.

- I was about to give Andrew a hard time. He hit on the item that I wanted to comment on in regards to getting adoption into our families. Being a very migrant agricultural-based community up here in Lindsay Unified, we found that it was very difficult getting our families to even understand the importance of internet in the home and how that affects their children's learning especially during COVID.

So really communicating and communicating well with the community, and why we're doing this was one of the biggest things we found that we had to do really well.

- Tom, do you want to feel... Do you feel left out at all or would you like to share any lessons learned?

- I'm going to pass on this question, but thank you.

- I'm going to...I'll come to you next. I want to note that National Digital Inclusion Alliance has done a lot of work on this and so for people who are surprised to hear that it is difficult to give free internet access away, This is kind of a known phenomenon now and it's being studied. There's people that are doing really good work on it and it's important to note that even though cost is a major barrier for many families, it is definitely not the only barrier.

And so even if you can resolve the cost issue, there is still additional work that needs to be done by the community. So Tom, let me ask you, what has kept you up at night over the course of this project or what's keeping you up nowadays?

- Well, I'm an insomniac by nature, but this project did even more so. Working at the statewide level, we had long advocated and had envisioned a statewide EBS network. When the FCC opted to confine the order to commercial and tribal licenses, we are really constrained in our overall model.

So we knew it was possible, it was feasible, but at the moment for Nebraska, it's theoretical. So I really described the private LTE network to our tribal counterparts, I was thrilled that they would pick up on it.

But then the sleeplessness arrived when you wonder how can 12 or 14 people manage to bring up a network of this size and complexity on top of their normal jobs. They did great, they're great people. They just managed to get her done, so to speak.

But going forward, statewide, we still have the homework gap problems and challenges. We may have a household in a rural area 35 miles from their high school with no connectivity in between. So the model that was implemented is not replicable in all areas, of course.

So that's really, you know, a part that concerns me and school administrators are already focusing on fall of 2021 as a normal restart. And I really want them to keep thinking about homework gap as they enter the fall semester.

- Yes, those are things that maybe keep a lot of us up. Let me ask if anyone else wants to pitch in with additional...

- I'll share, Chris. Right now what's keeping me up at night currently is I'm trying to plan and budget for next year about how many students will need collectivity, especially the students who will be participating in our virtual school pilot. I have budget preparations to make but don't have concrete information from families yet. Some of you have already alluded to how hard it is sometimes to get that information, but students in our virtual school will need broadband and in most cases, the hotspot won't work.

So we'll be providing broadband for them one way or another, and we have a lot of planning to do. And that's keeping me up at night.

- Yeah. For me the only thing I'll add is that we're working with a smaller company and so their ability to scale is always a little bit in question. And they're on firm financial footing, but if anything were to happen to them as a company, it certainly would leave us vulnerable for the solution that we have.

- Any other things or is there a kind of sleep extremely well?

- Yeah. I have to say it's such an honor being here with so many folks with such large wide-scale networks. I feel like from a smaller school district perspective, schools aren't used to hiring a whole lot of technically skilled IT staff. So there may be a lot of folks on this call, they are worried about, "Okay. I have three people. Can I do this?"

And I think, you know, clearing a lot of the fog for these networks to say it's not really that difficult if you can reach out to somebody, but being a smaller school district, there's always the concern, what if I can't manage this? Who's going to pick this up if I'm not around to keep this network going? And that's certainly a concern.

- I know that I'm no longer a technology director, but one thing that I still continue to think about is I think a lot of people are thinking that fall 2021, we're going to go back to "normal." And I think one of the lessons that we did learn from the pandemic is that a lot of students actually do better in an offsite school, whether it be a virtual school in their home.

And I know New York City was looking at just starting right back up and a lot of people were saying, "Wait a minute, there's a real need for virtual learning for some of these students who have been bullied, who have other issues, who have their own children to take care of." So I think that's something that affects all of us that are in the technology world in ed tech that we also, we've moved away from, you know, we just provide the internet in the schools to now, we really do have to think about those students where they are and it may not be in the school building.

- I'll add one other thing and this may sound odd, but if you've ever been chased by a Doberman, you run really fast and we've been chased by this pandemic to change our teaching practices, our learning experiences, our systems in a moment's time, multiple shifts and pivots we've had.

Now the Doberman goes back to sleep and is chained up, and what's the new normal going to look like? And there's quite a few moving parts that we've learned over the last couple of years, families, community-based organizations, what's the teaching practice, and is it supporting what was being expected beyond the school and are the necessary conditions working properly beyond the school for every child.

A few years ago as I'm co-leading a personalized learning initiative, we had high schoolers, teachers who were like, "I can't give Khan Academy assignments to students when they leave school because it's not fair." Now it's mostly fairer. So we need to make sure that students know how to use it. I would call it no longer the homework gap. I'll call it the learning beyond school gap and it's that difference that makes what happens in the affluent neighborhoods differ from what happens in neighborhoods of poverty.

They may have great books in the library, that's fantastic, but in the digital age, if they don't have the chance to play, explore, and learn with digital resources in that digital world, they can't become critical agents to choose how they participate in the future world.

- That's very powerful. I'll second that and from my perspective running a nonprofit program, I am worried that some of the philanthropy may lose some interest in this field without that Doberman chasing the children. I want to go to Andrew with this because you brought this up, but everyone commented either in the process or today about E-rate and how most of you, I think maybe all of you did not have an opportunity to use E-rate funds for the majority of this investment.

What opportunities have changed? Has anything changed? Are there new funding opportunities on the horizon to help schools make these investments if they think it's right for them?

- So great question, Christopher. I think there's short-term changes, for sure. I mean, the latest stimulus of funding is allowing families in need to go to any provider and get up to $50 a month to cover their cost. But those aren't sustainable and that's the part that, you know, worries me and what's one of the reasons why we embarked on doing what we're doing in trying to get a sustainable solution for the long haul.

Boulder Valley School District actually has a waiver request into the FCC way back from 2016 that is set idle for the last five years. The FCC could pick that up and rule in favor of it, and it would open up the ability to use E-rated assets to do what all of us are trying to do to help kids in need at home.

There's also petitions from various states around the nation as well and so they can rule on any of those, and it would help us all in that bigger picture to have sustainable long-term solutions.

- Let me ask if... Christine, looks like you're going to say something. Go ahead.

- Yeah. The SEC is also getting ready to release emergency connectivity funds over $7 billion that will help build out networks and build some fiber construction. It's going to be an... I'm being told, it will be an easier process for application than E-rate is, but once again, that's a limited...I mean, it's the funds.

So one time group of funds and so hopefully people can take advantage of them. But then the sustainability beyond that could be in question.

- And then if there's funds stability in our network, my understanding is that they're restricted to only those places where there isn't a provider that can do it or has a network already. So, you know, there are lots of providers around the nation that have maybe inadequate internet out there and that causes a problem for us as well.

- You know, I think that goes to both the need for us to do data gathering to build better maps because often right now, the maps that FCC uses are driven by carrier perceptions that they're available and what the pandemic showed is hotspots in the parts of town that don't have good towers and radios don't get good reception, right?

So I think the infrastructure fund that should be coming out will be one area of support, but otherwise, we're going to have to find ways to collaboratively work with our anchor institutions, find ways like what Andrew did to work with existing providers, find different models. And is one provider ever good enough in the poorer part of town?

I'd answer no. We have to have layers of choices and supports because the revenue isn't going to drive innovation in those spaces like it does in the rich parts of town and we've got to have every kid participating because then there's greater employability, greater economic vitality, and more vibrant communities.

It's a great investment.

- Phil, I just want to tag on to that because you're absolutely right. The maps that are published are not accurate and that is why we helped our county with their speed test survey. So they continuously remind our community to... They just literally have to click a button and it'll run a speed test from their location. That's the tool we helped develop for them and we're providing our own maps of connectivity speeds because we can have a little bit...

It's an attempt to have more accuracy.

- You know, I'm sure it's a good time to recognize two organizations that are working on this. SHLB, the Schools, Health, and Libraries Broadband organization, they are working to try to get the congress to update the map so that we have more accurate information. So if you don't know about SHLB, it's shlb.org, shlb.org. And the other is COSN, cosn.org and COSN just released a report on the study of actual internet in the homes of students in need, and what their experience was, their bandwidth, you know, not theoretical, but actual measurements of that.

And I think these efforts by both these organizations are helping us get better data so that we can make the case more clearly with accurate data to congress for changes that are needed.

- Yes. I would note that school districts have... Particularly those that are deploying devices, have an unparalleled ability to collect that kind of meaningful data over time and I know that some of you are already thinking on that. Phil, I think you in particular. But I want to ask Luis a question that's related to the funding one before we leave that behind. One of the things that has succeeded in some of these cases is working with other partners, anchor partners, part of local government.

Do you have any advice for school districts that may not have the relationships already built in terms of how one goes about getting their partnership?

- Absolutely, Chris. I think that's been the secret sauce for us in Imperial County, right? The collaboration. It is really the... You know, necessity is the mother of all invention. You know, we started back 20 years ago, really there was only one provider here in Imperial County and, you know, we couldn't get what we needed. So that's when we decided to pull our efforts and put this collaborative together, right?

And we meet pretty much almost on a bimonthly basis with the board. There's a formal structure and governance structure. So conversations are around broadband and capacity are ongoing, the support has been great. And again, we recognize that while most of our agencies, our schools, we, you know, serve county government cities, first responders, libraries, hospitals.

And so that has allowed us to create what we call economy of scale. And the economies of scale allowed really to leverage resources. We operate this network with three FTEs and we have over 100 sites connected. And so it really paints a picture of what can be done and then I would also offer that, you know, from our perspective, E-rate is a great funding source.

I think it's been tremendous work for our schools and to connect our schools, and give them the capacity. But we also recognize that, you know, there are limitations with E-rate and you're subject to a lot of rules and timelines. And just for us not having that constraint has been really powerful, you know, to be able to do the networks the way we think, feel, you know, fit our need. I would also say that there are great partners out there.

We've worked with USDA being a rural community. We've worked with them to get support for the network to the ReConnect Program. We are exploring NTIA. NTIA just released a grant for connectivity and specifically focused on community anchor institutions in those sorts of...

And connectivity to the residents as well. So, you know, there are other opportunities there to kind of think outside the box. Universal services are not the only pot of money that is out there, but I would encourage, you know, and even if when you work with municipalities and counties, they potentially have access to other funding sources that may not be traditionally seen in the education space.

- Does anyone else want to pick up on that? As we have about 10 minutes left, I want to make sure we hit another couple questions. Let's keep them short.

- Yeah. Chris, one of the other funds, of course, we haven't talked too much about is ARP ESSER III funding and that's the largest of the three disbursements. And so we've helped our school districts in Nebraska to become aware of the Rural Digital Opportunity Fund awardees as well as CAF II.

So we have a number of providers coming into the state that are on aggressive build-out timelines for the FCC, yet they lack vertical assets. And districts actually have financial resources that they could use to partner with these vendors and in specific conditions to reach student homes while these providers are reaching out to their general patronage that they promised to the FCC.

So that may be a case where they go 50/50 on a vertical tower that doesn't exist and so on. So it helps districts to think outside the box and make better use of their federal funding in this one time environment.

- Just to build on Tom's point, in this moment as everyone's looked at the short-term gaps to throw in and there's lot of federal dollars that are going towards hotspots and such, we need to keep people's eyes on the prize of the underground infrastructure fiber that's often in short supply in the most needed areas.

And also to Tom's point, the now vertical assets that can be used, you know, if they allow for colocation of different services and all that good stuff. The other key thing and we've heard that in a couple of these stories here is how do we pay attention to the household as a whole. We've got university, college, K-12 students, employees, citizens, all within one household and we can have anchor institutions or some collaborative way to solve for it.

The last piece is when we get to 2030, I'm certainly hoping in our region, we don't get surprised again even if there isn't a pandemic, you know, even if it's normal times, that we've done the work necessary. So in 2030, we've got the kind of services that we need for every household.

- Let me jump in and put Peter on the spot with a question that's come up I think independently twice in the chat which has to do with security. You know, you mentioned earlier that you're coming from a smaller school district and school districts I think or everywhere are deeply concerned about their attack surface and now going out there and providing services through new vendors you haven't worked with in the past, there's got to be greater threats.

So how do you mitigate that or how do you think about that?

- Thank you. I would say that is something that's very frequently on my mind and it's funny transitioning to this question from funding perspective, and that while you might not find a lot of these projects, don't forget the possibility of cost allocation. There are a lot of threats out there where we take something like a very robust firewall for our district, for example, as our first line of defense would be taking 25% of that and allocating 25% of that piece of equipment to our community Wi-Fi network.

So we have that piece of equipment that was 75% covered by E-rate, 25% covered by the district of our overall percentage of coverage through the E-rate program, and it applies not just to the firewall, but several other systems down the line all the way to our distribution points. So while we can't use E-rate for those, we can do cost allocation to reduce our costs and by implementing those more robust systems, we have good security at the firewall level.

You do need someone on your staff that's familiar with security levels, security practices from segregating your network, who's going to be on your network, what can they access, those policies you need to get in place to ensure your network is secure. But to get the equipment in place to mitigate those security issues, there are still maybe options out there for E-rate and cost allocation networks for a lot of smaller school districts.

- Now Peter, if I could just... Am I hearing that basically among your answer you're saying this doesn't significantly change the equation for you in terms of your security and your threats, I think is what I'm hearing. Is that right? And I'm curious if other people want to reflect on that.

- Correct. Yeah. It hasn't changed my role too much in the school district from what I need to do for the school district in general anyways. You still have guest networks and networks that you have people use. You're basically extending that to their homes. I have a few more considerations as far as what they can access when you're looking at in line or web filtering for what you want your homes to be able to access, but the internet we provide to a lot of our families is by and large much more secure than if they did get internet from a regular provider.

Sure, it's filtered and we get our fair share of complaints that some resources aren't accessible, but we've also been greeted with smiles from our community, from parents that don't understand technology by providing their children safe internet. And we see in our logs that we certainly try to get hit and we've been able to mitigate most of those issues.

- Great.

- Well, Chris...

- Yes, go ahead.

- Yeah, I was going to say the difference from a security standpoint isn't what it used to be. With one-to-one, the devices are now out there, our network is more porous than it's ever been before. Taking a signal from RF or, you know, EBRS, or whatever it might be in a segmented fashion through our network can send it on its lovely way to the internet is, you know, from an administrative standpoint, they'll need to understand that's safe compared to the challenge we now have with all the users doing all the things in digital spaces and bringing devices back into the network.

We have different challenges than we used to, but this particular one is actually reasonably safe.

- Yeah. Christopher, I'll add one thing here. You know, we think about the digital divide just as the students or often it's framed with just the students, but family, I think, Phil, you just mentioned the families. And I think of this as the economy as well.

So when we run internet into these homes, the students get access, but the parents also get access to our student information system so that they can have better visibility into what their students are doing and in fact, we have training programs for parents that may not be digital literate themselves. We'll basically take them through a program that has funded grants and at the end of that, the parents actually get a Chromebook that becomes theirs.

And so I think we also have to keep in mind that if we want equity in our society, we have to think about it with the economy and what this is doing for families when we get them connected, job searches, right? Research, helping their students being connected in what they're doing.

- Excellent. I think we're out of time. Lisa, do we have chance to give one or few more people final notes or should we get to the bullet points that we have to read at the end?

- Sarah, it's up to you. What do you want to do?

- Yeah, I think... Well, I think that Andrew said it well and that's a good note to end on.

- Yes, thank you.

- So in just the last couple of minutes, we did want to first of all thank Lisa, Chris, and our state, and district technology leaders who joined us today and have been engaged in this process of documenting their models and helping us get this information out to you all over the last year. So first of all, big thanks to them and really quickly, for those of you that are still joining us via WebEx or YouTube, we did want to offer just a minute for brief reflection.

So we're really interested to hear from you, you know, what is one thing you've learned from this event or, you know, what is an immediate next step that you have? What do you plan to do with the information you learned today? So if you want to just take a few seconds to just kind of reflect on that before we hop off to our next meeting and maybe drop something in the chat box, or send it out on Twitter using the hashtag #EDWirelessBrief, that would be great.

And finally, I did want to note that there are some ways to stay connected. So as you visit our website, tech.ed.gov/wireless-brief and explore the brief, which is currently available in HTML format, we have a PDF version coming soon, so you'll be able to email that around your colleagues, you can continue to share your questions for our tech leaders using that hashtag, #EDWirelessBrief on Twitter.

So we're going to continue monitoring the questions that come in from folks in the field through next week and we plan to kind of collate the questions and publish a summary blog post of Qs and As that we've received both today and over the next couple of days on the tech.ed.gov blog by the end of the month. One other thing to keep an eye out for is that we do have a podcast series on the way that will have additional in-depth discussions from the tech leaders you heard from today.

You can see a couple of the topics here on the slide. So once we roll those out, they will be available on the tech.ed.gov website where our wireless brief lives. So with that, I wanted to just say thank you again to our speakers and to everyone who joined today. Great questions from everyone and we're really excited to be able to share this information with the hope that folks that are exploring this as a possible solution can see those who've come before and potentially reach out, and connect to learn more about the models that they've used.

So thanks everybody for joining and have a great rest of your day.