Broadband Summit: Connecting America

FCC-NARUC Joint Conference on Advanced Services

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Commissioner Tate - Good afternoon. I am Commissioner Deborah Taylor Tate and I am opening the meeting for Chairman Kevin Martin, who will be joining us in just a moment. I am so glad to see so many of you all here and want to welcome you to the ”Broadband Summit: Connecting America.” It is a pleasure to be here today; it is really an historic day because this is the first meeting since I became Chair of the 706 Joint Conference on Advanced Services. Some of you all who do not know, perhaps, the Telecom Act of 1996 established Section 706 to encourage the FCC to bring advanced communication services to all Americans. The Joint Conference is composed of both FCC Commissioners, as well as State Commissioners, and is a Federal/State Joint Committee whose mission is to fulfill the goals of Section 706.

In the past, we have held fact-finding meetings and reports to Congress on the status of those advanced services, and today we continue down that path. We have had about a three-year pause in activity, and so I am really thrilled that Chairman Martin wanted to re-invigorate and re-appoint new State Commissioners to the Joint Board, and to continue on with a fresh slate of both Federal and State Commissioners in doing our work. Obviously, we have an excellent afternoon and presenters prepared for you all, who

will enlighten us on best practices all across the nation, technology initiatives, and other ideas that are going on around this nation regarding broadband deployment.

We have a tight time frame, and that is why I am going ahead while we await Chairman Martin's arrival. And it is now my honor and privilege to introduce Chuck Reid, the distinguished Mayor of this absolutely stunningly beautiful and vital City of Technology, San Jose, who will provide some welcoming remarks to our group. Mr. Mayor, thank you so much for being here. [Applause]

Mayor Reed - Thank you, Commissioner Tate. And I want to welcome all the Commissioners here on the Committee and all of our folks that are here, particularly on behalf of our hotel workers, and our restaurant workers, and maybe even our nightclub workers. We have one request for you, that you leave town broke! Spend it all, we really appreciate it. The local economy is not in as bad a condition as the national economy; in fact, we are doing pretty well here locally, relatively speaking. But we could use a few extra bucks spent here. So we appreciate you coming to town, and thank you for bringing this particular visit here to do this great work on broadband access. San Jose is the capital of Silicon Valley, the innovation center of the world, and we are very proud to be the tenth largest city in America, and we think the best days of Silicon

Valley are ahead of us. And we are very anxious to do the things that are necessary to make sure that that next wave of innovation, and the next wave, and the next wave after that continue to follow the five decades of great innovations that have come out of this Valley, not just in telecommunications, but in many other areas. And we view broadband access as one of those crucial building elements, basic infrastructure, Petri dish of innovation, and making sure that we get that kind of broadband access widely available is really important to our own future. I am not going to pretend to know what the next new thing is, but I do know that you have to have the infrastructure available for the creative, talented people that come here from all over the world to invent, and grow, and build the next new thing. And broadband access is one of those things we need, so I am looking forward to seeing what comes out of this work, and what can be done regionally, as well as nationally to approve broadband access, to make sure that whoever invents the next new thing does it right here in Silicon Valley. So thank you for coming. We arranged the weather just for you, so we just need to know when you are leaving town so we can go back to the regular sunny day -- oh, it is sunny. Thank you very much for coming. [Applause]

Commissioner Taylor Tate - Thank you for taking time out of your busy schedule. Obviously, we are grateful

to have Silicon Valley because, indeed, you are a driver in this difficult economic time, and so we look forward to the vision that you have set forward today, and for joining us. So thank you so much.

Now I would like to introduce my colleague and dear friend, and actually the Chairman is here, so why don't I introduce you instead? My other dear colleague and friend, Chairman Kevin Martin. Commissioner Larry Landis is going to take us through the next portion of our discussions. One of the State Commissioners who has been so active in so many of these issues, we thank him for his service on both the State and the Federal level. Commissioner Landis.

Commissioner Landis - Thank you, Debbie. Good afternoon. On behalf of the State members, it is my pleasure to welcome you to what promises to be an interesting and informative afternoon. I want first to acknowledge Chairman Martin's leadership and commitment to the ubiquitous access to advanced services. He has been tenacious in his advocacy and advancement of that goal. During this service on the Commission, both as a member and as Chairman, we have made great progress across the nation. I also want to express our appreciation on the State side, for his leadership and support in reconstituting the 706 Joint Conference. I also want to acknowledge Commissioner

Tate, who has not only taken on the sometimes thankless and often challenging task of chairing not only this group, but also the Federal/State Joint Boards on Separations and Universal Service, the latter among the most complex and intractable areas of communications policy; this is the fun one. So those of us from the State side, who have worked with Commissioner Tate when she served on the Tennessee Commission, valued her friendship, her grace, and her collegiality then, as we do now.

Our colleague and former FCC Commissioner, Rachelle Chong, of California, who is State Co-Chair for Programs, will be joining us later this afternoon. It was Commissioner Chong who, working with Commissioner Tate, with Greg Orlando in her office and with others at the FCC, has been responsible for assembling the line-up of speakers we will hear from this afternoon. So when you see her later, please acknowledge her considerable contribution. We are also indebted to the California PUC and to its staff, and particularly to Robert Haga for a lot of the heavy lifting on this activity. Commissioner Randy Mitchell of South Carolina, who is State Co-Chair for Policy, is unable to be with us today. My colleagues who are with me from the State side are Commissioner Mark Johnson of the Regulatory Commission of Alaska, and Commissioner Krista Tanner of the Iowa Utilities Board. Please also welcome Commissioner Ray

Baum of the Oregon Public Utilities Commission. Commissioner Baum is Chairman of the NARUC Telecommunications Committee, and we are pleased to have him here with us today. We also have with us today Commissioner Sharon Gillett of Massachusetts, who is one of our presenters. Unfortunately, our other State 706 colleagues were not able to make it because of conflicts with state obligations, but I do want to acknowledge them. Commissioner Betty Anne Kane of the District of Columbia, Public Service Commissioner, and Commissioner Vendian Viafides of the Maine Public Utilities Commission. I do want to mention that Commissioner Betty Anne Kane is working with NARUC State members from all over the nation to produce a broadband Best Practices Guide. We hope to publish the broadband Best Practices Guide some time in 2009, under the auspices of the Joint Conference. We encourage every state and local government with an innovative broadband initiative to submit a summary of the project to Commissioner Kane in the District of Columbia or, if you wish to, just see me during the break and we will make sure that you get contact information. In a few weeks, she is going to have a template on which parties can submit their information, or, if you submit something early, she will get it in the right format for you.

At this time, we will have opening statements of

the members of the 706 Joint Conference here on the dais. Chairman Martin will start. Mr. Chairman, followed by Commissioner Tate, and each of the State Commissioners.

Chairman Martin - Thank you, Commissioner Landis and thanks for helping to all those who helped organize the event. I want to start by just saying that I am particularly pleased to be participating with you all in re-invigorating the Joint Conference. I think that the questions, regulatory choices that both we face at the Federal and State levels related to advanced services in broadband capability are critical for us to continue to try to work on cooperatively and jointly. Broadband and advanced service capabilities are critical from a consumer perspective; they are increasingly driving economic growth throughout the country and, more importantly, they are helping transform almost every aspect of our lives, whether they are talking about increasing the way health care will end up being delivered, and we are a health care connectivity that we worked on with the Commission, educational opportunities to where we will be able to live and how we will be able to work. And so I think that this is going to continue to end up being an important and critical issue, and one in which no one entity at the Federal or the State level has all of the answers, and that is why I think Joint Conferences like this are critical, to

be able to share those experiences and inform from the Federal and the State perspective the changes that we might want to make.

I certainly know that, in the past, the Joint Conference's efforts have certainly influenced the Commission's policy-making in very positive ways. I remember we had a hearing like this down in North Carolina related to rural health care, connectivity years ago, and the Commission has subsequently adopted changes in our roles to help facilitate supporting the rural health care connectivity, like having really arose right out of the Joint Conference that occurred there, and I think we will continue to end up seeing progress as a result of joint efforts like this. And so I thank Commissioner Tate and Commissioner Chong for helping organize this around this conference out here, and I think it is going to be very informative for all those involved, and exciting to see how it goes, too. Thank you. Commissioner Tate.

Commissioner Tate - Thank you. Well, again, I want to thank the Chairman because this would not have been possible without him, and I am glad that it worked out for all of us to be here, and we will miss our colleagues. I, again, want to express my deep gratitude to Commissioner Chong because it took a lot of sheer persistence to make all this happen, and all the logistics, and I thank the

California staff, as well.

Broadband is indeed the future economic child of this country in order to ensure sustainable growth or green technologies to decrease unemployment through new job creation. I just came from Ericsson, where they are bringing 1,500 new jobs to this area. It is just spectacular what is going on when you drive outside of this hotel and just see all the companies, some of the names I have never even heard of before, that are collected here. It is truly an innovation world here in Silicon Valley.

It has been my honor to serve first as a State member, and now as the Chairman of the 706 Board. I understand, indeed, that states are important partners, as are cities, as we move forward with the deployment of advanced services across this country. The economic effects from broadband are absolutely exponential. We are going to hear much more about that later. Wireless providers have invested $15 billion in wireless broadband and Connected Nation estimates that increasing the availability of broadband would have a positive economic impact to this country of $134 billion. Broadband is vital to this information revolution, and obviously wireless broadband is outpacing fixed broadband, soon to be a billion wireless broadband users by 2011. Pretty spectacular. It is the crucial infrastructure for our cities and towns, just like

interstate highways and industrial parks that in earlier generations brought jobs, people, and investment.

I have a much longer statement, but in order for us to keep on track, I guess the one thing that I did want to know was one of the important goals in today's meeting is to share what best practices are going on across the country, and so I am very thrilled that, from my home state of Tennessee, we will hear from Mike Ramage, who will talk about Connect Tennessee and much of the unbelievable opportunities that broadband is bringing to my very rural state.

One important step that the Federal government can take is to implement an accurate nationwide inventory and we will, of course, be moving down that track after President Bush recently signed into law the broadband mapping bill, which empowers us to revise our metrics, and become more involved in not just the deployment, but also the adoption across the state. Ensuring broadband access to all Americans, as the Chairman said, especially to those in the low income areas, or rural parts of America, is not only important to our national economy, but to our global competitiveness. So I look forward to hearing from all of our presenters and, again, welcome you all for being part of this. Thank you.

Commissioner Landis - We are here today because, both as a nation, we have come far in the nine years since

the establishment of the Joint Conference, and because we still have further to go. We are here to celebrate Federalism at its best. We are also here to remind ourselves of our obligation to address those who are currently unserved, the least, the last, the lost. The least -- the working poor and others for whom the door opening opportunities of advanced telecommunications may seem beyond reach financially; the last -- those who are currently on the fringes of technology's ability to deliver on the promise of broadband; and the lost -- those who, for a variety of reasons, have not yet embraced the valued proposition which can be opened to them.

At the national level, we acknowledge the essential role of table-setting and getting the framework right. And we will take an early look at the health care initiative which our Federal colleagues have launched with Universal Service funding.

We are also here to celebrate innovative programs fostered by the vision of state and local governments, and public private partnerships. Indeed, depending on the organization doing the counting, and what programs they are counting, there are currently major programs in operation in over 80 percent of the States. In the process of looking at these best practices, we will celebrate success stories, examine works in progress, and share visions of achievement

which are in the early stages of implementation. From the Mayor of a small town in Southern Indiana, who was told no by the incumbent provider, and became determined to bring wireless broadband to his community because he was inspired by the needs of constituents like the single mother who needed a high speed connection to retain her job as a medical transcriptionist, to those employing satellite communications. The Native American tribal and basic health care providers in remote Alaskan villages, and the distance learning educators in that state whose linked classrooms span an area larger than the state of Connecticut.

In short, we are here to explore the merge of technology and the human spirit, and we are here to renew that promise to all Americans. Commissioner Johnson?

Commissioner Johnson - Thank you, Commissioner Landis and colleagues. I will shorten up my statement in the interest of time, as well. Today I expect we are going to hear a well-crafted presentation on the benefits of the extension of broadband services to Americans. Residents from my own State of Alaska have benefited enormously from the deployment of advanced telecommunications services, and we hope to demonstrate some of that for you here today. While great progress has been made in the deployment of new technologies, and there is much to learn from experiences around the countries, it is important for us to create

strategies to address both aspects of our technology, and both aspects include necessarily speed and availability. I think you need to have both. Thus, broadband and 768 kilobits per second is just the beginning. We need to consider policies that permit the delivery of data at 2.5 Mbps, 10 Mbps, or higher. And secondly, to ensure that the services are extended to Americans throughout the country. We also need to understand the effects of national policies on the development and deployment of infrastructure for things like Internet Protocol Version 6 and the ultra high capacity Internet 2, as well as technologies that are being showcased here at the Wireless Communications Association.

I believe we need to be forward thinking and craft plans that respond to future developments. That is the task as I see it. I am obviously vitally interested in making sure that all of us, including those of us on the periphery, are still involved in the Network. And I think that is an over-arching goal that is extremely important. So I look forward to working with my colleagues on this project. Thank you.

Commissioner Landis - Commissioner Tanner.

Commissioner Tanner - Thank you. Before I begin my remarks, I do want to take a moment to thank Chairman Martin and Commissioner Tate for being here today, during what has certainly been a busy and interesting week. That

you make time to be here today speaks volumes to your commitment to broadband implementation, and we thank you for that. I would also like to thank Commissioner Chong, although she is not here, for putting this outstanding Summit together.

I wanted to focus my remarks today on our long efforts in Iowa to bring broadband deployment. It was just ten years ago that, as a result of a legislative mandate, that wireline providers in the State of Iowa completed a project of providing non-tool dial-up Internet access to all communities in Iowa. Two years later, the Iowa Utilities Board began a process of assessing the availability of high speed Internet access across the state. In that first survey in 2000, the Board found that roughly 31 percent of Iowa communities had high speed Internet access, and that was defined as 200 kilobits per second. In our latest survey with information as recent as June of 2007, we found that almost 94 percent of all communities had high speed Internet across Iowa, using the 200 kilobits per second threshold. Ninety-six percent of rural communities and 86 percent of our non-rural communities were identified as having high speed access. Service providers in Iowa have grown to include cable companies, wireless, satellite, traditional wireline providers. In our next broadband survey, Iowa intends to redefine what is considered high

speed, both to be consistent with FCC terminology, and also to reflect the reality of what consumers consider to be high speed. The new low end for high speed Internet access will likely be set at 768 kilobits per second. Based on our most recent survey, roughly 28 percent of customers currently receiving some service in Iowa will no longer be considered as high speed. In Iowa, approximately 31 percent of DSL and 92 percent of our satellite wireless customers will be at speeds less than the new minimum.

I give you this history to illustrate how rapidly our policy goals with respect to broadband availability have changed. It was just ten years ago that our goals consisted merely of providing non-tool dial-up access; then we measured success by the speeds of 200 kilobits per second; now that threshold will likely be 768 kilobits per second. Even though we know that that will be a short-lived standard, industry experts predict that by 2015, consumers will routinely be using applications that require speeds of 100 Mbps, or higher. I am proud of Iowa carriers for consistently meeting the policy goals that we set for them, and I am confident that they will continue to meet the new challenges that face them. I am not unaware, however, of how difficult these challenges are. As Iowa carriers are expected to invest in Network upgrades with an increasingly short life cycle of the equipment necessary for those

upgrades, our carriers are facing increasing revenue uncertainty, and I am not just talking about recent events at the FCC; in Iowa, we, too, have begun the process of access reform. In the past year, we have reduced the intrastate access charges, charged by rural local exchange carriers, and have promised a rule-making to consider further reducing those access charges. In addition, there is currently an open docket before us, in which we are reviewing the intrastate rates of Iowa's mid-sized carriers.

It is clear from the statements made by these carriers in these proceedings that Iowa carriers have long been using access revenues to fund broadband improvements. I am not making this point as a reason to halt access reform, but instead it is important that we recognize the reality on the ground. And that is, in Iowa, as in other parts of the country, broadband deployment has been enabled by access revenue that our carriers have historically received.

So in closing, I urge my fellow State and Federal Commissioners to continue the challenges, to challenge our carriers to provide the advanced services to our communities that are necessary to compete in a 21st Century global economy; and, in support of that goal, to provide a stable and predictable regulatory climate that recognizes the financial complexities facing the carriers. Thank you.

Commissioner Landis - Commissioner Baum.

Commissioner Baum - Thank you. I want to acknowledge the efforts of the FCC on behalf of NARUC. I think Chairman Martin has one of the toughest jobs in the world. They do complicated issues in groups of sometimes two, or three, or four, and it is a tough job, and he has tackled this comprehensive reform in a way that no one else has ever done in the past, and we want to thank him for pushing ahead with that, and at the same time, reconstituting the 706 committee, and reaching out to states. He spent a couple hours with the State Commissioners on the phone over the last couple of weeks; he is working on multiple issues that would boggle most people's minds. And that also goes for Commissioner Tate, who is also expected to understand these issues deeply, that whole segments of industry spend their whole lives trying to understand. And inter-carrier compensation, universal reform, is one of those issues. So we do appreciate their efforts, their outreach to the States, the cooperative Federalism that has been a part of this group of FCC Commissioners. Commissioner Tate and I served on the Joint Board and we pushed out a proposal together, working together. Her leadership is appreciated on that Board, and she will continue to do that here on the 706 Committee. And, of course, without Chair Martin's support of that, none

of that would be possible. But we do appreciate their efforts. On behalf of NARUC, we are encouraging you to not give up. Life is tough, there are setbacks and we need to press forward because Americans are depending on us to try to do the right thing as far as we are able to see it. And so I would encourage you to continue to do the best you can, to see if we can get this done, and we appreciate your efforts. Thank you.

Commissioner Landis - One thing I should announce before we go on, the transcriptionist has asked if any of you in the audience ask questions as we go through the panels this afternoon, please state your name so that we have that as a part of the record. Debbie?

Commissioner Tate - I just want to thank all of our colleagues who have joined us from across the vast nation and for their insight and, as the Chairman said, which we often relied as we plod, of course, forward to bring broadband across the nation. And I am now pleased to introduce our first presenter. I know you all are glad that we have stopped talking. Drew Clark, Executive Director of broadbandcensus.com, a free resource of broadband availability, competition service, and service quality that is available on the Web. He is a well-respected Washington telecom and technology reporter, and monitors broadband issues on Capitol Hill and across the country, and today he

is going to provide us with a legislative update on the new broadband mapping bill. Drew, thank you for all your efforts. It has been fun to watch this project grow, and I have been using it. So thank you.

Mr. Clark - Great. Thank you, Commissioner Tate. I also want to thank Commissioner Chong and Commissioner Landis for the invitation to be at this event, as well as all the other Commissioners and the Chairman who are here.

So I have been asked to speak about the Broadband Data Improvement Act and to give a little legislative update on it, and maybe look forward a little bit as to next steps in the next Administration. So here is the outline of my presentation, and I will leave some time at the end so we can address questions or answers.

Just briefly, what is BroadbandCensus.com; what is the background and political context for S.1492, the Broadband Data Improvement Act, what is included in S.1492, what is not included in S.1492, and what will or might happen with broadband data in the Administration of President Elect Barack Obama.

So briefly, as Commissioner Tate mentioned, BroadbandCensus.com is a free resource of data and information about broadband by local area. It was launched in January of 2008 by myself. I am a technology journalist in Washington. We are a consumer focused rating service for

businesses and Internet end-users, and our core mission is public information, news about broadband, events and conferences, broadband breakfast clubs -- several of you Commissioners, Landis and Chong, participated in our Broadband Census for America Conference that was held September 26th in Washington, providing research about broadband under contract with two Internet projects and others, and a Best Practices Broadband Wiki which is under development. Also, I just have a flyer outside for those who would like to pick up this and take it with you. I am happy to address any questions about what and why Broadband Census exists, and these are some of our partners.

So just some background now for broadband data legislation. There has been criticism about the FCC's data collection methodology for some years by Commissioners, Michael Copps and Jonathan Adelstein. Perhaps the turning point in my mind about this debate was the Government Accountability Office Report in June 2006, which looked at the Zip Code by Zip Code data that the FCC had been releasing, and said that, based on its analysis of the data, there were only two providers per Zip Code on a median basis, as opposed to the median of eight that the FCC had reported from its data. The Freedom of Information Act lawsuit filed by the Center for Public Integrity, that I was involved in, for broadband data in September 2006, there has

been an increasing perception of value to broadband carriers for aggregating information about data if some degree of confidentiality could be assured. And then, finally, lurking in the background has been this question of is there or is there not a national broadband strategy. And we are obviously seeing this very pronounced right now, lots of calls for a national broadband strategy, but the discussion of data has been what kind of inputs are necessary in order to have a successful broadband policy. So these are all backdrops to the legislation. Here is just a quote from the Freedom of Information Act lawsuit: "Disclosure of data about carriers could allow competitors to free ride on the efforts of the new first entrant to identify areas where competition is more likely to be successful." So, you know, the FCC has been fighting efforts to release data on the grounds that it could allow more competition in broadband. Here are just some more thoughts on that; the case was resolved in the FCC's favor. So the Bill, S.1492…

Chairman Martin - I do not mean to interrupt, but since you are characterizing our brief, it was actually also because the carriers do not want it to be disclosed, and so it was not provided in a public way. And what we were doing is explaining why they did not want it to be disclosed.

Mr. Clark - No…

Chairman Martin - No, no, hold on. It was not

that we were actually fighting it because we did not want competitors to be able to gain entry. And by the way, Drew, I understand the lawsuit is important, and you have filed it, so you filed it, and you are more than welcome to file litigation any time you want, but as you just ran over at the end, all of the lawsuits have been resolved in our favor, saying that the information was all filed under seal and was not to be disclosed. If the law has changed so that that information is supposed to be disclosed, we will disclose it. But in the meantime, the lawsuit that you keep filing has lost and I think that is important for everyone to understand when you are characterizing why we did something. So you can characterize why you did it, but I can characterize how the Commissioners respond.

Mr. Clark - No, no, those are fair points, Chairman. I just want to make clear that the law does not need to be changed for the FCC to release this information. The FCC chose through its discretion over a period of time not to release information about carrier by carrier level, and so…

Chairman Martin - Drew, and I know that is your opinion; however, as I said to you, the information we are collecting is filed with the assurances from the companies provided not to be disclosed. Now, I know your opinion is that, however, you lost -- that was also what you argued in

the lawsuit, that it should have to be disclosed, and you lost.

Mr. Clark - No one is disputing that fact.

Chairman Martin - I am not going to have an argument with you over it. I think we should move on. But if you are going to bring up and try to characterize what we were doing, I am going to respond. But I think what would be most helpful for everyone is not to have a FOIA -- this is not about FOIA litigation. No one is interested in that.

Mr. Clark - No, no, clearly.

Chairman Martin - I mean, so if you do not mind, I think everyone wants to talk about broadband, not FOIA.

Mr. Clark - I agree. I am just setting the stage for the intensive discussion that the Congress…

Chairman Martin - And we are anxiously awaiting.

Mr. Clark - I am just trying to point out that there was a lot of discussion and interest in the issue of broadband data, you are quite right that the carriers intervened in the lawsuit, and you are also right that the data was collected from the carriers under the promises that it would be kept confidential. I am just pointing out that the law does not need to be changed for the FCC to release this data.

Chairman Martin - And I am just pointing out that, again, people are not interested in FOIA litigation. They

are interested in data services.

Mr. Clark - The Broadband Data Improvement Act was introduced by Chairman Daniel Inouye of Hawaii. He described the measure as giving the baseline statistics that the nation needs in order to eventually achieve the successful deployment of broadband to all Americans. A nearly identical measure by Senator Dick Durbin was introduced, but later stripped from the Farm Bill. And just also to note, the FCC Data Collection Order that was issued in March of 2008, and released in modified form on June 12, 2008; this was also going on in the background. So even as the Senate and the House are considering broadband data legislation, the FCC is, of course, going through its process and redefining broadband as one of the Commissioners described, from 200 kilobits to 768 kilobits.

At least four agencies are impacted by the Broadband Data Improvement Act; the FCC must make annual reports of broadband to Congress. They also must include international comparisons, U.S. versus international, using 75 cities. And it needs to conduct public surveys of technologies, prices, and speeds. The Census Bureau has been instructed to expand its American Community Survey to include broadband subscriber information. The Census Bureau had collected some broadband information in the past, but it dropped this in 2001-2002. Now, under this bill, it is

instructed to put that back in. The Government Accountability Office has been tasked with submitting a report, again, comparing U.S. broadband to international broadband on speeds, prices, and quality. And the Small Business Administration is to conduct a study of speeds, prices and availability. So there is a theme here; there needs to be more information about speeds, prices, availability.

One specific change for the FCC is that it needs to compile a list of the geographical areas that are not served by broadband providers. Now, prior to the FCC's re-definition in June, from 200 to 768 kilobits, that was a very small area, indeed. Look at the green colored area of the next slide. So this is the FCC's determination of availability of broadband by five-digit geographical Zip Code, and it is just those green areas in Northern Maine and Northern Alaska there that are not served by any carrier. All the other areas, whether it is blue, orange, white, that is served by at least one carrier, according to the FCC data. Of course, part of the purpose of broadband census and other efforts is to track and identify who those carrier are so that consumers and others can have information about them. But as the definition changes, obviously we are going to see more green areas on this map. And so, just going back to the bill, the FCC is going to need to compile this

more extensive list of areas that are not served by broadband of 768 Kpbs and then compare it to the per-capita income, population density, etc.

Okay, the last big element of the Broadband Data Improvement Act is to encourage state initiatives to improve broadband. The Secretary of Commerce is to award grants for the development and implementation of statewide initiatives to identify and track the availability and adoption of broadband services within each state. And there must be matching non-Federal funds of at least 20 percent. No Federal funds were included in this bill, although there had been $40 million in previous versions.

Okay, these are the aspects of the State initiatives to improve broadband. They are designed to provide baseline assessments, they are to measure areas of low deployment, they are to identify supply and demand barriers to adoption, identify speeds of broadband connections, create technology planning teams, work with broadband service providers and tech companies to encourage deployment in unserved areas, establish programs for improved computer ownership, collect market data on broadband, facilitate information exchange between public and private sectors, and create statewide geographic inventory maps of where service is and where it is not.

Okay, so what is missing from the Broadband Data

Improvement Act? Well, there was alternative legislation. The Broadband Census of America Act, H.R 3919 has passed the House unanimously. I was looking for the vote there and it was unanimous. That had at least two key provisions that are were not included in the Bill, 1) the National Telecommunications and Information Administration was to create a national broadband map; and there would be the disclosure of the names of carriers on the Zip plus four code basis. Those both were excluded from the Broadband Data Improvement Act. And, of course, there is no funding, as I have already mentioned.

Now, just in the interest of fairness, it needs to be pointed out that appropriate authorization bills generally do not have funding; they are often -- they need to be funded by appropriations measures. So even if the Bill had said, "We authorize $40 million for broadband," the Appropriations Committees would have to come along and provide funding. But it was an important symbolic defeat for the funding that it was taken out entirely from the bill.

So Chairman Dingell of the House Energy and Commerce Committee said that he had wanted there to be a nationwide map of broadband infrastructure, and remains hopeful that we can work toward that goal as the legislation is implemented. And Subcommittee Chairman Ed Markey said he

wished the Senate Bill contained the more rigorous data collection and disclosure provisions of the House Bill. Under that House Bill, as I have mentioned, the NTIA would develop this broadband inventory map that would show geographic extent of broadband service capability on a provider by provider basis. And the map would provide for, again, the disclosure of each commercial or public provider of broadband service capability within such area. Now, the industry had said that it had no objections to H.R 3919; however, of course, it is worth pointing out that that was not included in the Bill, as it was passed.

So what happens under the Presidential Administration of Barack Obama? Is there a possibility of reviving a national broadband map? Is it even needed? Or are the state maps that are being developed on a state-by-state basis sufficient, so that consumers and others who seek information about broadband can get the information they need from the state maps? And what is the value of the broadband map on a nationwide basis? Now, that is just the language of the bill about how -- oh, sorry, that is Chairman Ed Markey's statement about how he wanted the Commerce Department's NTIA to put this information on a map.

Okay, so as we saw from some of the other aspects how SBA, GAO, and the Census Bureau were tasked with including not just availability and adoption information,

but also information about speeds, prices, reliability, competition. I call this the broadband SPRC. Increasingly, people are not just talking about broadband as an on/off thing. Is there broadband, or isn't there? Do we have 200 kilobits per second, or do we have 768 kilobits, or not? People are increasingly talking about broadband as a growing threshold, one megabit, two megabits, 10 megabits, 100 megabits, so that big broadband applications can be enabled. There are obviously a number of mapping efforts out there. I will not peak about California Broadband Taskforce or the Massachusetts' Broadband Initiative because I know we have people here who can speak to those. One of the partners of Broadband Census has been Virginia Tech's eCorridors Program, and they have done mapping on a user by user basis. Ireland has a broadband information website with carrier-based information; Connected Nation, and I believe they will be on the program too, will also be speaking, and BroadbandCensus.com.

This is the map that eCorridors has put together at Virginia Tech. They have just taken the tiers that the FCC recently created in its June Order, color by color, and it is has mapped it against the responses that they have received. So obviously there is a lot of data that still needs to be collected, but this is, again, a user-based collection methodology, and you can see, you know, basic

broadband, green and up, is what meets the new threshold for broadband. All those yellow areas would be excluded from the definition of broadband now that the FCC has changed it. Here is the upload speeds, the yellow is, again, what is going to be excluded under the new definition. And finally, this is a more local map, again, produced by eCorridors, based again on user contributions to the broadband collection they are undertaking. Ireland has also been involved in mapping out broadband on a carrier-by-carrier basis, they actually list the carriers, and the head of the Irish Embassy's unit discussing this has spoken to these issues at the Broadband Census for America Conference in September, mapped out broadband there. And they actually include information about latency, which is obviously very relevant to wireless applications -- can you do voice or other applications with broadband.

So in conclusion, this is just what we are providing. We offer information and news about broadband. We publish all the information under a creative commons attribution non-commercial license, which allows researchers in Governments such as NARUC members, to freely use the data. And, again, our focus is trying to ensure that we are not forgetting the speeds and prices and competition aspects of broadband information collection, not just availability, but price, speed, and competition.

Finally, just skipping over this, I want to just conclude with what we are providing, information and a resource that others can provide information about state-by-state efforts, starting with articles about 17 states, and news and information about what kinds of projects -- Illinois, Massachusetts, Virginia, and then these state-by-state Wiki's are a repository for best practices, so that you all and others can go to the sites and provide information without your state, without your county, within your city, about what types of broadband is available, and then, of course, we aggregate the data we are collecting about carriers, the speeds, services, and consumer ratings of these services. So thank you very much. I have a few minutes to take any questions that you have about the Broadband Data Improvement Act, or other aspects of broadband data collection.

Commissioner Tate - Thank you, Drew. Any questions from the audience or from my colleagues? Yes, Commissioner?

Commissioner Gillett - Commissioner Sharon Gillett from Massachusetts. My question for you, Drew, is what would be the normal time frame of taking S.1492 and sending it through Appropriations and all those kinds of things?

Mr. Clark - Sure. Well, appropriations are done on an annual basis, and so you are never really assured

anything from one year to the next. But the decisions start off in the spring, there is a Budget Committee Resolution that determines the general perimeters, and then each of the 13 -- it used to be 13, it is now 10 on one side and 12 on the other -- each of those Appropriations Subcommittees has a target for what they are seeing to spend, and then as they get closer to the fall, and adjournment, that is when the decisions get made. For something as small as $40 million, I mean, that is really not going to be influenced by any of these external factors about, you know, the fact that there is a $700 billion bill for aid to the financial industry. And yet, at the same time, it is unlikely that this is going to get passed before September or October of next year. So that basically means that, unless the Commerce Department decides to fund these initiatives out of its own resources, which it may be able to do, I cannot offer a definitive opinion on that, the funding for the state initiatives would basically be waiting until 2010.

Commissioner Tate - Any other questions? Good, we are staying on schedule. Thank you, Drew, so much.

Mr. Clark - Thank you.

Commissioner Landis - Thank you, Drew. [Applause] Next I would like to introduce Dr. Daniel Ballon, a Policy Fellow in Technology Studies from the Pacific Research Institute. Dr. Ballon will present on the topic of the

future of broadband. Dr. Ballon.

Dr. Ballon - Hi. I would like to thank all the Commissioners for inviting me to speak here today, particularly Commissioner Chong for allowing me to come here and give our perspective as a small nonprofit think tank based in San Francisco. My Department of Technology Studies focuses on public policies that promote innovation in the technology sector. And I think it is fitting for us to be giving this presentation on the future of broadband technologies, given our State perspective, because half of our portfolio is on State policy, and half on Federal policy.

I think it is helpful, before we look at the future of technologies of broadband, it is useful to gain some perspective and look how quickly these technologies have developed and changed over time. If we just look at a brief history of consumer-oriented data communications networks, we see the enormous evolution and increase in speeds that we have seen in only 30 years, and the data that I am showing here comes from the mind of Link Hoewing at Verizon. It is just his recollection of speeds available to consumers over the past 30 years. And what we noticed is that the overall pattern, first of all, is exponential. And second of all, it is really driven by new applications and innovations, that you see things like CompuServe in 1979

causing a small increase in demand for speed, followed by AOL and its massive adoption of those communities. And then, in 1993, when Tim Berner's is leadings events at the World Wide Web, and following that, when Netscape has its IPO and you see a huge shift to graphical user interface, you see millions of people moving online. It is worth noting that, between 1995 and 1996, there is a speed increase of 27 fold, so I had to change the scale here. That is how big of a revolution this was. And then there is not that much of an increase in speed until 2004, and then you start to see the Web 2.0 revolution take hold on things like social networking, causing massive influxes of users. MySpace takes off, FaceBook launches, Google has its IPO, and then in 2006, YouTube really takes off. So what we really see here is a pattern, and I am not going to dwell on this in too much detail because Tom is going to go over it in much greater detail as an economist. But I think before we want to look at future technologies, it is important to look at this historical trend and note this historical trend, and look at what it tells us about what is on the horizon.

Most of the demand for broadband development is driven by innovation at the content level. So innovation at the content level triggers demand, which triggers investment and new technologies, which triggers adoption of those

technologies, which leads to more customers and feeds back and leads to more drive to innovate at the edge of the network. So according to Pew's recent survey, 55 percent of American adults have home broadband, and that has tripled in four years. Only ten percent have dial-up connections. So because broadband adoption is demand driven, people need a reason in order to seek out a fast connection. Of those remaining non-Internet users, 33 percent of them simply are not interested. And if you look at why they are not interested, only 12 percent of those users are not interested because they do not have access; it turns out 62 percent of those that are not interested do not even have a home computer, so no amount of broadband will help. So clearly, there is a mechanism for broadband development, which is driven by innovation at the content level. And it does not seem to be that, if you just build more pipes, people will come; it is driven by content. So there needs to be a reason for people to adopt broadband -- that is something to remember. So I think that puts us in good stead from where we stand today, and there has been a lot of discussion about net neutrality and network management practices. I am not here to discuss that today, except only to say that, from my perspective, that is a very good thing that we are having this discussion right now because that means that we have got a pressure point on broadband

investment. And to me, this means we are really at the cusp of an explosion in new broadband technologies deployment and adoption. I guess it is important to note that this has happened before, and as I showed in the previous slide, between 1995 and 1996 with the shift to graphical user interfaces, but the first wave of adoption driven by those technologies caused a slowdown in speeds that people were able to achieve at their dial-up connections. And this has been called the World Wide Wait. And as great telecommunications scholar, Dilbert remarked in 1997, that the entire World Wide Web was designed to make millions of people sit around waiting for nothing to happen. So the real question is, what changed here? And what changed is an enormous investment. Cable operators invested $10 billion to upgrade their lines; SBC invested $6 billion in Project Pronto to accelerate DSL. This is all driven by demand. People were willing to pay more for connections that are 100 times faster than dial-up because this massive investment was driving massive technological change. And these two quotes at the bottom show that regulators were cognizant of this fact, and they exercised restraint accordingly.

So this slide is just to show that investment appears again to be a pressure point today, but investment is strong. Telecommunications, for instance, are spending hundreds of billions of dollars. Investment has increased

40 percent in five years. And it is worth noting that good public policy plays a role in ensuring robust incentives to make these investments, and some examples of these would be elimination of mandatory unbundling for broadband that started in 2003, and that stimulated massive convergence of technologies, offering access to the same Internet across different platforms. Cable was never subject to mandatory unbundling; fiber was exempted in 2003, DSL in 2005. But the propagation of these different technologies requires that regulators use the same regulatory framework across all technologies. Essentially, we need to let consumers decide which technology will ultimately work best for them. The temptation to lock different technologies into different boxes was once labeled by Michael Powell as “the one-wire problem,” and you can see that quote that he characterizes there.

What we see is that we have enormous broadband competition, so Powell's vision, in fact, appears to be paying off. Certain markets might seem like a monopoly or a duopoly today, but thanks to massive broadband investment, this will soon change. According to the FCC, 89 percent of Zip Codes currently have four or more providers. In less than 10 years, the number of broadband providers is expected to increase 13-fold.

So it is useful to look at what is going to drive

the next generation of broadband technologies, and what kind of content is on the horizon, that is going to be feeding America's appetite for new applications? And the promise of these technologies for enhancing quality of life and productivity is simply enormous. If we look at Cisco's latest study of Internet traffic, they project that total IP traffic will grow six-fold by 2012. This is going to hit particularly hard for mobile platforms, where traffic will increase 20 times by 2012. The Internet in 2012 will be 75 times larger than in 2002; this is equivalent to 7 billion DVD's each month. It would take half a million years to watch all of the Internet video on the Network each month in 2012. So the moral of the story is that, while peer to peer might be a focus at the moment when we are talking about bandwidth, its share is going to drop dramatically compared to new services. There is a lot of room for new growth and a lot of that growth is going to be in video applications. In particular, set top boxes are going to lead to an explosion of video applications. When you look at all forms of Internet video, a significant share of which is peer to peer, this is going to account for 90 percent of all traffic by 2012. In the third graph here, the bottom left, you see that approximately one-third of all U.S. media consumption is going to be Internet based in 2012, and in the final graph, bottom right, you get a sense of the mobile market

where you can see that mobile providers are going to be increasingly driven to compete with existing wireline broadband offerings, and the landscape will reflect that overall broadband market. For Internet and video applications, in particular, this is going to increase from 37 percent to 63 percent.

So, because investment and competition in broadband are fundamentally pushed forward by consumer demand, it is important to understand what kinds of things consumers will be demanding in the future. This is not an exhaustive list by any means, but I am just going to show some of these bandwidth intensive applications, many of which are video applications. So high definition and video on demand is clearly going to be a huge source of bandwidth use, looking ahead, and a huge driver of broadband development. According to Cisco, online video accounted for 19 percent of total traffic last year. High definition is only going to increase these numbers dramatically. Just to give a sense of what this means for the future of broadband, 40 hours of high definition video generates as much traffic as a million e-mail messages. Downloading just three hours of high definition content a week would generate at least 27 gigabytes per month. Four million high definition video customers is equivalent to 50 million YouTube viewers. So the most bandwidth intensive applications are going to

stream high definition movies directly down the pipe. And today, only 5.7 million households -- that is nine percent of broadband households -- have the necessary 10 Mbps connection; this is going to expand to 30 percent of total households in just five years. That is a seven-fold increase.

It is also going to be big business. By 2013, consumers will be spending over $6 billion; this is a six-fold increase over five years. Internet enabled set top boxes are going to continue to accelerate growth as people hook the Internet directly into their high definition television sets. And I am showing down in the lower right hand corner some of the major players that are getting involved in this business.

So another Internet video technology that is going to require a lot of bandwidth is Internet TV or IPTV where video streams are encoded as I.P. packets. Because this enables both upstream and downstream data, it is going to revolutionize how people watch television. It is going to be much more interactive; people will be able to do everything from choosing alternative endings to the same show, to voting for your favorite reality show contestant directly from your remote. Because content rides on traditional infrastructure, there will be incredibly low barriers to entry -- for broadcasters -- and I use that term

as broadly as possible. You will no longer just have traditional broadcasters, but you will open up television to the entire Internet, potentially creating unlimited broadcasters that can reach your television set, all customized to the viewer's taste. This will create millions of personalized or niche channels, so that the set top boxes that are going to allow this technology to transition easily from the PC to the living room are starting to come online. Revenue is projected to grow to $5.8 billion in the next three years. So from 2006 to 2011, bandwidth demands on the network from Internet TV will increase 44-fold. And in the second graph here, we see that the percentage of people that are seeking this content on their PC's has jumped seven percent in only one year, which is really very amazing.

According to e-Marketer, 52.5 percent of all Americans, or 154 million people, will watch online video at least once a month. And, again, I have shown some of the major players that are involved here. I will not go through each one, but I think it is worth pointing out one of them, Fancast, which is part of Comcast, and that is rather interesting because Comcast is itself a content provider; they have their own video on demand offerings. But I think they see so much diversity on the Web that even traditional media companies need to have an offering so that they do not miss the boat.

So another technology that is going to drive future broadband's growth is video telephony. This can be seen as the next incarnation of voice-over I.P. telephony. According to Cisco Systems, there are going to be three waves of Internet traffic growth, and this is going to create demand for fast connections in both directions. And this is a particularly bandwidth intensive application, and in order for it to work, jitter needs to be kept under 30 milliseconds. It is predicted to reach mass adoption between 2012 and 2015, and real time communications will provide unique challenges because the data cannot be cached. So what I am showing here in the second graph is that the surge has already begun. There is more bandwidth today on video calling than the entire Internet backbone in 1997. So various projections suggest that high definition video teleconferencing will be a $1.3 to $4 billion market over the next five years. And while you are here in San Jose, if you have a chance to visit Cisco Systems and demo their Telepresence system, I highly recommend it because systems such as Cisco's Telepresence and HP's Halo offering will allow businesses to cut down on travel costs and save on gas prices. It also will require enormous bandwidth because it needs to be life sized, real time, and high definition. Cisco's video conferencing rooms include three 60-inch plasma screens. This is a huge evolution from the original

AT&T picture phone -- picture it here -- which was originally introduced at the 1964 World's Fair.

So in the interest of time, I will not spend too much time dwelling on these other technologies, but it is important to say that there is a lot, obviously, on the horizon that are going to require considerable bandwidth and that are going to drive future broadband development. Telemedicine is one of those key technologies, and I look forward to Dr. Nesbitt's talk later where he will go into this in far more detail, but essentially bringing back the house call is what telemedicine will do. It is going to decrease the cost of health care, it will increase access and improve outcomes. And ultimately it will enable things like telesurgery.

Virtual Worlds is another key technology, and we are not just talking about second life here. This has moved into the enterprise area, where businesses are now investing in virtual communities as an immersive web environment to bring together voice, video and data to enhance collaboration. It allows synchronic interaction between employees all over the world. And, in fact, we are already starting to see some state regulators have begun to adjust to the new world of virtual universes here. In fact, in June, in Vermont, they created a special class vacation for virtual corporations that have no physical infrastructure, and they are allowed

to conduct Board meetings via an electronic or telecommunications medium.

Another key technology will be online gaming. This may sound less life and death than telemedicine, but it is still important that there be a fast and uninterrupted low latency connection in order for these games to work. It has been estimated by Parks Associates that, by 2013, Internet connected game consoles will generate over $8 billion for Microsoft, Sony and Nintendo. In addition, cloud computing is also going to be a key bandwidth consumer over the next few years, and hopefully Google will give us a talk on that shortly.

So the good news with these new technologies is that the future looks bright for broadband infrastructure. There are a lot of choices, a lot of platforms, and considerable investment right now, going on to make sure that all of these types of content are made possible. And what I would like to do in the remaining time is walk through what these technologies are that are going to drive the future of broadband.

So what broadband technologies are on the horizon to meet this incredible demand? Cable providers have invested $130 billion in capital investment over the past 12 years, and cable infrastructure is available to 92 percent of U.S. households, so there is considerable opportunity

here for widespread adoption of broadband through cable. DOCSIS or Data-Over Cable Service Interface Specifications is a set of protocols developed by Cable Labs for delivering I.P. broadband over a cable TV network. These networks are largely hybrid fiber coax. The newest version of DOCSIS, DOCSIS 3.0, more than triples the available speed to 160 Mbps downstream 120 Mbps upstream. This could allow cable providers to offer potentially even higher speeds, going up to even Gbps. So the way that this technology works, the DOCSIS 3.0, is based on a revolutionary change in how the signal is transmitted. So a single downstream channel currently can provide up to 38.8 Mbps, over 6 megahertz downstream, and upstream 30 Mbps, over channels as wide as 6.4 megahertz. So DOCSIS 3.0 uses something called channel bonding, which shares the traffic load over multiple channels. And that is what I am showing in the upper left hand corner. It creates these wide band channels. And channel bonding, what it does is dramatically increases both upstream and downstream output. And technically it is important to point out, there is no limit to the number of bonded channels. So it is also worth noting, and what I am showing here in the upper right, is that these DOCSIS wide band channels have full backwards compatibility with existing cable modems.

So sticking with the cable technologies for a

moment, over 35 million customers currently have cable Internet. It has the most extensive nationwide network. In the first graph, I show that there has been over $130 billion in private capital investments since the passage of the 1996 Telecom Act. Comcast aims to roll out DOCSIS 3.0 to 20 percent of its footprint by the end of next year. Time Warner is aiming for a roll-out early next year, and ABI Research predicts penetration of DOCSIS 3.0 will reach 60 percent by 2011.

In the second graph, I am showing that the surge in investment is increasing the reach of cable infrastructure. The availability of cable has doubled in only eight years, and this is good. It is starting to look like an as asymptotic function, which means it is approaching 100 percent. So when the DOCSIS 3.0 roll-out is complete, at least 93 percent of households will have access to 160 Mbps downstream, 120 Mbps upstream broadband. And as cable is meeting growing demand, customers are lining up and what I am showing at the bottom is that adoption is moving ahead at an almost constant rate, this is pretty much linear. Between 2001 and 2007, growth in cable broadband customers has been nearly perfectly linear, getting 4.8 million new customers every year.

So moving now from cable to the telcos, we see that a lot of the development of DOCSIS has been driven by

competition across platforms, in particular from telecommunications firms that are investing in advanced fiber networks. Verizon is spending $23 billion through 2010 to build its fiber optic networks directly to customers' houses, this is called Fiber to the Home, or sometimes Fiber to the Premises; it not cheap, it costs roughly $850.00 per premise to deploy this technology. But, it is projected to attract seven million customers by 2010, and it will be available to 19 million homes, that are roughly half of the company's footprint.

AT&T is also investing in fiber, but at a cheaper approach, which is more similar to cable in that it is a hybrid network. It runs fiber to a node within 3,000 to 5,000 feet of the home, and then copper wire to the house. Both of these networks are what are called passive optical networks. The data is carried by light waves of different colors, so they do not require any electrical components between the data center and destination. Because the network is passive, it has no need for remote powering, which allows for low operational and maintenance costs. The capacity of the network can be increased by including multiple wavelengths of light on one piece of fiber, giving a very high potential upper limit to speeds. So broadband PON, or BPON, is the first generation of this technology. It can theoretically generate speeds of 622 Mbps downstream, 155

Mbps upstream. GPON is an upgrade to this technology, which can accommodate higher transmission rates of 2.5 Gbps downstream, 1.5 Gbps upstream. So earlier this year, Verizon began rolling out GPON in nine states, and it has pledged to incorporate GPON into all of its new infrastructure. So Verizon's fiber optic network and its service, called FIOS, currently passes 11 million homes and businesses; by 2010, it is expected it will pass 18 million premises; that is 50 percent of the company's total footprint. And customers are adopting the technology at a good pace; it is already at 20 percent penetration where it is available.

And what I want to show in this graph here is that these investments that Verizon is making, as well as other companies that are investing in fiber to the home technologies, are enhancing America's competitiveness. According to RVA research, the U.S. leads the world in annual growth of Fiber to the Home connections at 76 percent growth per year. Also, the U.S. ranks second in the world for total Fiber to the Home connections. So Fiber to the Home is already available to over 10 percent of households.

With regards to AT&T's Fiber to the Node technology, the company spent between $4.5 and 5 billion over the past two years on capital expenditures. Adoption is also increasing at a fast pace. It is expected to reach

one million customers, which is an increase of six-fold in only a year. In AT&T's established market, they have reached a penetration of 10 percent. AT&T's fiber network currently passes 14 million households, and this is projected to double to 30 million households by the end of 2010.

So there is also a great deal of promise in wireless technologies, to potentially replace wireline technologies, as broadband alternatives. So to meet the increasing demand for broadband access, wireless providers need to build networks that are optimized for data, and that can handle the influx of new Internet enabled mobile devices. And the evolution of fourth generation networks means that wireless broadband is coming of age. It is providing end to end IP Networks that can compete with wireline broadband offerings -- and I show here a broad projection of speeds that are possible, and this may be a slightly optimistic projection. [Laughter] But it is what is theoretically possible -- I am supposed to be forward looking and looking at future technologies!

So the major standards, bodies involved in 4G technologies have chosen Orthogonal Frequency Division Multiple access as their physical layer transmission technology, and that is what I have illustrated here in the upper right hand corner. OFDM is a spread spectrum

technology, similar to CDMA, except that the segments are divided according to frequency. It divides the spectrum into equally space tones that are all Orthogonal to each other, and because the tones were Orthogonal to each other, they can overlap without interfering with one another. This allows the data stream to be split into a number of parallel data streams. It also allows multiple users to share the bandwidth. There are two competing technologies for 4G networks, WiMAX or World Wide Interoperability for Microwave Access, which is certified by the WiMAX Forum, and LTE, or Long Term Evolution, which is being standardized by the third generation partnership project. WiMAX and LTE share a lot in common, but they are looking to achieve data speeds in the short term, around 100 Mbps, and allow advance video technologies on mobile devices. It is even potentially faster for stationary applications, where home connections can replace wireline entirely with speeds up to one gigabit per second. So in May, Sprint and Clearwire agreed to combine their existing mobile WiMAX initiatives to form a new company, called Clearwire, which is backed by $3.2 billion in funding from a number of supporters, which are illustrated here in the lower left hand corner. LTE is backed by a number of major carriers, such as Verizon, AT&T, China Mobile, and Vodafone, but also a number of handset manufacturers such as Nokia and Erickson. Neither of these

are conclusive lists of all of the backers, just to give you an idea. Sprint will advance their WiMAX using its spectrum holdings in the 2.5 GHz band, and Verizon and AT&T are utilizing the recently auctioned 700 megahertz spectrum. So, as speeds grow, these technologies could become viable replacements for wireline broadband for many customers. The range also makes the technology suitable for reaching rural communities. WiMAX has a theoretical reach of 30 miles.

So it is worth pointing out that, by 2010, Clearwire expects their WiMAX network, which they have already begun to deploy, to cover 120-140 million people in the U.S. For LTE, roll-out's are expected in 2009, and AT&T expects roll-out's in 2010 to 2011. So in the first graph here, we are showing the growth of WiMAX and LTE are going to spur enormous increase in Internet enabled mobile devices. Sprint estimates that there will be 130 million 4G devices within three years of the launch of its Zume WiMAX service. And the number of traditional voice sets is going to remain largely constant. Therefore, mobile devices are going to replace traditional computing capabilities, and there will be over 1.5 billion wireless devices by 2020.

In the second graph here, I am illustrating that investments on infrastructure will continue to grow to meet demand. The new Sprint-Clearwire Venture is worth $14.5 billion alone, Verizon Wireless already spent $4.74 billion

on the C-block, 700 megahertz spectrum, so it could build its LTE Network. Wireless broadband holds great potential for rapid and widespread adoption because of the existing reach of mobile networks. There are already 250 million wireless subscribers.

In the third graph in the middle left, you will see that demand is going to be biased towards wireless. In 2006 and 2007, 68 percent of new broadband customers were wireless. Furthermore, the U.S. also, just as it does in Fiber to the Home, leads the world in mobile broadband adoption as a percentage of total wireless subscribers. In addition to this innovation, who knows what kind of innovation will be possible on White spaces, but, again, hopefully Google will tell us about some of the innovations they have planned with White spaces.

So many people have been quick to write the obituary on satellite broadband, and I think it is worth looking at what is on the horizon and maybe being a little cautious before declaring satellite technology as dead, as a viable high speed Internet alternative. So the benefit of satellite Internet is its reach. It is available in areas where terrestrial connections do not exist. It is typically, however, viewed as last resort because customers pay more for slower speeds. It is hard to even consider it broadband because none of the three satellite major

providers satisfy the FCC's definition for an advanced service. And satellite accounts for only 0.7 percent of total high speed lines in the U.S. But the point here is that there may be hope for faster, cheaper satellite access. In February, the Japanese Aerospace Exploration Agency and Mitsubishi launched an experimental satellite capable of speeds up to 1.2 Gbps, which is called the Kizuna satellite, or the Winds Project. This project is costing the Japanese government $342 million, but the Japanese have already announced that they are successfully achieving speeds of 155 Mbps downstream, 6 Mbps upstream, to homes. So if advanced satellites can offer ultra high speed two-way communications, it might be possible to provide service directly to consumers or, alternatively, you could sell wholesale access to provide backhaul for terrestrial wireless providers. This could help bring high speed communications to remote and rural areas. And this is the approach being taken by an innovative start-up called O3b Networks, which in September was backed by Google and HSBC. It is launching 16 satellites to provide cellular backhaul at speeds of one to 10 Gbps. The Holy Grail here is ultimately to be able to combine the speeds of fiber with the reach of satellite.

So I will just conclude by saying that, looking at the future broadband technologies, it is clear that the

future does look bright. At the dawn of this new Administration, it is helpful to survey the horizon and certainly there is a lot more that can be done, but it is clear that there are a lot of new technologies that are soon to come online that are going to vastly increase America's competitiveness. We have abundant innovation in both content and delivery. The U.S. is leading the way in many of these future technologies. We have an abundant competition with multiple technologies competing across platforms. And the only word of advice I would give to regulators is that it is very important not to give unfair advantages through inconsistent regulation across these different technology platforms. And it is also important not to pick winners through subsidizing one technology over another, given that all of these technologies could potentially be interchangeable in the future. Thank you.

[Applause]

Commissioner Tate - Dr. Ballon, thank you. Wow, what a whirlwind, taking us from…

Dr. Ballon - I threw a lot of data at you.

Commissioner Tate - Oh, my lord, but it was spectacular, it really is. And maybe you want to share some of this with our dear friends at Organization for Economic Co-Operation and Development ("OECD") if you think we have fallen so far behind. Does anyone have a question? I am

trying to keep us on schedule, but if you have a burning question for Dr. Ballon, yes, Commissioner.

Commissioner Gillett - Commissioner Gillett, Massachusetts. Do not worry, it is a short question. The Kizuna satellite, fascinating, is that geosynchronous? Does it still have the high latencies of traditional satellite broadband?

Dr. Ballon - I actually do not know off the top of my head. I know it is a K-band satellite, but I do not know whether it is geosynchronous or not.

Commissioner Tate - Yes, sir?

Mr. Weissberger - Alan Weissberger. I am from [Bleak] Communication (phonetic), Broadband Chairman, Santa Clara Valley. So there is a lot of negative press about the U.S. being so far behind in broadband, and I heard your talk regarding the Fiber to the Home, the mobile broadband subscribers, how would you address those critics who might challenge your stating it? I would submit, as an example of being behind in high speed DSL, right here in Santa Clara Valley, where we are limited to maybe 2.5 gigabytes downstream.

Dr. Ballon - I know a number of people have criticized various ways of measuring competitiveness in broadband. And I am not up to speed on the specifics of how every study is conducted, but I suppose that the moral of

this story, what I am trying to present, is that the future of what is coming down the pipe in the near term is going to put us right back up there on par with any other developed country. And that is why I am trying to put forward this optimistic message, that because there is this enormous burst in demand for new content, our service providers are responding accordingly, and leading the way in the next generation of technologies. And a lot of these are really being driven here, more than anywhere else in the world, so that that will put us in good stead in the next five to 10 years.

Commissioner Tate - Commissioner Baum has a question.

Commissioner Baum - Has the capital crisis impacted your view in any way about the investment capital needed to do all this?

Dr. Ballon - You know, I think every company has their long term plans, and I have not heard any evidence that they plan to adjust those plans. Verizon's plan, for instance, is extremely forward looking -- five, 10, 20 years in the future, and I think they probably see beyond the current capital crisis, and they do not have any plans that I know of to cut back on their Fiber to the Home investments.

Commissioner Tate - Certainly looking at the

cranes around here, it does not seem like there are surprises here. Let me move ahead, Dr. Ballon. Thank you again, so much.

We are very thankful and appreciate that Tom Koutsky has come from D.C. at kind of the last moment, and I am really thrilled. He is the resident scholar of the Phoenix Center for Advanced Legal and Economic Policy Studies. He is going to address the Supply/Demand side drivers of broadband deployment. And, Tom, welcome. And thank you for being here.

Mr. Koutsky - Thank you.

Commissioner Tate - And while he is getting ready, just to do a little advertisement back to the OECD statistics, the Phoenix Center has -- is it one or two studies out, responding to some of those?

Mr. Koutsky - Well, since the OECD comes out with it every six months, we have semi-annual studies.

Commissioner Tate - Great, wonderful.

Mr. Koutsky - Yeah, and actually one of them is out in front.

Commissioner Tate - I commend those to you and, with that, thank you, Tom, for being here.

Mr. Koutsky - And I will do my best not to dwell on that, but I can certainly answer questions about that. I have actually been rather definitely -- you know, to make a

point, I have definitely changed the title of my presentation, and I want to do that to emphasize a point to you, because we have heard a lot today about -- and typically telecommunications policy tends to focus on the supply side of the equation, which is from econo-speak standpoint the costs and benefits of a business, of a network provider being able to build networks, and should we subsidize it, at what level should we subsidize it, or mandate it? Those are supply-side factors. And I am going to give you a little explanation as to why I want to kind of re-orient the debate, and I am very encouraged, actually, by the entire agenda. And I would like to thank Commissioner Tate and Commissioner Chong for putting together a very comprehensive agenda, that really goes into the meat of what I regard as the sum of the significant issues.

Before I start, a little bit about the Phoenix Center. We are a non-profit research entity. We are relatively small, but we started off as FCC staffers. So we have actually been kind of plowing through FCC data on broadband before people used the word "broadband" when we first started doing it at the FCC, and we now continue to do that as we have kind of gone on our own ways now throughout industry. So all our research is available for free. I am more than happy to speak of anything. We have a policy paper series of about 30 or so, on various topics, but we

have four or five on news core issues.

I think the key thing from Daniel's -- a really comprehensive presentation, that is a take away for policy makers, is that demand and supply are intertwined. You cannot just separate the supply side from demand side and regard them as two different spheres for policy making. The fact is, and Daniel made a great case for this, is that if people want the service, if they want to watch -- I will cite a personal example -- if they want to watch streaming videos of the Wiggles or other pre-school activities on YouTube, they can. And if they demand that enough, they will pay a provider like Verizon enough money to get the bandwidth there. And Verizon will provide that service to that customer as long as it is profitable to do so. That is kind of how we do things in America, until about a month ago. [Laughter]

But we need to kind of maintain that perspective here. And there was a lot of reasons for optimism to think in this space, but at the same time, we do see that broadband or broadband availability is reaching 90-95 percent of American households, which at the surface sounds very good, and it sounds like something we should be relatively happy with, unless you are one of the one in 20 people that are on the other side of the equation, and that is where I think we need to start to understand why the

service is not available in that area. And to think of it as a perspective of just simply a series of supply-side questions, and not a series of demand-side questions, misses what perhaps may be a critical insight. So the fact is, we have traditionally in telecom policy treated it as a supply-side problem. We have debates, we have fights, we just had one about an hour ago, over, you know, investigating why certain providers do not do something, and whether or not we should have enough data or make them file particular data, or whether we should have rules that would make it more expensive to provide a service in a particular area through mandates, etc., which at one level seems counterproductive to make something more expensive if profitability is already a problem; I do not think you want to make it that much more expensive. And then there is the other side of the question, which is should we subsidize this? And on what level should we subsidize these services? So here we are. I mean, we built this patchwork of public policy that is mostly supply-side focused, and we find ourselves sitting here today with, again, a one in 20 Americans potentially problem in terms of having access to broadband and advanced services. And we find ourselves drawn in to debates over what is the definition of broadband. Should it be 200 kilobits or 2 megabits, or 20 gigabits? We litigate disclosure lists, we fight over implicit subsidies, and

access charges, and what they fund, and whose access charges if we want to change them. We fret over creating a broadband fight. We are worried about possibly recognizing that broadband is critical to our nation's future, but then we worry about the price tag for it. That fretting results in the situation where, if we do not have sufficient funding to fund the Broadband Universal Service Fund, then the Government is in the position of picking communities and service providers that are winners or losers, which is another thing to fret over, and worry over, and fight over. And we will make today's inter-carrier compensation debate seem like child's play in 20 years -- we were talking about which communities should have access to 20 gigabits as opposed to one. And we are also worried about the future of the nation's economy in its rural areas. I think that is something that needs to be addressed.

So why I am here, and what our research is focused on, has been to think about a fresh approach. I think it is time to take a fresh approach to this, and I am actually very optimistic that, with the broadband Data Quality Improvement Act, and the initiatives that it promises to support, eventually, one day, but also the initiatives that we see at the State level. So the research that the Phoenix Center has done is we have really -- if you are thinking about the interrelationship between the demand side and the

supply side, and the key insight that Daniel talked about is that, you know, service providers will provide it if it is profitable; the question is, let us understand why demand for certain broadband services in certain communities may be lower than in other communities. And the very first step of this is not to look necessarily at the service provider community, but to really try to understand what may be happening in certain communities. Is it a lack of computer ownership, as Daniel indicated some surveys have indicated? Is it a lack of education? Actually, is it a language barrier, potentially? And in terms of computer training and computer resources.

So kind of the interesting insight that Phoenix Center did, when we first started looking at this from the perspective of looking at the various different broadband subscriptions and availability data that are published both by the FCC and the OECD, is to explore the variability between the States and between nations in their broadband adoption rates, and to try and see if we could explain those differences -- the extent to which we could explain those differences based on certain economic and demographic conditions. And I am not saying that these explain all of the differences that we might see between Denmark and Turkey in terms of their broadband adoption, or between Massachusetts and Montana, but it explains a lot of them.

And we can use economic tools to, in essence, do what is called a multi-varied progression. We can use those to really try to pinpoint which factors are more important. So when you are thinking about a demand-side broadband program, or that Connected Nation in Kentucky, and in California, you are faced with these other choices -- do I focus on low-income households? Do I focus on minority households? Do I focus on immigrant households? We can use the data and basically take advantage of the variability in broadband adoption to really ferret that out, and figure out which ones are more important.

Honestly, we kind of went into this a little bit blind when we started this research a couple years -- about a year ago. We did not really know what we would find, and we actually found a lot of surprising things. This is just -- I am just going to give you just an indication from a statistical analysis standpoint, do you actually like to have the fact that there are what appear to be winners and losers? Do you like to have variation in the results? So here we have, you know, Denmark, you know, 35 broadband subscribers per household, and Mexico, 4.3, so we have demographic information that can possibly explain this. A surprising variability in the United States, as well, the same measurement between New Jersey, Nevada, and California, which are all reasonably high -- or very high -- to the

Dakotas and Mississippi which is relatively low. A little word of caution on the FCC data -- we actually have had to kind of truncate our data set analysis of the FCC, so this affirmatively on both sides does not include mobile broadband services. And that is for a reason, because they are measured differently by different countries, including the United States. At that point in time, we really could not do much with that until we get a better handle as to what is happening with mobile broadband. We are actually in the process of writing a study that might just look specifically at mobile broadband to see how different it is. But that is just a word of caution. So I am giving you the numbers that are based on the best available data that we have been able to use and that has some kind of level of consistency. And it tends to be from the 2005-2007 period.

So how do we explain these differences between the countries and states, various communities? We have heard a lot of people talk about population density, does density matter? Does the size of a household matter? And it actually goes into how you actually may want to measure broadband -- do you measure it by household, or by population, etc.? Set up questions about all these FCC reports. Does income matter? We know that income is related to computer ownership, so one would presumably think that it is related to broadband subscribership, but how much

so? Is it purely because of the computer ownership? Or is there an additional level to it? Income inequality was actually one we asked, and we came up with some interesting answers on. It was one I had not expected to see so much. Education level, population age -- younger populations such as Korea tend to subscribe more to broadband services. And how much does price matter? Obviously, when you are talking about the sale of a good service, you know, the cheaper something is, people will buy more. We are trying to measure whether there is something more, in addition to that general linearity relationship where, if it is cheaper, people will buy more. Are we going to say if it is cheaper, do people all of a sudden want it more? Is there a demand effect of it being cheap? That is a different way of explaining that point.

This is the first slide for most of us in the audience, and the next slide is for Sharon Gillett. [Laughter] In essence, what we are trying to do here is create a function -- we are trying to create an equation that is all of these various factors -- pricing, equality, education, age, density, urbaneness, education level, whether you have children in your household, or whether you have any children in your household that are in school, whether you have an advanced degree. All of these factors, we have data on for in the States and also among the OECD,

so we try to analyze this and use the regression techniques to try to separate that out. There are really two different purposes we could do, one is to, in essence, create what our Chief Economist called a golf handicap, you know, given the fact that certain countries like Mexico and Turkey are poor, and have a lot of rural areas, we are going to need to expect them to have a lower broadband adoption rate. But how much lower should it be than Denmark? Should it be 90 percent lower? Or 85 percent? So you can actually figure out a way of gauging the differences between countries that way. This is the Sharon Gillett slide. And I will be more than happy to let her explain that to you. [Laughter] You are supposed to nod your head and say, "Yes, there is something to this."

The OECD data, I am not going to go through these in detail, but the papers are out there. But these were where we call regressers, but these were the factors we studied. We looked at a bunch of more factors. We probably looked at four or five times this number, but the purpose of the regression analysis is to identify the factor that has the most explanatory value to the equation that you write. Right? So someone can say, "Well, did you look at percent of the population over 50, or percent of the population under 20?" Is there an age factor? It's like, yeah, we did look at those things, but we found that the age over 65 had

the most explanatory effect for this very basic point. And there were a couple of things we kind of played around with here. The Ginny co-efficient, which I will talk about later is income and equality, and that is the income of the richest households basically divided by the income of the lowest ten percent of the households. And that is something that varies across countries.

Basically, we were able to find that those 10 or 11 factors explained about 91 percent of the variation between Denmark and Mexico in the OECD. It did not explain all of it, there is 10 percent that cannot be explained by these factors, but that might be public policy, that might be something that we do not have data on, it may be pure randomness, although we try to take care of that with other aspects of the regression. You can look at the marginal effects. This is not so easy saying the one or anything, but generally the bigger, the more that matters. We actually found that telephone penetration in a society had a lot to do with what penetration was available. It actually says that, if you wanted to extrapolate that to the United States, you know, currently, it says there probably still is some kind of role for a Lifeline in the Linkup program because there is the significant correlation between people having telephone service in some way, shape, or form, and broadband adoption. That just may be that we may be

reaching communities or maybe talking about communities that really have not been connected for the last 60 years. It is kind of hard to think about them getting connected for the next 60 if we still have not accomplished that first step.

These other things are kind of what you expect them to be. I think the one that is interesting here is that density is not as significant as a lot of people might have originally thought. And the U.S. data provides a little more insight as to why, and I will do some explaining on that. This is kind of the other aspect of it, but this is the golf handicap aspect of the paper, and it really shows you who is out performing the demographic conditions that their country is essentially endowed with. Right? Iceland, you know, has certain demographics associated with it. They are doing really well on broadband, despite the fact, or maybe because of the fact, of some of those demographics. But they seem to be over-performing in one sense. You see a lot of Scandinavia is up there, as well, but they are not as high as they had been. You see a country like Portugal kind of move up the scale. Portugal is a country you would not even think about if you were going to compare the United States policy to other countries' policies, you would never think about comparing us to Portugal because they are like 24th in the OECD. But according to this, they are third. You know, they are

making the most, they are making lemonade out of lemons in one sense. But they are making the most of what they have and that is really from a public policy perspective what we should be thinking about. And that is especially important in rural and farm areas of America. So it is kind of interesting and we can talk more about that; it is not the focus of what I am doing here.

This slide is the domestic data, this is again using FCC state-by-state data from a period of a year, so similar factors, not identical factors for a lot reasons, in part because we have better data for the United States, it is more consistently collected, so we were able to delve into a lot more, and so we were able to separate out rule population versus farm populations, which is interesting because we show it to be different. So that is why we did that. You know, percent of families that have people in school. We also used interesting demographic ones -- is English the language at home? Are you an immigrant household? And the most interesting is, you will see, and you might be surprised by what we found. Again, we explained, this was pure coincidence, but they are squared or we explain that in 91 percent again. Now, that is pure coincidence how that happened.

These are kind of comparing. And the way to think about it is, since we are looking at multiple variables in

the same equation, you cannot just say one per one; so a way to think about it is that, as I increase one variable by ten percent, let us say we are talking about GDP per-capita, household income, if I increase household income by 10 percent in this community that I am examining, you know, how much more broadband would be consumed in that community? Right? And so that is kind of what this table was. So just kind of think in your head. So if you increased GDP per-capita, domestically we found it increases broadband subscription by about three or 3.8 percent; internationally, 5.8 percent, that is reasonably close together, it is not a pure one-for-one, but it is a pretty significant effect; in essence, the more money you have, the more likely you are to buy broadband. And it goes up pretty sharply. What is interesting is the income and equality factor. Now, this is not on a household basis, this is looking at a society as a whole, and saying that it, for whatever reason, it is a negative sign -- if I increase the inequality of income in the society, or in a community, through its Ginny factor, the consumption of broadband services drops by far more than 10 percent. And it is a little bit of a surprise, we would expect to see some aspect, but to have that be a very strong factor. And I do think it possibly does point in the direction that there may be some systemic issues, and it is not just domestically, it is also internationally, as well.

I do not want this to become a “blame America” thing; there may be some systemic issue with, for lack of a better term, an underclass, that if you build or generate up an underclass, you have a really significant barrier to broadband adoption that can get at community stuff. This matters for broadband deployment because, I think you will definitely see this, a broadband service provider, as I said before, is going to deploy where it is profitable to deploy. It is going to deploy a network where people are going to buy it. If there are pockets, or if there are communities where it will not be bought, it will not get deployed. That will be just kind of a natural reaction of a capitalist society. So something for us to watch for, and to think about as we develop the demand-side programs. I mean, do we really target it into the impacts of income inequality.

Tertiary education is the OECD term for college degree or advanced degree. We see a significant -- kind of what you expect -- people with college degrees buy broadband. So you could think of, you know, student loan policy as being broadband policy in one sense. One in the United States is interesting, is percent of household or children in school, 28.1 percent. Now, remember, these are all separated out from everything else, this is everything else being held the same, if you have a kid in school in your household, you know, your demand for broadband services

increases substantially. So even among poor and low income households, that demand increases substantially.

Age, population -- age is another issue, as well. There is a suppressive effect, the older the population. The other one I just want to kind of point out in the United States side of the domestic factor is foreign-born population. Again, this is holding everything else equally. It is a positive sign. An immigrant household, all other things being equal, is more likely to buy broadband service than a Native American household. And there might be a lot of reasons for that. It might be a way of staying in touch with culture. You know, CBS, NBC, ABC may not really speak to you as much if you were born in another country. It might be your only way of staying in touch with your native culture, I do not know. Again, we are holding everything else equal. You know, we are assuming it is an immigrant family with median income, median education, median everything else, much more likely to adopt broadband for a variety of reasons, which I do not really know, but there it is. So that is an interesting point that I think we need to kind of bear in mind.

I would like to just talk a little bit about density because we hear a lot about it. And the fact is, if you really delve into the data, density does matter, but in a different way than you might have originally thought. We

see debates in Washington about people will throw up slides and they will say, "See, density does not matter," right? They will throw up the fact that Iceland has high density, or has a low population density, but has high broadband subscriptions, and the fact is, it matters, but it does in a very subtle and nuanced way. And it is almost -- to think about it is almost a relationship between the urban centers of a society and the rural population or society. In essence, if you have a big city in your community, it will obviously become attractive to service providers, and that will result in build out of broadband that works in the big city, which may eventually spill over into the rural or farm areas adjacent to it. But, as you increase basically the ratio between the rural and farm populations, or farm populations, and the city, in essence, think less about Upstate New York and Manhattan, and more about Omaha and Nebraska, Omaha does not do Nebraska as much good from attracting capital standpoint than Manhattan does for Upstate New York. There is -- the relationship between how large the rural and farm population is and the size of the city is what really drives it. And I kind of find this as I talk to State Commissioners. I have done a lot over the years. There is a general -- some people might think of this like, "Well, Omaha is always going to get it, so I just need to worry about the other areas," and that is not

necessarily true. Actually, if we are talking about 50 gigabit type services that may be demanded in the future. It is not necessarily true. You have to kind of think proactively about proactive policies. There is some policy on that and I will wrap up with that and then take some questions.

The way I like to think about this research is that this should identify areas that, if you want to build up a program that stimulates broadband services, or the demand for broadband services, you are going to want to look at factors like these and say, okay, how is the program I am thinking about implementing, or funding, or providing a matching grant for -- how does it take advantage of one of these factors? Or is it working against one of these factors? Some factors, you may not want to work against, you know, population age, retirement communities, or you may want to have a policy of understanding that older populations may be less likely to adopt broadband, and you may want to have a proactive policy that focuses in on those. Again, there are a few factors that are very significant in positively impacting broadband adoption, these are ones that, if you figure out a way to reinforce, or to essentially give a booster shot to, you can pay off in Spades because you are essentially getting them more bang for your buck. Find the households that have children in

school, even if they are the forest households. That is probably the most important one out of this is that, if you figure out what is preventing those households from subscribing to service, they are inclined to do it. It was at 28 percent was the level I saw. That means they are going to buy. There is some other reason they are not doing it. So if you can do what like Connected Nation is doing, or other programs in terms of doing computer training in schools, and computer distribution programs, you can do a lot very cheaply, and you do not necessarily need to have a network broadband subsidy program for this, you just need to find 5,000 Intel PC's. [Laughter]

Commissioner Chong - Who is paying for this, Tom?!

Mr. Koutsky - Peter Pitsch. Immigrant communities, again, it is maybe, look at immigrant communities, again, our studies show that they are actually more likely to buy service than a native American community. You just have to figure out why they may not be doing it. It may be that, again, for the same reasons as before. I kind of go into examples of programs that may deliver the most bang for the buck, you know, you can almost play the law school exam game and say, in an area of high immigrant population, have a donation program for families that have kids in school. You can add these things together and that might be a very efficient and effective program. And the

other side is to try to mitigate factors that have an adverse impact. Again, really focus in on this income inequality question because I think it is often perhaps under-reported and under-appreciated, that there is an aspect to doing this, and maybe in community centers or in food banks, those types of things, to really try to reach that under-class. Again, retired and older populations. Retired people tend not to subscribe to broadband. We can try to figure out why and maybe possibly effect that. English language matters, as well.

So that is basically the point I wanted to make is to try to re-orient ourselves towards identifying the demand-side factors that matter the most because, when we get down to it, we are not going to have enough funds in the broadband fund or in the system to essentially subsidize the construction of the network that Daniel thinks we are going to need to have in the next 20 years. We just are not going to have sufficient funding for that. So the key is, let us see what we can do with demand stimulation programs to attract as much independent private investment to this industry. Do not make things more expensive for private network providers to actually go and build these things, but, instead, try to make it in essence more profitable for them to build out. Then you will still definitely have areas that the business case still will not be made, and

that may be two or three percent of the population. I think Michael from Connecting Tennessee can talk about that. Then, you can have a targeted subsidy program. But in the mean time, you have slashed the cost of that significantly. And you have actually done it in a relatively pro-market and efficient and effective manner, as well. And you have more people in rural communities using broadband services. So I will just leave it at that, open it up for questions if people have questions or thoughts.

Mr. Temple - Eric Temple with Cisco. I just went through the whole Muni Wi-Fi debacle and this is about 100 cities, small, medium, and large. And we found it may not be equipment or access or business model issues, per se; we found that there is a large percentage -- because I studied the Digital Divide thing, and it is in RP's and nobody really knew what that meant -- and it may be an access authentication issue. So a lot of underprivileged, they are not credit worthy, they do not have permanent addresses, they may be afraid of the INS, so they are not willing, or they do not trust -- the service providers require credit cards and permanent addresses to authenticate. So we think -- not "we", I am not speaking really for Cisco, I am speaking for having visited 300 cities from Roundup, Montana, to El Paso, to Des Moines. If we could possibly -- instead of credit cards and permanent addresses, maybe even

trade an Employment Development Department, if you are registered in the EDD, and you can provide that number, that is your log-in and password, no privacy issue, no INS issues. So no subsidy. So it was not an issue of, "Hey, we need 400,000 laptops in wireless Philadelphia," which quickly gets the industry wrapped around the axle, because you can get a $400.00 ASUS EEE PC. You can go to villages in Indonesia and there is a television on inside that little shanty, so they can get these devices and it is not an incentive to the service provider. But I think if you look at shifting how they get authenticated, you can reduce employment, get them out of the house, and eliminate their fears of Big Brother, and credit cards. So that is just a question/comment.

Mr. Koutsky - And that is a good idea. I did the laptop programs because it is the easiest way to conceptualize trying to overcome an income for an underclass program. But, no, I think part of a program would be to study why low income households or even undocumented households may not subscribe to broadband. The answers may be obvious once you start talking to people in that situation, but the first answer should not be, "Let's subsidize construction of the network and they'll buy." That is not an efficient answer. So I think actually, I had not really thought of that, there might be some way for us

to try to quantify that and solve it. I am not sure how, but there might be a way.

Commissioner Landis - Tom, a couple of questions with regard to data collection. There was a study done some years ago that showed that the best predictor of an influx in students in the K through 12 school system, in an established area, was the percentage presence of widows over the age of 75 in that community because, as they died off and moved out, new families would tend to move in. So my question is, to the extent that you can do that, did you try to look at some of the unorthodox data?

Mr. Koutsky - I had not thought of that, but there is probably a statistical tool. I will tell George, George Ford at our company. There is probably a statistical tool to see if there is some relationship between that, just like we did between the variable of urban and rural or farm, you basically kind of multiply it against one another and regress the product.

Commissioner Landis - And it was your rural versus farm that really brought that to mind?

Mr. Koutsky - Yeah. The other thing is that -- this is a little coming home for me because I helped start the nation's first DSL provider, which is headquartered five miles from here, ten years ago -- and it is easy for us to think that businesses always know these things, but I would

bet you that just about any broadband company, you know, the person making a capital budget decision, is not thinking, "Boy, there is a lot of old people in that community. I'm going to build now and be ready for when they die." [Laughter] So that might make it to the spreadsheet, but more like on Tab 3! So the fact is, we are dealing with increasingly limited capital budgets, and so if we are trying to explain availability, you know, that type of factor may not matter so much. They will just essentially say, from my standpoint, that this is the market economy and they will say, "Older population, not really that interested right now." All right? And then that leads to the policy problems, the policy questions, and we cannot blame them and consider them to be evil people, and then have litigation over whether they should disclose the fact that they did not go into that area, etc., because of mortgages in certain areas, this is just the cold reality of the market economy. And what we have to do is recognize it and understand it, and then leverage it in a way that obtains the policy goal it wants to do, rather than blame people and have unhelpful discussions about redlining.

Commissioner Landis - The other question that I have is, Iceland is frequently cited because they rank number 3 in terms of penetration per 100 households. But if you look at Iceland more carefully, and maybe it is because

I am from Indiana, but Iceland's geography is about the size of Indiana. But 99.9 percent of the population of Iceland is located in an area about the size of the city of Indianapolis, one of 92 counties in the state, so the population density data that says less than ten individuals per square mile is essentially meaningless when you delve down below the surface.

Mr. Koutsky - We knew that. That is why we actually did the regression the way we did. I put it back up, but lost it, so on my screen, I can see it. One of the regressers in the OECD data set is not just density, population density, but we also have the thing called "Big City" which is the percent population in the biggest city, and we actually did that precisely for Iceland -- and Korea, actually, South Korea has essentially the same issue as Seoul. And so that is one of the reasons why, from the OECD standpoint, you will see the density factor is .03, is relevant, but not that relevant. Oddly enough, Big City kind of like have this kind of interesting effect where, the more the population lives in the biggest city, it will have an almost suppressive impact on broadband. I thought that was interesting. But we tried to separate that fact out because, you are right, I mean, it is a big country, but they all live in one area, so it is very dense. Australia has a very similar situation, as well, oddly enough, as is

Canada. So as we tried to factor that with the Big City, other people have done different progressions. They do not actually give as good of results, called "Urbanicity," which is a way to measure the density of a city versus the density of rural. We found this one actually worked better than that.

Ms. Siminitus - I am Jackie Siminitus from AT&T. I am the Regional Library Director. And my question is, have you looked at any public library information such as the three-year in a row study that the American Library Association and the Gates Foundation funded through Florida State University? It is all on technology in the libraries.

Mr. Koutsky - We have looked at it. We did not put it into the regressions so much because it was looking at different time periods. Domestically, we are limited by a certain period of time because of the whacky aspect to mobile broadband subscription, so we are kind of limited. So I am aware of those studies; my wife is an ALA member, so we get them all the time. So we are aware of them, but there was just no way to match them up sufficiently to have it matter so much. Things like education and children and all that stuff, we have data on that going back too, so we can pick annals any time for that. I would like to put stuff like that to see if there is some relationship between access in a public school library, or a community library

program.

Ms. Siminitus - Access in a school library because . . . ? --

Mr. Koutsky - Yeah, they are not public.

Ms. Siminitus - In an economic downturn, the public libraries are very full because of the unemployed.

Commissioner Tate - Do you have a microphone? The problem is that the transcriber cannot get this and we would like to have your comment.

Ms. Siminitus - I just wanted to bring up the point that the public library is where a lot of people that do not have Internet access at home, or broadband access at home, go. And they also use it as a community gathering center in times of crisis, too.

Mr. Koutsky - That is what I thought.

Mr. Pinsley- Bob Pinsley, Sprint, and first of all, I wanted to compliment Commissioner Tate and Commissioner Chong at the FCC because, obviously, they realized many years ago that setting aside the spectrum for education was the wisest thing to do, that was the highest multiplier. And I guess my question really is, what programs have you seen that have been successful linking broadband with education? Where have you seen that be successful, particularly if there is not one laptop per child, that can be done more marginally, more incrementally?

Mr. Koutsky - What is interesting, and I am going to be a little biased because it is a trip out there, there is actually an interesting program in Portugal, and also Spain, to a lesser extent, which is a teacher training program where they went in and discovered that the barriers to classroom use of computers and broadband services often were a teacher training issue, and teachers did not know how to use computers and broadband services themselves, they would not teach the kids how to do it. And then that has a spill-down effect because then the kids are not learning in school, so they do not bug their parents to go buy a computer, etc. And I am probably over-stating this because there are some other details, but essentially they took the proceeds from the sale of their 3G wireless licenses and put it into this type of program. They took the money, here, it was like, and they said this is money we are going to plough right back in, we do not put it into general receipts, we put it back into this type of program. So there are teacher training programs that I think -- you know, Intel has done a lot of research on this, and you can go to Intel.com/oneworld, and they have a fair amount of research information on this. So Turkey does that, as well, and Portugal, and what is interesting is, in our OECD thing, is we see those countries somewhat over-performing. So I do not know enough to say that they are effective, but thinking

about it from that standpoint necessarily, it is not simply about figuring out ways to get kids laptop computers; it is figuring out ways to get teachers in low income schools trained in these technologies, so they integrate them into the classroom and into their lesson plans, so that it becomes an attractive technology for the entire community. So that would be one example. I know Michael probably, from Connected Nation, probably has a few more. I know they do a lot of work in schools. So I will kind of defer on that point; you will probably here more, as well. I believe California does something similar, too.

Commissioner Landis - One last question.

Ms. Tan - Hi. Lee-Whei Tan. I am an Analyst at California Public Utilities Commission. And my question is associated with the variable, the inequality in both the international data and domestic, it seems like it is a very significant variable, and my questions are, how do you measure the inequality? And the second question is, can you also explain why that is? So does that mean that, in between two communities, if the income gap is much larger, then a subscription rate would be lower? And do you have some kind of solutions for that?

Mr. Koutsky - Solutions are kind of above my pay grade, to use a phrase -- but essentially the way we measure it is through what is called a Ginny coefficient. And that,

you can find Ginny coefficients for communities, you know, throughout the world. It is essentially the ratio between the income of the richest 10 percent of the population, I think, and the poorest 10 percent of the population. And so you just divide one into the other and you get the sense of whether there is relative level in equality in income, or whether there is more income inequality. So that is how it is measured. So it is less so about not just -- because it is separate and apart from just the income effect itself, which I find to be particularly interesting, because it is a pretty strong factor, so it is not just the fact that it is a poor community, all right, that that matters; that is going to be picked up in the income -- GDP per-capita coefficient. It is the fact that there is a disparity between the rich and poor in the community of interest. And I am not entirely -- I do not really have a really good explanation as to why that is the case, other than the fact that we see it as a strong factor that is significant both among the OECD countries, and among the United States, the various different United States. Hopefully, one of the promises of the Broadband Data Quality Improvement Act is that, if we start to get more granular data that is available to researchers, then we might be able to figure out a way to explain that a little bit more. But I do not really -- the only thing I could say is that you almost have

to re-double your efforts in those types of areas. Do not just think about it as being an issue that is related to "this is a low income neighborhood," but try to maybe think about it more from the standpoint that there may be underclass problems or questions about an underclass, and that might be related to questions of documentation authentication, it very well may be, I do not know. But it is interesting that, in its significance, separate and apart from income, and so hopefully we will be able to explain that over time.

Commissioner Tate - Tom, thank you so much. You know, this was a great -- let's give Tom a round of applause. [Applause] I think perhaps that we all might want to take a short break now, if Mr. Conrad would indulge us. But before we do, I want to recognize that Commissioner Rachelle Chong has arrived, and to thank her in front of her because she has not been the beneficiary of all the accolades that have been stated. It was a year ago that she invited us to come to California, and what a great place to be in Silicon Valley. We tried to do this meeting in a number of different venues, it never worked out, so I think it was meant to be here. And so thank you. And with that, maybe perhaps you have a few comments?

Commissioner Chong - Well, they all look like they want the break. Maybe we should do that first?

Commissioner Tate - Okay, that is great. Then you can open us when we come back. Thank you, all. Ten minutes.

[Break.]

Commissioner Landis - If someone out by the door could invite anyone who is out in the hall to please come in and join us?

Commissioner Tate - If you all will indulge us, I would like to give Commissioner Chong the opportunity to make just a few opening comments that she was not able to do at the beginning because she was working for the taxpayers of California. And so we are glad that she has arrived. And then we will move quickly onto the next panel presentation. Thank you.

Commissioner Chong - Thank you very much, Commissioner Tate. I first wanted to thank the Section 706 Conference on Advanced Services for giving California the honor and privilege of hosting our meeting today. We are very honored by the presence of our many distinguished guests. And, in fact, I think that if we were to close the room doors, and lock everybody in here, we could essentially solve all the broadband problems of the world in about three hours. And then we will tackle ICC. Okay, that was a D.C. joke for all you California people. I will explain that later. I remember how it was, and I do not want to think

about ICC again. Been there, done that.

Well, we have learned from many broadband programs from all over the nation ourselves here in California. Early on, I made an important visit over to see our friends in ConnectKentucky, and we learned from them, so in terms of the California portion of the program, we are hoping that other states might learn something from our experience.

California is a very challenging state to provide broadband in. We are really, really big, we have very diverse terrain, including lots of deserts and mountains, and things like that, and we have a lot of people who do not speak English. That is the bad news. But the good news is, we have a very focused leadership in California on this issue of broadband, and because of that leadership, starting with Governor Arnold Schwarzenegger, we feel that we have made a lot of progress in the last four years, really bringing attention to this issue and trying to resolve it. Later in the program, you will hear from our leaders of many of the programs we are doing in California, so I will not go through it, but I did want to take this opportunity to talk about the goal of nationwide broadband. I would like to put forward some suggestions to our guests today.

First, obviously, we should set as our goal getting broadband to all Americans, the infrastructure, and we should set forth specific milestones to get us there.

Second, I think that we need Federal rules for national broadband reporting in a very granular way. I can tell you that California has found that our address level broadband mapping project was extremely useful from last year, and we have used it in so many ways, I cannot even tell you -- in terms of measuring competition, finding out where broadband is not, which was not really what we thought, and then being able to attack the unserved areas in a targeted, cost-effective way.

Third, making sure that this broadband mapping captures speed is also important because, if you do not know what the speed is, you are not going to get yourself to a global performance standard, in my opinion. We did do the mapping here in California with the carriers' participating voluntarily, and that was a huge -- it was wonderful that it was voluntary. They were reluctant to give information on the speed part initially, but we did get them to do it, and frankly it was really critically important. Also we should aim high for broadband speed goals as a nation. And just to give you an example, our Broadband Taskforce aspires to 50 Mbps by 2015 as our state goal. Fourth, we also think that, once you have good broadband data on a nationwide basis, that would be the time that we should create a new and targeted broadband fund. The fund would be to bring broadband to unserved areas in America. I would suggest

that we should focus first on communities where there are schools, libraries, and health care facilities. And I do think that if you have such a fund, you should require the States to have matching funds, so that the state has some "skin in the game."

Fifth, we should also consider a program for low income broadband support, and we should consider whether we need a federal program that subsidizes the installation costs, similar to the way that we subsidize installation for phone, the Linkup Program, which I know many of you are familiar with. Sixth, I think we should be developing federal and state models for permitting standards and encourage state agency collaboration. For example, here in California, CalTrans is now providing notice to all of our telecom providers, whenever they open up a highway, or build a new highway, so that the conduit can be laid for the fiber while the roads are already opened up. Seventh, I also think we should be supporting the State Telehealth Networks that were begun by the FCC Rural Health Care Pilot Program. Later today, you are going to hear from Dr. Nesbitt and his team, who are here for the California Telehealth Network. Bottom line is, that telehealth network is going to drive tremendous advances in broadband in California's rural areas, and that needs to have continued support by the fund after the initial three years of the funding.

And finally, I think we need to continue federal and state leadership groups such as this, because this is a very big problem, and the States are limited in what we can do jurisdictionally. And that is why I think it is important that we have federal leadership on this, and that the federal leadership is listening to and coordinating with the state leaders so that we can do this together. I guess I do have one more point, I think we need more spectrum for broadband. Thank you. [Applause]

Commissioner Landis - Because we are running a little bit behind, I am going to invite Mr. Conrad to come up to the podium. And while he is doing so, I would invite anybody who finds that this is not only the 706 Joint Conference, but the Second Annual Climate Change Conference, to please feel free to remove jackets or other decent apparel and make yourselves more comfortable.

Dan was to be our last speaker before the break, but he is from a small Internet search company you may have heard of called Google. Among others in the Internet space, Google has been advocating something called White Spaces. Advocates want sophisticated new wireless devices to operate in spectrum on a secondary basis at locations where unused TV spectrum called "white spaces" is open. On Tuesday, the FCC agreed, issuing a Second Report and Order establishing such rules. Here to tell us what this new order means is

Dan Conrad. Please welcome Dan.

Mr. Conrad - Hello, everyone. So I am here to talk about White Spaces. But I thought I should step back for a moment because, thinking about it, it is a little bit surprising that I am here because I work for Google. And last I checked, Google was a software company, and a search company, and yet here we are talking about a rulemaking on broadband, talking about what to most people is a bit of an obscure issue. White space is unused television channels. And so I thought I would give a little bit of background. Everyone here probably knows something about the white spaces, but hopefully I can share Google's perspective of how we got here, and why we care so much about the white spaces.

So to step back, Google's mission is to organize the world's information and to make it universally accessible and useful. So organize the information and make it accessible. And it is that making it accessible where my team, we call ourselves the Alternative Access Team, gets involved. We are interested in increasing the amount and capacity of broadband pipes. We are interested in openness, and we are particularly interested in openness in the wireless sector, which is not one which has lent itself to openness in recent years, and we see a great opportunity here in the white spaces to start to change that.

We are a company that likes to experiment. We believe in failing early and often. And one thing that you might not know about us is that we actually are a wireless carrier, so we, a few years ago, built a WiFi Network in Mountain View that was the unlicensed spectrum that was available to us. And the usage statistics on that network are, to me, astounding. It is approximately 15 percent of the population of Mountain View uses that network in any given month. And I have an Economics background, so I appreciated the previous presentation. We have some good empirical data, too; you can look at a map of Mountain View and see where the usage is happening and it is directly inversely correlated with the median income in that area. So what we realized is that we are actually bringing connections to people who did not previously have connections and, to us, that is very very exciting.

The other thing is that we are operating in a 2.4 GHz range because that is what is available. The 2.4 Ghz range has a couple of problems, one, little one being that it does not work indoors. This is basically an outdoor only network and, if you want to bring it inside, you have to set up a repeater. The second is the range is very limited, so you absolutely could not use this in a rural area.

So we live and learn. We built that out. I might tell you that putting together a business model around WiFi

on 2.4 GHz spectrum would be untenable, except the news that I saw that AT&T just paid $275 million for a company -- I think they paid something like $100,000, a hot spot, so I was thinking we might look to put up the Mountain View network to bid. I think we have got quite a few spots there. But I am not sure exactly what is motivating that for AT&T, but I do know that the requirement for handsets to be able to drop off to networks with higher capacity is only recent [phonetic]. So the 2.4 GHz does not work as well, and so we started getting interest in, well, what is available in lower 3.0 Gig ranges, the types of ranges where you can get through walls, the types of ranges where you can cover real areas with a single tower, and that backhauled out one tower rather than having to have a tower every several hundred feet. So we got involved in the 700 megahertz auction, very interested in trying to bring openness and competition to the application layer and the heads-up layer, and that motivated our participation in that auction. I could probably share some stories from the war room, though our bidding strategy was simple. There are always twists and turns that are unexpected. We should also mention our investment in Clearwire, alongside Cable MSO's and others, which is an opportunity for us to invest in both broadband competition and in wireless competition at the same time. So that was an exciting opportunity for us.

And that gets us to the white spaces. So I will leave you with an inspiring quote, while we talk about why the white spaces matters to us, why we think it is significant. I will be flipping through here in the interest of time, and we will try to have a little bit of time for questions. The first thing about the white spaces is, you know, what is it? Right? So I like to say, oh, if you think of your old TV and clicking through the UHF stations, and it is the static-y pages that you see, it is the unused TV stations that you cannot pick up the signal on, and the first point here is that it is a lot of spectrum, so this represents in a number of different markets the amount of vacant spectrum that is available; we are talking about a really enormous amount of spectrum -- 100 megahertz in many areas. The second thing to understand about the white spaces, and what makes it significant to us, is that it is in lower frequencies. So this is just a simplified spectrum map. You can see cellular, which is largely AT&T and Verizon, in the orange down there. The recent 700 megahertz auction, which largely went to AT&T and Verizon, is the only spectrum currently available for cellular communications for mobile devices, below 1 GHz. PCS is up in the higher ranges. Of course, you have Clearwire up in the even higher 2.5 range, and so getting to some of this spectrum, which is actually unused right now in

these lower ranges allows you to -- the propagation characteristics allow you to hit great range, allow you to reach rural areas, allow you to even maybe get indoors with your network.

So what I do not want to communicate is that Google has some grand master plan for what is going to happen with this spectrum. What we are interested in is seeing it opened up. We are very very happy to see the support of the Commissioners with the ruling on Tuesday to open the spectrum up to unlicensed use, to allow anyone to bring whatever business model they want to this space. The thing about WiFi is that the 2.4 GHz spectrum was considered useless. The FCC decided to open it up to unlicensed use, and we cannot imagine a time without WiFi today. But to open up a swath of spectrum to fully unlicensed use without restricting the number and types of participants that can operate in that spectrum, we have no idea what types of applications are going to show up, and I think what Larry Page says is we are most excited about the ones we had not thought of.

So I do have a podium, so I am going to bring up one issue that we consider very important to the success of the white spaces, and this is the issue of adjacent channels. So in rural areas, we are okay. There are tons and tons of unused spectrum. But in city centers, in urban

areas, there are very few channels which are not adjacent to channels which are being used. So if we are on Channel 35, there is a station being broadcast on Channel 34, we would consider that an adjacent channel to Channel 35, and the concern is that, with using too much power in Channel 34 might in some cases interfere with the television signal in Channel 35 if that signal were not powerful enough. So it would be, if you are using a very high power level in 34, and 35 had a very low TV signal, you might see some interference. So the concern is around the power level on those adjacent channels. This chart here just shows for a set of major markets how many channels are non-adjacent, so you can see, for example, Boston; at the top you have only two channels which are not adjacent to an occupied channel with TV, whereas you have nine channels which are adjacent. So you actually have nine channels of unoccupied spectrum, but only two of them are non-adjacent. Now, if you set the power level to low in that nine channels, then you are only going to have two channels with spectrum to work with. So this is the concern.

There are a couple options out there. One is to simply -- let us say we will set the power level for adjacent channels at 40 kilowatts, just fix the power level, set it very low so that we do not have to worry about interference. Now, the problem with that is that in 40

kilowatts, you are only likely to get the same type of range that you see with WiFi. So Google has proposed a variable power system whereby, if the power level on the adjacent channel is high, and we do not have to worry about interference, then devices that are in that adjacent channel could power up to relatively high levels, and this just gives you an idea of the number of channels that would be available for mobile broadband. We are putting the limit there at 1 watt of power under the fixed versus variable proposal. So this is something that we look forward to working with the FCC on, continuing to iron out and demonstrate that the variable power proposal, if anything, better protects some of the lower power stations, and watch the unlock of a lot of spectrum. The reason this is important is because, if you only have capacity in the urban areas, but you do not have it in the cities, we are concerned that we will not see the type of economic activity because there just will not be the demand for device manufacturers to go out and spend the millions of dollars necessary to design, and chip sets, and build-out devices. So with that, I will wrap up. I hope this is helpful and gives you some perspective on where Google is coming from, and I am happy to take any questions. I am glad I was so clear [laughter].

Commissioner Baum - Well, what is the megabits --

what is the potential for this? What is the bandwidth? This is unlimited?

Mr. Conrad - So here is where I will confess that I am not an engineer. The reality is, when you are looking at 100 megahertz of spectrum, the capacity is very very great.

Commissioner Baum - And for rural purposes, what is the distances it can go? Is it just like WiMax and beyond that is it going to be…

Mr. Conrad - So it is all a function of -- you have a trade-off, right? Your power levels, your capacity, your distance. I mean, obviously, this is the same spectrum that TV is broadcasting on, over many many miles, but that is not a likely use. The power levels are too high. But we would anticipate a much higher range than you see, for example, with WiFi. You can think of what cellular, which is adjacent to this spectrum, handles. So cellular towers can go several miles.

Mr. Wullenjohn - Rob Wullenjohn with the California PUC. You mentioned that in rural areas the adjacent channel issue is not a big factor. Is your proposal in those areas that there are just the normal limits on wattage? And if you are using the normal limits on wattage, what does that get you in terms of propagation, for lack of a better term, in terms of service? Is it more

like WiMax?

Mr. Conrad - Yeah, so our position is that we would like to see as much spectrum available for use as possible, and if we have more spectrum in rural areas, then we may see different business models in those areas. So I would not see any reason to restrict it, provided that we can demonstrate that the variable power proposal will not interfere with television signals, which is the first priority. So that interference would not be different in rural vs. urban areas, so I would not see any reason to unnecessarily restrict in rural vs. urban.

Mr. Treuer - My name is Phillip Treuer with the Alaska Public Utilities -- sorry, Regulatory Commissioner of Alaska, I am on the staff. Could you talk a little bit more about the kind of services you anticipate might be using this spectrum, other than just the traditional computer Internet and cellular, wireless?

Mr. Conrad - Yeah, I can talk about it again. Again, the thinking is that the most exciting services are the ones we have not thought of. Now, obviously, you can think of traditional types of services -- why not have your WiFi hot spot be operating in the 700 megahertz range and be able to cover not just your home, but a larger region around you? The fact that we have built a municipal WiFi network, and have sort of seen the limitations, and we know very well

the operating structure there, we know that it is very difficult to make that work in that spectral range, but that cost structure changes fundamentally when you move to a lower frequency of spectrum. And we might see that actually become a real business model, but all this is conjecture. We are more interested in seeing the regulatory environment opened up so that others can figure out the services.

Mr. Chastain - Bill Chastain, Metropolitan Area Networks. I just wanted to offer an answer to Commissioner Baum's question regarding range. It is 80 miles to the curvature of the earth, basically. And in terms of the efficiency that can be garnered within that frequency range, it is many many Gigabits of capacity in the available white space channels, and something on the order of 45 Kilohertz can get you Gigabits of connectivity, basically. So it is really a windfall.

Commissioner Baum - We are looking at trying to serve mountainous country, you know, in the Western-

Mr. Chastain - And it propagates.

Commissioner Baum - Yeah, because we used to do it by translator stations. We used to provide microwave television. Is that the same concept we are talking about, is they would put up microwaves and similar -- or use existing systems throughout there and propose to put a better quality signal with more bandwidth…

Mr. Chastain - Yes -- capacity.

Commissioner Baum - Capacity.

Mr. Chastain - Right. Yes, sir.

Commissioner Baum - Because we are trying to figure out how to do this efficiently in these high cost areas, and we do not want to, you know…

Mr. Chastain - That is the way you do it, you re-purpose and set it up alongside what is already there.

Mr. Finch - Bob Finch from Sprint. One of the great successes of WiFi is it has really been a global standard. What do you expect will happen with 700 Megahertz? Because I do not know of similar activity in other parts of the world, but perhaps it is going on.

Mr. Conrad - Yeah, it will be interesting to see what happens in the standard space. And it is actually interesting that 2.4 GHz has clustered around a single standard. I mean, it is not a legal requirement that it needed to; it was the efficiency of the industry consolidating around that standard that led to that. And the many extensions of that standard have extended its usefulness over time. I mean, we are always looking at economies of scale in the Silicon, so I expect that, you know, our partners in this effort, Phillips, Motorola, others, will find themselves focusing on probably one, maybe just a few standards.

Commissioner Landis - We are running a little behind, so if any of you have further questions, Dan, if you will be around for the balance of the afternoon, I am sure there will be an opportunity to visit with you later. Please join me in thanking Dan. [Applause]

Mr. Conrad - Thanks very much.

Commissioner Landis - We now turn our attention to initiatives from various states in terms of attacking how to bring broadband to the entirety of the state. One reason that we are doing this is because there is as great a diversity of solutions as there is based on regulatory environment, the nature of the marketplace, the configuration of the state, and frankly the politics of the state. And one of the things that we found very clearly is that there is not necessarily a right or a wrong answer; there is just a better answer for each of the States. And so what we are going to look at this afternoon is some case studies. And with that, if you could welcome Commissioner Gillett, the first of our presenters, she will be presenting on the Massachusetts Broadband Initiative.

Commissioner Gillett - Thank you very much, Larry, and I would like to thank the entire Joint Conference, and especially Commissioner Chong for inviting me to speak about what Massachusetts is doing. Just to start with a brief clarification, since this is often misreported in the press.

My day job is a Regulatory Commissioner. I do not direct the Massachusetts Broadband Institute. We are, in fact, at this moment -- I think many states will resonate with the fact that, in many states, there is not an authority whose job it is to worry about broadband in the state; that has been one of the challenges, and what we have recently done in Massachusetts, which I am going to tell you about, is to create such an authority. We have an open job posting for a Director of that new institute, and if any of you are highly qualified individuals seeking that position, I will happily point you to the posting after this. But that is not me. I am a Regulatory Commissioner, and one of nine Board members for the new institute. I am going to show you a lot of maps today and they are in both in blue and red, so there is no political implication from these color choices. But what I did want to show you with this map is why we do have a broadband problem in Massachusetts.

Most people think of Massachusetts as a relatively urban state which, in the eastern part of the state it is, and, indeed, in each of our major regions, we do have a metropolitan area, which owing to the way that government statistics are kept, tends to make us look like an urban state in many programs that rely on these statistics, including some run by the Department of Agriculture. But what we find relevant to broadband, and what explains a lot

of our history in broadband deficits in the state, is the density of surrounding areas. So all of our cities have broadband that is great. The question is, once you get outside a metropolitan area, what happens? And what this map is showing you is that the density differential is quite substantial between the eastern and western parts of the state. In the Boston area, it is 18 times more people per square mile than in the Berkshires. And, in addition, those cute little triangles that my staff put on the map are the Berkshire Mountains. So it is mountainous, it is trees, it is challenging terrain, and there are not a lot of people in it.

I think Tom spoke earlier about density and its role on the demand side. I am focusing on density in its role on the supply side, where it is very clear that density is a major driver of how much it costs to serve any given area per subscriber. And that is just a fact that we deal with. It is a fact that has not gone unnoticed, and it has, in fact, been on our radar screen for a long time, especially for the people who live in these communities. Mass may be the birthplace of the American Revolution; we also think that we may be the birthplace of the Connect Movement. Berkshire Connect was a very early attempt to do demand aggregation. It was focused on the needs of businesses, and it involved banding people together to

attract a new telecom provider to the region. It had the good fortune of doing this at a time when everybody and his brother was investing in telecommunications in the late 1990's, and succeeding in really lowering the cost of a T-1, but it was focused on the needs of businesses, it was not focused on the residential user. So some later efforts were directed more in that direction. Pioneer Valley Connect, which is the next three counties to the east of Berkshire County, not quite as low density, but more income challenged, as well, so equally tough. Many unserved and underserved communities -- by "underserved," I mean some part of the community is served, and others are not -- so in Pioneer Valley, there were several trials done of using all this wonderful unlicensed wireless technology, and guess what? It ran into all the things that our previous speaker spoke about. The good thing is, these connect programs have really showed that the demand is there. In Massachusetts, we have a broadband penetration rate in our state, we estimate it from the FCC statistics that the residential penetration rate is about 70 percent. I think one of the previous speakers put up 55 percent as the national average. So we know that people want broadband in our state; that is not the issue. The issue is, can they get it? And what we are finding is that there were significant areas where they could not. The other issue that we found was that, with

these wireless pilots that we did, which did all use the unlicensed spectrum, I believe they are in the 2.4 GHz, but each of them tried a different technology, the actual coverage in a one-square-mile region required twice the equipment that was predicted. It required twice the density of radios. So that kind of blows out the economics that everybody was promising, that wireless would be a savior for these low density communities.

So all these efforts notwithstanding, they are great things, they have shown that people really want this technology, but we still had gaps. We still found that, when Governor Patrick took office in 2007, we had 32 communities in the state that had no cable modem, no DSL, very limited wireless broadband, very limited 3G, and 31 of these were in the western portion of the state, no surprise there. In addition, we had 63 towns that only some of the town is covered. Just something else you might want to know, for those 32 towns, none of those has cable television. And obviously some of them have -- and, by the way, they are all served, if I could digress for just a moment to that little ICC inside comment that Commissioner Chong made -- none of those is served by a rural ILEC, they are all served by an incumbent (ILEC). So Governor Patrick was acutely aware of this, among other reasons because he has a second home in the western part of the state, it is a

very beautiful countryside, and his neighbors made him aware, especially during the campaign, that this was a big deal --broadband was really important. And he totally got it. And he really pushed us, those of us in his administration, to do something about it, and to figure out what, if you will, the least distortionary way to approach this problem would be. We think the private sector has done a fantastic job of pushing out broadband in the ten years that they have been at it. We just have not got it all the way, and how do we get there without messing up the success that we have had in the rest of the state. And the solution that we adopted, which we introduced in August of 2007, and in which the Legislature passed a year later, and the Governor signed on August 4th in the town of Goshen, Massachusetts, which just to give you an idea -- no sitting Governor had visited the town since it was founded in 1761 [laughter]. There is some significant east-west gaps in our state, and they are very evident in this issue. But what the legislation provides for, first of all, it creates an authority that is responsible for broadband, within an existing quasi-public agency of the state called the Massachusetts Technology Collaborative. MTC is responsible for technology driven economic development, so this falls very naturally there, and allowed us to utilize a lot of the resources they already had, and not have to create a whole

new agency and use a lot of expense to do that. What the legislation provides for is up to $40 million in bonding authorization to close broadband gaps statewide, with the first priority being those areas where there is no service available. I neglected to tell you one other thing about the Pioneer Valley Connect Pilot Projects with the wireless pilots. So these were one-square-mile projects, and they were typically done in, say, a town hall, they would put an antenna on the town hall. And there was an interesting phenomenon observed after these were deployed, which was cars in the parking lot of the town hall, after it had closed, and when the Boston Globe said, "Well, what is going on here?" They found out that what it was, was a mom in the car with her middle schooler, with the laptop open doing his homework. And if that is not pathetic, I do not know what is. But it was a lifeline for folks, you know, they were so starved for this.

The approach taken in the legislation is to use the public funds in a public private partnership, and a co-investment model. What do I mean by that? The studies that had been done previously to understand these gaps and how to fill them, indicated that it would take significant money to close these gaps. Basically, the infrastructure did not exist, and it needed to be built. And the amount of money required was more than you would look for from a yearly

appropriation at a state government level. So rather than appropriate it, we went to the longer term approach, which is to treat this like roads and bridges, and to bond for it. And, boy, am I glad we did because the State Budgets, as everybody here knows, are under severe pressure at this moment. And as Governor Patrick recently indicated, as long as the markets for our capital remain open to us, we are going to continue to bond up to $40 million for this.

So the public money has to be spent in ways that are consistent with the bonds, which is to say it has to buy things that the public sector owns. So the public sector will buy things that are long term assets, and invest in things such as long haul fiber, perhaps, or wireless towers. It does not specify in the legislation exactly what it is going to be invested in, and that is one of the things that we are engaged in right now, is figuring out what are the best bang for the buck investments for the public money. And the intent is to partner with private sector firms, who can fund the rest of the infrastructure that is needed. The thinking here is that some of the communities we are trying to serve are really tiny. They may have 300 people in them. If everybody in the community bought broadband -- and they might -- but even if everybody did, it still might not be very profitable for a firm to serve. In fact, it might not be profitable at all, even if everybody in the community

bought this technology.

So the question is, how do you incentivize a firm to deploy where the economics are very challenging? We do not think firms are evil, we do not think there is a moral issue going on here, we just understand that, when you do break-even analysis, they do not look good. So how do you do it? You provide capital that will help decrease the cost of deployment. That is what we ended up concluding. And our hope is that private sector firms will also be able to lever traditional sources of funding such as from the rural utility service, who were very kind and recently came to North Hampton, Massachusetts to speak with a great turn-out of private firms who are interested in hearing what they had to say.

The level of funding that was developed for this legislation relied on the idea that one could do a regional scale network, and the economies of scale you would get from that, it is not a town at a time approach; if any of you are familiar with New England Town Meeting, you will understand that this is a little bit of a radical concept for our communities, but they are getting used to it.

The other point I would make is to something that Commissioner Chong mentioned earlier, which is the use of state assets for broadband deployment. You mentioned that CalTrans notifies -- I did not catch who they notify, but…

Commissioner Chong - The carriers.

Commissioner Gillett - The carriers, right, they notify the carriers when they are going to open a road, for example. And that is exactly the kind of thing that we are seeking to do with this legislation, is to make the new Broadband Institute responsible for working with other parts of state government. So, for example, we have state forests in many of these communities, there are fire towers, they are great places for wireless antennas, and we are already dealing with requests as to how can the private sector get on those.

Where are we? We have established the Institute. It has got a Board of Directors, it has two of the three staff, like I said, we are still looking for a Director. We have just begun that search. We have published, as a first level of engagement with private sector, this is a public private partnership, but of course it was designed by the public sector. So now we need the private firms to join the conversation, and so to do that we have published what we called a *Call for Solutions*, which is not a procurement document, it is a dialogue document. And I hope that the private sector will engage with us in designing the most cost-effective mechanisms to incentivize private firms to enter these markets. I will also point out that, last March, we were going to have a very nice forum attended by

about 300 people, including FCC Commissioners McDowell and Adelstein about broadband in these areas, and unfortunately predictions of a ten-inch snow storm scuttled the forum. But two days before it, Verizon, which is our incumbent telephone company, announced that they would bring DSL to about two-thirds of the people, and about two-thirds of the 32 unserved communities, leading the Government to just, while his bill had always been intended to -- remember, the legislation was still sitting in the Legislature at the time -- so while his legislation was intended to stimulate private investment, it had already done that even before it was passed, and the good news is that Verizon has actually deployed -- they just recently finished that deployment, and there is now DSL in communities where it was never available for the last 10, 12 years. So that is very exciting.

The first two of these bullets are in the past tense. There is a lot left to do. And we are really in the very early stages of this initiative. Right now, where we are focused is on two big steps; the first is for us to understand where the gaps are, and I cannot emphasize enough the importance of good data, that many people have mentioned earlier today. How you measure things really matters. As Commissioner Chong said, we need to be able to assess our progress here, we need to know where we are at. Right now, in Mass, we are focusing on availability, but it is very

clear, as Commissioner Tanner mentioned, that this is not a fixed target, this is a moving target. The rural areas are always going to be challenged in terms of the level of service that they can get. So we are working on assessment. I am going to talk more about that in a minute. We are also developing the request for a proposal, which will be the procurement that goes along with private partners. And once we do that, hopefully we can get quickly to contract negotiation and construction, and nothing will make Governor Patrick happier than when we break ground.

I just want to talk for a minute about some of the assessment challenges, and how do you tell where broadband is and is not. I understand that the FCC has made significant improvements to the way that they collect and map the Form 477 data. And that is greatly appreciated, and I want to show you why. This is a map that we extracted from the FCC nationwide map when we were developing this initiative in 2007; this was the latest data available at the time. As you can see, no green, no zero service areas, now let me show you what the people in our state actually told us when we went and asked them. Red in this map -- and this is mapped by town -- we have 351 cities and towns in Massachusetts -- red is a town that has no cable or DSL, no commercial consumer grade broadband service. There is also very little -- we know from experience there was very

limited 3G at the time in these communities. So we know we have big swaths of territory that do not have coverage.

So how are we going to assess progress? I just want to give you a pointer to the future. This is a prototype, this is not necessarily an accurate map, but it was one that we developed just to show a methodology that we may be able to use going forward to assess our progress. What this map did was take the cable strand maps that are required by Mass law to be filed both with communities and my agency. We gave them to our GIS branch of the state. And they took those and they combined them with the location of a DSL central office. Rather than drawing a concentric circle, they actually know where all the roads go, and where the buildings are in a community because they are Mass GIS, so they know that. And they were able to lay out wires in a way that -- I mean, it is not perfect, but it gives you an idea of likely wire lay-outs and it lets you determine at the end, the red dots are unserved structures. The thing I like about this map, I have seen some maps, for example, of Wyoming, that cost Qwest. They show huge swaths of the state with no service, which is very impressive until you realize that there are no people in those portions of the state either. And there are no buildings and there are no structures, so, yes, while we are driving through them, we would like our cell phones to work and it would be even

nicer if our 3G worked, but nobody lives there. So what these maps are trying to do is to figure out where there is a structure, and whether it has service or not, based on empirical rules of thumb.

So with that, I will leave you and just show you this pretty picture of one of the town hall pilot projects. That is a pretty town hall in Western Massachusetts. It is a very pretty area if you want to come visit, and the wireless antenna is tucked away in a way that looks -- it does not leap out at you, it is very environmentally friendly. So thank you all very much. [Applause]

Commissioner Landis - Quick question? If not, we will go on to the next speaker, Michael-- my grandfather's name was Frank Vasquelanas Domingo Hayes [phonetic], so I apologize, I am keenly sensitive to not butchering people's names, Michael Ramage?

Mr. Ramage - Ramage.

Commissioner Landis - Ramage.

Mr. Ramage - But Ramage sounds a lot more sophisticated.

Commissioner Landis - From Connected Tennessee.

Mr. Ramage - Well, I appreciate you letting me come and talk about Tennessee today. I know at least one of the members up here love to hear about Tennessee, so I will definitely share some good information.

I have been listening to the presentations and I see the hundred megabit, the gigabit, these really high speeds, and then I hear the 70 percent adoption in Massachusetts, and everybody does want it; we do not have either one of those problems. In Tennessee, there are various issues that we have and broadband barriers that we have had to overcome. And if I could get 70 percent of the population that want broadband, that would be a fantastic thing. It is something that we are working towards. And Commissioner Landis, you said in your opening remarks, the least, the last, and the lost, and that is really what we are dealing with, is the last mile in rural areas, and how do we get there.

Connected Tennessee has been alluded to today, is part of Connected Nation, and we have used the model in Tennessee that was developed in Kentucky, and modified it some because Tennessee is different than Kentucky, and we have different issues in Tennessee than in Kentucky. But the first thing that we did when we started our project was that we wanted to see what the barriers were. What was the picture before we got here? And on this screen, you can see a couple of those. The leading barriers to broadband adoption, when we started in Tennessee, first and foremost was awareness and education. And I am not talking from a K-12, or higher education standpoint, but people and

businesses, for that matter, did not see why broadband was relevant. And we can say all these great things, but until we make it relevant to them and their family, it does not really matter. So that was our first -- and still is -- a big obstacle. Second was computer ownership. Obviously, if you do not own a computer, you cannot adopt broadband. So that was a barrier. We started looking at why do families not own a computer. Well, it gets down to the point of affordability at some point, but by and large, it goes back to the education and awareness. And then also availability is a barrier, particularly in the rural areas, and I will show a map in a second on that.

And then who are our underserved groups? And I heard some of these groups talked about already today, first are the rural residents. The rural residents are an underserved group, both from a residential standpoint and a business standpoint. The elderly -- I heard somebody say over 65, same thing applies in Tennessee, and our research found that out. And low income families were another group that has historically been underserved in Tennessee. From a business standpoint, and we wanted to look at both aspects, rural businesses, small businesses, and the agricultural sector and the retail sector -- retail including restaurants and hotels, were the sectors that utilized broadband and technology the least. So with that as our framework, we

went to work. And Connected Nation developed the five A's of technology expansion, which we also use as the foundation of everything that we do in Tennessee. First, Availability, if it is not there, then these other issues do not really matter; the second is Awareness, its Applications, its Affordability. Well, if it makes sense to address the Availability piece first, but as has been discussed by Tom and others today, there is a supply and there is a demand, and both of those have to be looked at. And in Tennessee, the demand piece is almost as important, if not more, than the supply piece. So we have had to look at both. And all four of those things together get to our ultimate goal. The way that we have approached this is that, in every community of the state, and we have 95 counties, we have created what we call a leadership team that looks at the different issues in those communities, in each individual community, what is it that is preventing us from the availability that we want, or the adoption that we want, and what can we do to make an impact on that? So though I had those barriers that we see from a standpoint, we also know community by community what the barrier is and what is the piece that needs to be addressed the most?

So first, a map. The pink area that you see on this map is where broadband is available. It consists of DSL, cable modem, wireless, fiber, fixed wireless that is

fiber, municipal, any type of broadband we show in that pink layer. And there is another piece that is not coming up on the screen very well, but there is a blue layer that is underneath that pink layer, and it is mobile broadband. Understanding the importance, particularly listening to some of the conversations today in this week here, we know that mobile broadband is something that we need to track, and we have begun and added that to our map. And if you want to see the mobile piece of Tennessee, it is available on our website. Those two layers together represent over 60 providers across the state that have provided our data and allowed us to map it. The other thing that you see on this map, which really speaks to the demand piece, is a bunch of stars, they look like dark red and maroon dots on the screen, but every star that is on that screen represents a person or business that has contacted our staff, saying they want broadband. And it represents over 5,000 -- actually, I think it is over 5,300 individuals across the state of Tennessee that have already contacted us, and I am sure that number is out of date already because we are getting them in every day. Many times it is because they are truly in an unserved area, but what we also find, going back to that Awareness and Education piece, is that sometimes they have broadband available, they just do not know it. So we are able to connect them to the proper provider, or here is the

two providers that are available in your area. So we are also making that connection. And there is probably, I would say, 10 to 15 percent that is that way, that they just do not know that they have broadband available. So that is something, being at the grassroots at the community level, that we are able to find out, is where is that demand. And as we go through our program and we build that demand, and you figure out, "Oh, I need broadband," tell us about it if you cannot get it. That will help us to take that back to the supply side and help them to justify build-out, because they will see a possible market and an area where they did not see one before.

So we have been at work in Tennessee for about 18 months, and we have in 18 months seen about 100,000 households get broadband, have broadband available that did not previously have broadband. It does not mean that they have adopted it, but we have seen a growth of about 100,000 households. So that is exciting in 18 months. But you also see on this map a lot of areas, and one thing that was mentioned in the previous presentation was that we do not want to serve the open fields. You can see some areas, particularly in the east, and in the southeast, there are some green lines on there, that is where Smokey lives. And I do not care about serving the bears. That is the Smoky Mountains, and we indicate that so that it does not just

look like it is unserved areas, it is unserved, but it is also a national forest.

But over the 18 months, we have seen a lot of growth on the demand side, as well. We have seen great residential impact. We have been trying to share and help develop applications that would make sense for residents across the state, and in the first year, we saw a 210 percent growth in interacting with health care professionals, 153 percent growth in interacting with state government, 107 percent growth in interacting with local government, taking classes online, purchasing products online, communicating with teachers. Every application that we tracked by and large had growth. And I would list them all on here, but it is just not enough room.

So we are starting to see people realize that broadband is important, and they are asking a question -- what can I do with it? And that is something that is changing. Over the past year, Tennessee has seen an above national average growth in computer ownership, in Internet adoption, and broadband adoption, all three of the indicators that we track. The lady you see in the center of the screen is a 91-year-old grandmother that this is a great example, particularly of some of the discussions earlier in the day, 91-year-old grandmother that realized that she needed a computer and wanted to learn how to use it, and

took a class at a local school, and got a certificate of completion, and they had a graduation ceremony, and she now has a computer, and now has broadband. We have seen a significant growth in the over 65 residents, 53 percent growth in broadband adoption among that age group over the past year. We have also seen a 124 percent growth in broadband adoption among low income families with children. And I know that we have talked about that, and Tom mentioned our computer program, we have a computer program in Tennessee called Computers for Kids. You see two pictures from events, the top picture was an event in Nashville that we had the pleasure of having Commissioner Tate at, and we gave computers to children that were in the foster care system, that really had not been given a chance. They had been trying hard, and we were able to reward them by giving them a new computer. And it was the most remarkable thing. Many of them, when they received their computer, had tears in their eyes because they just wanted a chance, and we were able to provide that. The other picture that you see on there is from a Boys and Girls Club in Murphy's borough, Tennessee, that we were able to help them get a computer lab to serve the kids in their after school program. We hear back all the time from these recipients. We have given out probably over 1,000 computers in the past year, and we hear back and we heard back from a girl that, because she got a

computer at home, because she got broadband at home, because she had a computer, she was able to do the research and compete in an essay contest, and as a result, she won a $500.00 prize. And she was so excited and the first thing she wanted to do was to tell her mom to make sure that she thanked us, because it was only because she had a computer. So we are starting to see the trends change. We are starting to see the conversation change. And I hope that one day that it will get to the point that you are at, where everybody gets it, and everybody understands the value of broadband and technology, and we could just talk about availability. But in Tennessee, particularly in the rural areas, it is about changing a culture. And the availability piece is the easier piece; it is getting people to see why broadband is relevant.

Also, we have seen an impact on the business side. We are now to a point that about 60 percent of businesses in Tennessee have broadband available, and that is a increase over the previous years. And we have also -- 56 percent of businesses that are connected to broadband have reported that the Internet has improved their business. And that is a significant statement because it is not just it makes it available, we do not just want to make it available, we do not just want them to adopt it, but we want them to see how it can improve their business, and that is a 14 percent

growth. We are seeing website development grow amongst small businesses, and broadband use among small and medium businesses, so we are starting to see the trends -- going back to my first slide -- that were the barriers in the underserved groups that we identified early on. The picture you see on the screen here is E.T. Rivas & Son. They are a mom and pop store that has been in business for over 100 years in the small town of Dresden, which is in West Tennessee, a town of less than 2,000 people. They sell specialty and durable goods, clothing, specialty clothing. And Dresden is not a market for them. If they were relying on Dresden, they would have been out of business a long time ago. But they have realized that the Internet can make a difference. Last fall, well, now they get over 90 percent of their revenue from Internet sales. And you see a storefront, but it is really a warehouse because, if you walk in, it is mostly boxes getting ready to be shipped out. Last fall there was a TV show that was on, and it talked about this particular type of children's overalls, and apparently everybody, when the show went off, Googled this type of overalls, and found this store in Tennessee, and by the time he got to the store in the morning, he was sold out of those overalls. And it is a market that businesses have not thought about, but when we share this story with other communities around Tennessee, the light bulbs finally start

to go off, "Oh, well, if they can do it, I can do it." So that is the difference, and that is the change that we are starting to see. The chart on the right is very significant. It shows that, of Internet connected businesses, a business that has broadband has three times the median annual revenues as a business with dial-up. And if you add in having a website for your business, it is four times as much. So we are able to show businesses that it is not just me standing up here and saying all this, but it does make a difference. Now, let me give a disclosure, it does not mean if you go get broadband and a website, you are automatically going to increase your revenues by four times, but it starts to change that mindset of opening the market, and opening the opportunity. And we have seen a lot of success of that in the first 18 months. But what it shows me is that the supply and the demand side is closely related and we have to make sure, particularly in a community, or a state like Tennessee with communities that are rural, that we can continue to just talk about the demand while we are talking about the supply. With that, I will be happy to entertain any questions that you may have. Thank you very much. [Applause]

Commissioner Landis - Thank you, Michael. Please welcome, if you would, Steve Constantine, who is Director of GCI Medical Services from Alaska, who is going to describe

some of the unique challenges of implementing telehealth in the State of Alaska.

Mr. Constantine - Well, I would like to thank the Commissioners for inviting me to sunny California. It is about 50 degrees warmer here than it is at home. [Laughter] So I am coming from a big place, I am a visual kind of guy, I got a lot of pictures, and I can talk as fast as a car salesman. So we are off.

First of all, that slide is not coming through real clear, but this is in Barrow Alaska. This is the northern most town in the United States. Those are satellite dishes, and they sort of look like they are pointing at the ground; well, they are a couple of degrees off, they are pointing at the equator. The satellites are sitting there, but those are feeding the television to the cable platform in Barrow, Alaska, which has a hospital which I serve. Okay, we are pretty big. We always like to lay this out. We started on the East Coast and on the West Coast [laughter], but we do not have a lot of people. We have one Congressman. But I have customers all the way out in that chain on those islands. There is a hospital out there that we serve. The television show we have on fishing -- I am blanking on the name -- it talks about Alaska fishing -- Dutch Harbor, Alaska, that is a picture of Dutch Harbor, Alaska. It has a small 20-bed hospital. They are

in the process of putting electronic health record in that I am assisting with. So we have a lot of small communities that are spread out everywhere. The red line, that is our road system. Those are our highways -- just the red. The purple is actually the Yukon River. The three dots represent roughly 60 percent of the population in the state, Juneau, the Anchorage Bowl, and up north is Fairbanks. Way up top, the road system runs to Dead Horse, which is up where ANWR is, where the oil production is. And that is a dirt road that goes up there. So these are the communities that I serve, that are in Alaska, that do not have roads to them, either by boat, airplane, snow machine in the winter when everything freezes. The key point is that almost every one of those communities, their entire local infrastructure runs off diesel generators. That means lights, power, water, everything comes from a generator that has to be running, that has diesel fuel that is generally barged in, or flown in, depending on how far it is, to keep that community's lights on year-round. Typical transportation, the small village, the real small ones, do not have a lot of vehicles, they have lots of ATV/4-wheelers, fishing boats, and lots and lots of bugs masher type airplanes, airplanes that seat four people, six people, eight people, and they fly on visual rules, under the weather. We call it scud running. So extreme weather. Fairbanks, it will get 90 in

the summer, low 60 below in the winter. I live outside of Anchorage. I do not have an air-conditioned house. I do not need it. We do not need air-conditioning in the residential areas in Anchorage. Commercial, yes. Residential, never gets that hot, 75 is hot. Okay? When you walk out to western Aleutians, in the Aleutian chains, it rains a lot, it snows sideways, all our equipment is rated to operate at least 100 mph, and we have multi-day snow and ice storms that really never make it to the national news because there are not many people out there. So we have a very thin infrastructure.

As I mentioned before, a lot of our utilities are powered by diesel. It is very high cost to maintain. Our small villages, any of our satellite or microwave systems are running off the local power plant, so if the power plant dies, it goes on to an up-system; if it is a big enough town, we have got a diesel generator put in there, and it will continue to run. But it is definitely at risk. We do a lot of building in rural Alaska. This year, because of fuel costs, generally aviation gasoline, our construction costs in the field are up 40 percent since January just due to fuel costs. In most cases, everything has to be flown in. Most of the fuel to all these villages is barged in. In the northern most part of Alaska, your barge season is approximately two months. The price of the fuel is set when

it gets on that barge generally out of Seattle, so most of the rural communities, when they bought a barge or two worth of fuel as it was brought in, bought it at the highest oil prices that occurred this season. They will have to live with that price until the next barge comes in next summer, even though oil prices are dropping, what, 60 today? They do not have that luxury of their gas prices going down. Gasoline, diesel fuel, and heating oil are between $8 and $10 a gallon. So think about buying your heating oil at $8 a gallon, for those of you who are on heating oil.

The other thing is, we have a very limited customer base. So generally our customer base are rural health care organizations, the schools, and in the business sector. it is oil companies, and DOD. The company I work for is GCI, it is a publicly traded company, it is Alaska based, we operate generally in Alaska, in Washington State. We are the largest cable provider. We are an ISP. We have two fiber routes we put in to lower 48. The program I run is called ConnectMD. It is basically in response for a flexible network that I had customers that wanted to move medical information wherever they needed it to, and the federal system that was stood up was fairly closed, so I built a commercial system that basically ties in from their systems into our terrestrial fiber-based backbone, and can get them anywhere in the world. And it is sort of a private

managed network in the sense that we encrypt all the traffic. And it will take any kind of IP data. Video is our biggest growth.

I want to talk about my largest customer. We talk fairly high level for most of the day, but what I do actually touches people. I work for CIO's, I work for CEO's, I help them implement. The Yukon Kuskokwim Health Corporation serves a point in Western Alaska, their coverage is about the size of Oregon, they have about 1,600 employees, their lives covered are about 28,000 people. Look at the average capita income -- $15,000. Transportation, boat, snowmobile, when everything is frozen, which is not a large part of the year, our aircraft. Look at the bottom line from the CEO, broadband deployment -- we have broadband in a definition fashion that will meet the new 760 Rules, essentially in every clinic that YKHC operates. This is where they are located. It is pretty hard. Most of us cannot pronounce any of the villages there, but it gives you an idea, when you look at the map in the lower right corner, the size of the region that their responsibility is for health care delivery. And they are the only health care delivery system in that entire region. There is not another one that exists. They have a microwave network out there. It was put in about five years ago, that has immensely helped the amount of bandwidth. Since

patient information generally starts in the smallest facilities, moves to a medium sized one, then it moves into Bethel, which is sort of their hub of the universe out there, and that is where most of your information goes back and forth. It all sits on a terrestrial platform. So essentially it has minimal latency. It is not at all like satellite. And then they have satellite circuits which connect them into Anchorage, into a terrestrial platform. This is one of our microwave systems that is out there, and that is sort of medium-sized system, but it is hard to see because 1) it is all frozen, but your co-location facility that people talk about where you put all your hardware and all that stuff, it is that octagon-shaped aluminum building that is sitting on pedestals because that is out on the Tundra. Okay, that is where your routers sit, that is a completely environmentally controlled unit that is designed to withstand 130 or 140 mph winds without any damage. And it exists out there. There is also a back-up power system and everything else.

Here is another tower. We have towers over 200-feet. Think about building a tower out in the tundra, where everything is soggy most of the time that is 250-feet tall. It is pretty amazing engineering. And the towers, once built, can handle microwave, they can handle local cell, we are rolling out a GSM wireless platform into 200 villages in

Alaska. In the Bethel area, the receivers and transmitters will be sitting on those preexisting towers. They have huge health problems, like any of the most isolated rural problems, suicide, suicide with adolescents, high alcoholism rate, even though a lot of the villages are dry, there is bootlegging, there is not a lot to do in the winter out there. The suicide rate in adolescence is almost off the scale. Well, this year they started a new Tele-Psych initiative, driven from some grants and some very strong ownership from the behavior health world within the YK. And we have gone out -- this is not the exact configuration, but that is a Tanberg [phonetic] Engine 95 high definition videoconferencing, runs at 2 megabits symmetrical, most of the deployment will be fixed; they had a problem with things leaving and getting damaged and everything, so we are going to go to a wall mounted system. But the capability of the camera and a Kodak is essentially the same. What we will do is they will have specialists that are sitting in Bethel, which is their hub, they can connect to the remotest plank over a low latency system, and do consults, training, family therapy, whatever they need, and if they do not have the exact provider expertise in the region, we can jump on a fairly high bandwidth satellite circuit and get them back into Anchorage either through the provider located in Anchorage, or -- I am standing up a circuit right now to a

pair of psychologists that actually live and work out of Minneapolis, and they are going to be treating patients, juvenile patients, that are located in Bethel, Alaska. And it is a combination of Internet and private line technology to make it happen. But this is stuff we are doing today.

When we jump into the adult side, we have -- this area has the largest returning group of National Guard members that deployed from Alaska. There is a very large contingent out there. And they spend a year over in Kuwait. And the problem the Army has when National Guard people come back is, the Army sort of screens them when they hit the States, they have got them for ten days, roughly, then they drop them into -- they go back to their state, and then they sort of disappear back to wherever they came from. If they stay in the Guard, there is still a link to some sort of organized system, but if they get out of the Guard at that time, saying, you know, "I'm not going back, I'm not going to do this again," they fall off the map. So the PTSD issue in a region like this, that is so isolated, the VA has a pilot program they are standing up with YKHC to try to touch these young folks that have come back and may have issues they will deal with in the future. But, as I said, substance abuse, family therapy, functional -- this is all stuff you can go over video conferencing. I was doing a test with a technician, and we had him about 125 miles away,

and so it was a double microwave pop. At 16-feet, when we put one of the cameras up, I can see his eye dilate. So if you are a psychotherapist, or you are trying to do a behavior health evaluation, you do not have to have that patient sitting in front of you when you have that quality. You can actually do distance. And if you cannot do the initial evaluation, you can definitely do recurring visits from wherever you can have that sound quality connectivity going on. So there is a whole list of things that these guys are ginning up to do to deliver health care.

As far as electronics and digital information, they are out looking for an electronic health record to deploy over their entire platform. They have got a dental plate program where they send essentially students to New Zealand to get trained as sort of a pair -- it is not a dental -- it is a credentialed program, but it is a two-year program, and they come back and they go out and provide dental services in their sub-regional clinics that have full dental treatment rooms, under the supervision of a dentist who is remote, sitting in Bethel, and they operate sort of like a Navy Corpsman would be on a ship. They can do a lot more than just an exam. They can pull teeth, they can do fillings, they can do a lot, but they are operating under high levels of supervision. Physical therapy, speech pathology, all of those services either Store and Forward

technology or high bandwidth video conferencing can give you the leverage when you do not have providers who are either -- you do not have them available, or it is hard to get people to live in very rural areas. I mean, it is a rough lifestyle, things are expensive. Tele-radiology, their primary radiology group is in Ohio, that reads their films. They are not in Alaska. And in most of rural Alaska, there is not a radiologist out there. They are living in the urban centers, and they have moved to the digital world years ago. So there is quite a bit going.

This is a Store and Forward Cart, this is part of a Federal program called the Afghan Program, it has been out there a long time. It is a PC based client server device. They add functionality and peripherals. If you look down there, it can do quite a bit, and these are deployed to all the villages, so a mixture of Store and Forward technology and real time video in the clinics provides a balance of sort of a virtual presence from a higher end provider, and the ability to capture information soundly, and not have to fat finger it in three times, and send it to the next level to review. You see there is the 4-wheeler there, there are a couple more people on it than you are supposed to, there are no helmets, and that is the primary mode of transportation in a lot of villages. And they have a lot of accidents, and some of them are alcohol-related.

So here is what happened. We have an ATV accident in a small village, Lower Kalskag. A person rolls an ATV on himself, they think he breaks his leg; well, they have got to put him on a plane to get him out there to the next -- the sub-regional is about the first x-ray machine around, it is all digital. Okay, they take an x-ray, they shoot it to the radiologist in Ohio, who makes the reading interpretation and says, "Ah, it's broke, but…" Okay? He takes it, he sends it to the Orthopod sitting in Anchorage at Alaskan Native Hospital, and says, "Ah, we'll just cast this." Okay? We do not have to fly the patient that started in Lower Kalskag, then goes to Aniak, then would go to Bethel, and then into Anchorage. And then, once you cast them, they are going to sit in a hotel for a couple days until the swelling goes down, so they can go back. So that type of technology makes a radical impact on what we are going to do. So what are the benefits of telemedicine technology? Greater access to health care, improved quality of care, and better outcomes. You can actually find out what happened when you treat a patient afterwards. It is a retention tool for medical professionals on the education and training side, a combination of Internet access and the ability through connecting to a terrestrial network in Anchorage, I can get them to in Seattle, Virginia Mason, University of Washington, Providence, the list goes on, for

CME, for Continued Medical Education credential if they want it. It is not as much for docs because they usually have it in their contracts, but we have a real high churn for nurses, and nurses have a shortage everywhere. And in Alaska, it is even worse. Well, nurses do not have contracts that say, "We are going to pay you to go to Aspen to get your continuing education." So being able to bring either real time or Store and Forward content up that adds value, that they can continue their credentials, allows them to stay in place, and maybe only stay an extra year. But recruiting and retention is a huge issue for rural health care. The technology, particularly of VTC is a new education pathway for patients and staff. The sub-regionals, we have just dropped, used Edge 95's, and are using the cameras in their conference rooms for six hours a day, for Admin, and then they have another camera in for Behavioral Health. So they are actively adopting this technology in a much faster manner than I have ever seen before. Ninety-eight percent of my hospitals and clinics, which total almost 200, have video-conferencing in them, and they are all moving into HD because, as soon as they see HD, it has the wow and the effectiveness factor of the same thing you saw when you first saw an HD or a blue ray image on a TV. It really works. It is an alternative to high cost air travel, which has continued to go up, and when

planes cannot fly. People have very strange ideas about Alaska, you know. I sat on the airplane coming down with a woman who is from San Jose, and she said, "How can you live up there? It's cold and it's dark." I used to live in Davis here in California, and I am a pretty avid bicyclist, so the next slide I had to throw in because it is cold, and it is snowy, and it is icy, you know, what do you do? Well, on my car, I put studded snow tires on it, and I keep going. So on a bicycle, I put studded snow tires on it, and I keep going. When it gets dark, I add a headlight. I keep going. So the advent of technology, whether it is a Tunston stud -- 300 studs in a mountain bike tire, or it is a high end LED headlamp has allowed me to do something that two years ago I would not be able to do it. And the technology that we are deploying now is doing the same thing for the medical and educational regions. Thank you. [Applause]

Commissioner Landis - Drew.

Mr. Clark - Drew Clark, Broadband Census. When we were doing our article about Alaska and the state of broadband deployment and competition, the Alaskan Bush Policy and the repeat of that seemed to have an impact in spurring broadband. I am wondering if you could speak to not only that rule that was repealed a couple years back, whether that impact has any impact on broadband, but also could you just address different technologies and how they

work with the telemedicine? You seem to say that microwave is good because there is not a real latency issue, but you just speak to the mix of microwave vs. DSL, cable, and satellite in Alaska?

Mr. Ramage - Sure. On the ruling on the broadband issue, I would have to defer to the Commissioner. I mean, I am a health care administrator by trade, who has kind of turned technologist, but I do know about latency, and I would say we have been dealing with latency -- I started in this about 2000, and a general latency for our circuits, when it is hitting a satellite, is about 650 milliseconds for routing, okay? You get used to it, in dealing with it. However, the biggest issue is when you have -- and people call that a "high latency circuit," is that you have a lot of applications that were designed, operating over a terrestrial platform, with either minimal or zero latency. Now, a lot of them will tolerate being bounced off a satellite. High bandwidth video-conferencing? Yes. People say you cannot do it. I can tell you that Dutch Harbor, we can do VTC with. I can do VTC with almost any sight in Alaska. Do we have issues? Do we have to tweak the application sometimes? Have we highly tweaked our satellite modems? Yes. But it can be done. The problem with satellite is going to always be the capacity on the satellite. As the applications that our clients are using,

as they go completely digital, and this is just on the medical side, all their applications -- they are going to not need more paper as they go forward because they are doing the same shifts that an urban center is for getting rid of electronic health records, and all that, but we are going to run out of capacity on the satellites. So when you move into a microwave environment, where you can physically do that, and you have got generally greater capacity at less expense, it is a much better way to do it. Ideally, fiber. If we can put fiber on the Tundra, that would be -- I mean, we just put in two fiber routes in the last ten years to the lower 48. And that was one. And now there are five coming out of Alaska. So there is not really a capacity issue coming out of the state. If we could get to a point where I could put fiber into Bethel, by running fiber under sea, across the tundra, however it takes to get there, where it touched that microwave network, I would essentially give anybody on that microwave in Lower Kalskag a almost zero latency ability to touch the public Internet, or move information anywhere. I would be terrestrial the whole route, and I would not have as many capacity issues. As we turn up the microwave system around the Bethel area, as YK fully blossoms, we are going to run out of capacity. And the hub is 150 megabits. And then you put in more radios. You can always build on that. But ideally, my vision of the

world would be ring Alaska with fiber to every regional town. But there is a lot of technology, there is a lot of money, there is a lot of permitting because we would be doing something nobody has ever done before, but that is how you get rid of the bandwidth constraints, is generally take it to the ground and go fiber.

Commissioner Landis - Thank you. [Applause] Again, if there are any folks that have questions, Commissioner Tate and I both had the opportunity separately to visit the facilities in Alaska a couple of years ago, and what you saw really is, if you will pardon the expression, just the tip of the iceberg. Sorry.

Our last panelist on this panel is Jon Christensen, who represents Open Range Communications. Open Range Communications recently received an RUC loan approval for a 17-state, 546 community high speed mobile rural broadband network. This is pretty cutting edge. So, Jon, if you could tell us about what you are doing.

Mr. Christensen - Great. Thank you, Commissioner. And thank you, Commissioner Chong, for inviting me, and Commissioner Tate for your leadership at the FCC, and Chairman Martin, all that they have done for rural America. Clearly, this project has been a lifelong project, it seems like. It has been three and a half years, $6 million through the RUS application process, and that has taken a

long time, but I will tell you, the RUS has made it a better project. We started out with bigger dreams. We had initially a 44-state 850-some community project, but that one was refined and retooled, and we came back and got approved this spring for a 546-community, 17-state project. Our average size community is about 7,000 people. Our build-out is going to be built in five different phases; the first phase will be targeted in California where we have 72 sites, and Alabama where we have 46 sites, then we move to the Midwest with Ohio and Illinois and Indiana and that area, the upper northeast is the last part of the build-out. We are excited about this project for a number of reasons, and there have been a lot of maps brought up today, and I am not going to talk much about the maps, but one of our little communities is a town in Alabama called Wetumpka, and Wetumpka, Alabama, I have been there twice in the last month, Wetumpka is a town of about 5,000 people, it is about 15 miles from Montgomery, and that is Muntgomery, if y'all know how to say it -- I had to learn how to say it right. I did not get it correct the first few times. But Wetumpka is very hilly, median income is about $33,000, and on September 15th, I got a phone call from Randy Hickman. Randy is a 37-year Alabama National Guard. He just returned from Iraq. This picture was him in Iraq earlier this year. But Randy called me on the 15th of September and was saying he heard

that we were coming to Wetumpka. I do not know if you know how the process works for the RUS, but you reserve your communities, and then you go through a long application process. Our first one was over 300 pounds of paper, our second one was over 300 pounds of paper, so we reserved Wetumpka, it was a underserved community, and we said that we were planning on coming there. He wanted to know when, and then he told me his story. And I would like to share with you his story because it is pretty interesting. He was getting broadband, no problem at all in terms of communications in Iraq; the problem was in Wetumpka. He has an 18-year-old daughter and she was trying to communicate with him, but they could not because he was on that last mile, one mile away from his home was a fiber, you know, fiber broadband, and what happened was, she would drive in to the local church, pop into the WiFi network, put her webcam on, and talk to dad. And then, that went on for quite some time, and then she started her college, doing it by distance, and then had to drop out because she just could not continue to drive into town and do that to get an education. But when he told me his story, I said, "That is exactly why the RUC formed its program, it is exactly why the FCC is committed to getting to every home in America, committing to making sure that everyone has the same opportunities of ubiquitous high speed broadband Internet.

I am going to tell you about another story, and this is a guy in St. Paul, Nebraska, it happens to be my brother. But we do not serve St. Paul, but I am putting in a little bit of a ask for the Clearwire folks because the Clearwire folks come within 20 miles of my brother's home in Grand Island, Nebraska. Well, Jim has fiber here at his insurance agency, but he does not have any service out at his home two miles away from St. Paul. And a local carrier comes within a half mile of his home, but they want $7,500 to bury that line. And so I told Jim, I said, "Just hold on and just wait because Clearwire is coming soon." So I hope you will look at Grand Island and figure out how to get a tower between St. Paul and Grand Island.

But it is a major issue because the urban and the rural divide is real. Most of you know that, most of you understand it, but I every day hear from these people all across the nation, from the broadband directors finding out why we did not pick their community, why we are not coming there, or when we are coming. And unfortunately, we had to -- the way that our U.S. system works, it is a reservation system. There are certain communities that are already reserved ahead of you, that you cannot get. We wanted a lot more communities, but we could not get it, and I would like to touch on what Sharon said. In order for this $266 million loan to get approved, we had to go out and find

about $100 million in private equity. In this market, that was not easy. But we found that provider of $100 million in equity, but then, of all things, they wanted to show profit. And it was just unconscionable in my opinion that they would even ask for that, but -- so we had to come up with a mix of communities, a mix of communities that had the unserved and the underserved, but also the served. Now, I could tell you, we have had our battles on the Hill because on the Hill, Capitol Hill, they could not understand why we were serving all these already served communities. It really got to be quite a difficult time. And the reason is, you cannot bring high speed broadband service to these unserved and underserved communities unless you have some profitable communities in there, that you can deliver an economic equation to, that makes sense for New York Investment Bankers. We would love to serve all the unserved and underserved communities, but we would never get the $100 million from the private equity partner, to get our loan. Like I said, this loan has not been easy, it has been three and a half years. We are not done yet. We are hoping to close in the next eight days. We have been approved. We have been funded. The FCC has done yeoman's work to get this thing done. They did everything they needed to do, but we are just not there yet. And so I wanted to kind of keep it to just a short little presentation here because, back to

my brother, he is a property and casualty insurance guy. He would not have to pay for two services, he would only have to pay for one Clearwire service, when he takes that service out to check on a farmer's corn crop that has just been hailed, he can immediately send a request in to the underwriter, he could put a webcam on, he could show him the picture of the hailed crop, he could get an answer back immediately, he could take it to the library, he could take it home, he would not have to pay for the two services. It is so needed in rural America, what some of these wireless carriers are doing. It is not perfect, it is not as fast as some would want, but we are making progress. When we are in the WiMax footprint, we are using the MSS ATT ATC through Globalstar and their spectrum. When we go outside the WiMax footprint, we will hook into their system. We have nine months from the date of closing to get our first "proof of concept" communities up and running, and then, from that point, 18 months afterwards, we have to have 2A interactive capability, so that we can comply with Rule 25149 of the FCC Order.

Globalstar is getting ready to put a billion dollars into the next constellation of LEOs. It is a heavy investment, and they have been a fantastic partner. Our customers will have access to their products, as well, and have access to SPOT (phonetic), which is the emergency

responder operating off the L band. We will be operating off the S band. And I put this last picture in there for a couple reasons, 1) we have heard a lot about the economic Superhighway, that the Internet broadband backbone is for America; in a lot of places in America, that road is still a dirt road. We just heard from my friend from Alaska, and it is maybe a snowy road, but, you know, in a lot of places, it is a dirt road. And it leads to a very foggy reception in terms of your broadband sometimes, as well. I just told Ken Kuchino (phonetic) a little bit ago that this slide really represented all the trees that we cut down to comply with the 600 pounds of paper at the RUS. But I said that might not go over too well here in California with the politically incorrect statements. So I appreciate your attention to this. I have learned a few things through this three and a half year process. If there is anything that I can do or answer questions or help with, I am more than happy to try to help you find how you can better navigate the RUS process. They have been phenomenal, they have been a great team. And I appreciate your time. [Applause]

Commissioner Landis - We are kind of slipping further and further behind on our time schedule, so we will take a five-minute break -- five minutes only, and we will reconvene.

[Break.]

Commissioner Chong - All right, I am sure they will wander back. But I would like to get started. I am Commissioner Chong, and I wanted to introduce Dr. Tom Nesbitt. It is a great pleasure to have him here today. He is going to talk about how a $22 million grant from the FCC's Rural Health Care Pilot Project kicked off a massive statewide effort here in California, to build what we call the California Telehealth Network, or the CTN. Personally, I think one of the most important things I am working on in my current job is this Telehealth network because I think that it is going to revolutionize how we deliver health care to the rural parts of California, and to places like Tribal lands.

And so we have here today one of the key leaders in California, who is leading the CTN Project, and this is Dr. Tom Nesbitt. He is Co-Director of the new California Telehealth Network. We are hoping ultimately to link about 900 health care sites, and deliver state-of-the-art telemedicine. Dr. Nesbitt has been the founding Director of the Center for Health and Technology. He oversees U.C. Davis' Telemedicine distance learning and medical infomatics program. His resume is so impressive, I could not hope to cover it, so we just put it in the binder, and I suggest that you take a look at it because he is an amazing guy. He has been really a driving force behind the Telehealth

Network, and I am a huge admirer of his. He has with him, by the way, two of his staffers, maybe more, and I wanted them to stand up for just a second to be recognized because they have been working day and night on the Telehealth Network. And also, I think we have some folks here from the Advisory Committee. So quickly stand-up and just be recognized. That is David Harry, Stacey Cole and Christine Schmoekel, we have got the whole gang here. And take it away, Dr. Nesbitt.

Dr. Nesbitt - Thank you very much. That was a very nice introduction. And Rachelle has been just a great partner in all this, and we really could not have done any of this without her. And so I am really honored to be here with the other Commissioners, as well, and to speak on this.

What I want to talk about really this afternoon is sort of why we do this, why we are talking about all this stuff, and hopefully demonstrate for you the impact that this can have on people's lives. And the reason for this is growing. The reason for this in health care is growing dramatically. There is an explosion. You know, separate from what is going on in the technology world, in the biotech world, the new treatments, the new diagnostics, all those things are dramatically expanding, and that knowledge is increasing. And because it is increasing, people who have access to it, compared with people who do not have

access to it, it creates disparities. And, you know, a comment that I have made in the past in talks is that, if we discover the cure for cancer, but only half the people have access to it, we really did not discover the cure for cancer; we discovered half the cure. Because medical science, no matter how good it is, is not valuable unless it is applied to people who need it. And the theme here is, that advances in telecommunication and information technology can help overcome disparities, and help redistribute knowledge and expertise to where and when it is needed. And that is why what all of you do is so important. And I have gone to some telecom policy meetings with Commissioner Chong, and I did not realize how complex this all is, and I learned more today how complex this process all is. We plug into the wall and think communications just magically happens.

But one of the things that we really believe in this project is that these technologies can facilitate a new, more efficient model of health care across the economic and geographic spectrum. So I want to talk about the role of information in telecommunication technology and health care, and specifically I want to talk about Telemedicine, interactive health care over a distance using technology.

Now it is important to realize that we transfer medical information around a lot. There are great sites

that you can go to, that bring up to date medical information. But the thing that is different about Telemedicine is the interactivity. It brings the expertise of a specialist, the person who put that information on up to date on a website, or write the online textbook, it brings that person's expertise to the point of care, and allows it to be customized to that patient in real time. This slide is just some of the specialties that we are doing out of our program, and the only reason I did that is so you would know this is not a limited list of specialties. This is all assisted and made easier by peripherals. The remote sites have peripherals and the specialty positions can actually do a fairly large part of the examination from a distance; although they cannot do all of it, they can do a significant part of that.

What I want to show you now is a video, just to show you some out-patient Telemedicine, and it is about two minutes. [Video of News Program]

Dr. Nesbitt - So you saw an out-patient utilization of this. And this also has implications in the in-patient setting. Hospitalized patients today, as all of you know, are much sicker than they were before. We do not put people in the hospital just to rest up, or to feel better anymore. If you are in the hospital, you are sick. And they really are getting treatment 24 by 7. The problem

is, in smaller hospitals, access to specialists really represent a challenge, and Telemedicine can also bring those specialists to the in-patient side, to the emergency room, etc. And here is a picture of some of our docs in the emergency room. This is Dr. Marson talking to somebody in an emergency room, here is Dr. Marson again on the right, dealing with an in-patient setting, taking care of a critically injured child in Redding, California, which is a couple of hours north of us. And here is one of our pediatric cardiologists dealing with a newborn in a small hospital with a Tele-cardiac echo link, as well as being able to see the patient to determine whether they need to be transported. So that is great that we have done that, and we have been working on that for a number of years, as a lot of other programs in California have been doing. But, really, to get a statewide network to really do this on a broad scale, there are several things that we need. In California, we are pretty lucky because we have fairly good reimbursement. But some things that need to happen is really to have broadband connectivity that is reliable, with explicit quality of service, that has security and privacy, but we also need equipment out in the field, at both the specialty and remote sites, and we need a trained workforce. Well, we are also, again, lucky in California because those last two -- a trained workforce and equipment out in the

field -- we were very fortunate, a much calmer election that happened a couple of years ago, the people in California passed a facilities bond act. In that bond act, it had $200 million to be used for capital improvements that expanded and enhanced medical education programs, with an emphasis on Telemedicine aimed at developing high tech approaches to health care. Now, this is all capital dollars, but we are, with these dollars that are at the five health system campuses at the University of California, able to build new facilities that will be training the next generation of physicians to do Telemedicine, and with some of this money, we are able to put technology out into the field, out into small clinics, and that is just about to happen in the next few months. And this is a statement by the Governor, attending one of our Telemedicine conferences, saying that, with Proposition 1D, we will be able to connect our best hospitals and our best medical schools with clinics in remote areas all over California.

But what about the broadband connectivity, which is what we are here talking about today? How do we create this ubiquitous digital health care highway in the state? The way we have done telemedicine in the past is we have used sort of a hub and spoke model, and we have places connected out there with, you know, some ISDN lines, you know, T-1's are out to some of our places, but we have had

this kind of a model and it works well, and we are doing thousands of consultations. You saw how many sites we have. But, really, the game changer in this was the FCC Rural Health Care Pilot Program, and I really want to applaud the FCC and particularly Commissioner Tate and Chairman Martin for this because this, I really believe, is going to fundamentally change telemedicine in the United States. There was $417 million dedicated for over 69 projects. What this meant to us in California is that, through the Governor's Office, there was a group of people pulled together to essentially submit one grant, or one proposal, I should say, to the FCC, and all these people worked together. The University of California is the applicant in this case, but it really is on behalf of this broad group, and some of whom are in the room as Rachelle introduced them a minute ago.

What our goals were with our project in California was to create statewide broadband network dedicated to health care, with explicit quality of service, privacy, and security, to link this network to national backbones, and to leverage and build upon recent investments in health care. That Proposition 1D is an example of the things we wanted to build up and be able to connect some of those sites, and also use this for ongoing disaster preparedness and response. Our original technical goals were to connect

about 300 sites to address technical and cost constraints, and really to do high quality Telemedicine and continuing education.

So where are we today? Well, our award was $22.1 million, you know, depending on how many sites we hook up, but we are also very fortunate because of the California Emerging Technology Fund in the state. They provided the 15 percent match, the program only -- the FCC pays for 85 percent of the costs, and we have the 15 percent match paid for through the California Emerging Technology Fund, which is great, and some start-up funds out of that. The process goes that you have to get a Letter of Agency from a health care entity that will allow us to get Federal funds on their behalf, so we have to apply for Federal funds on somebody else's behalf, so we get a Letter of Agency. We were very worried that we would not get 300 entities represented. Well, we had nearly 1,000 locations represented in our Letter of Agencies. And each one of those sites have to be qualified. It is a very meticulous process, and USAC has already qualified over 730 of our sites, and our RFT has been submitted for posting to USAC. So we anticipate starting to build this thing out once the vendors respond to the RFP. That RFP will be probably up and ready to look at in ten to 14 days. We expect in the first quarter of '09, we expect to start building this out.

So you remember I told you the current state. So what is this thing going to do different than our current state? Well, you know, there are a number of networks -- and this is just sort of theoretical, but there is a number of networks that use sort of the same idea. And these places could really connect to each other if they wanted to. Some of these have a bridge in one of the communities, and there is a T-1 that goes out to a hub site, and people are connected locally, but what this network is, it is an anywhere to anywhere network, a peer to peer network that is going to allow these sites to all connect to anywhere they want, without us controlling that. They can connect to their peers and share resources, and when we add all these other sites, they will have many more people to connect to, including a number of other hub sites, as well as a number of spoke cites, because if we can get up to 500 sites, we will have truly a statewide Telehealth network.

And I want to also say that this effort has not only led us to develop what we believe will be the next generation of telecommunication for the state, for underserved areas, but it has also led to a new focus on Telehealth in the state and actually has brought people together, stakeholders with a new enthusiasm that I think we have not seen in this state, and I really think it is going to change things dramatically.

Now PowerPoint slides with nice little lines shooting across them are kind of fun, but what I want to show you now is a video that will really capture, I think what this actually means to people. And this is about an eight to nine-minute video, but I think it will keep your attention. [Plays video of news program telling story of woman whose son falls into diabetic coma, and is saved by telemedicine treatment in rural Willits emergency room by emergency room doctors in Davis] [Applause]

Dr. Nesbitt - So with that, I will see if there are any quick questions. Yes?

Mr. Kirby - I am Paul Kirby with TR Daily. Do you ever have situations where perhaps the local or the rural doctor is reluctant to do telemedicine for turf reasons, if you will, or pride? I mean, that might sound horrible, but you know, they deal a vacant hand to it and they do not need to call in the calvary, if you will.

Dr. Nesbitt - Well, I think that there is a period of time where there is some reluctance, but we have often tried to introduce video conferencing through less threatening forms, like through case conferences, or through a CME event. But once they start using it, and once they find out the benefit of it, they have been -- they love to use it, as Dr. Barash said. Sometimes it is a little intimidating, but our specialists have said, you know, these

are the doctors they get to know the best, you know, they get to see them, and they really begin to feel comfortable and feel like, you know, "I am going to call up and just ask a question." So I think you are absolutely right. I think there is some reluctance, there is somewhat of a learning curve, but I think after they use it, they embrace it.

Mr. Greer - I am Mike Greer. I am with the CPUC here in California. I was just wondering, how far are we away from remote robotic procedures?

Dr. Nesbitt - Well, there have been some remote surgeries done, particularly in Canada, they have done a number of them. It does require, you know, with robotic surgery, if you are sitting this far away from the patient anyway, you can extend it. It takes a lot of bandwidth to operate a robot. But I think we are probably -- there is probably a reluctance on patients. I think I would certainly be reluctant. But they usually have a surgeon at the bedside, and when they have done these cases -- they have done one for Chicago to Paris, I think, they have done a Cholesisectomy. I think that will be increasing, and I think, actually, you do want an expert surgeon who knows how to work the robotic system, and if you have somebody at the bedside, I think we are not that far away, but obviously it is extreme bandwidth that it takes to operate instruments. You are not just talking about -- because you are also

looking at 3D, so you are using sort of more bandwidth just for the visualization; but then, for the robotics, it takes even more bandwidth. But just the next task for this group to take on.

Dr. Nesbitt - Well, thank you very much.

Commissioner Chong - Very good. Thank you, Dr. Nesbitt. [Applause] I would be remiss if I did not recognize Cathryn Nation, who has joined us from the University of California, Office of the President. Cathryn, I am going to embarrass you and just make you stand up for a second. [Applause] Cathryn has been instrumental in leading the efforts with University of California. They are the fiscal agent for the Telehealth project. And so we have spent many a long hour in small rooms discussing this network, and planning, and pushing, and plotting, and I wanted to thank her. She is a very very busy person, and I wanted to thank her for coming today. I know she wanted to come to express thanks to the FCC for our grant, and give her the quick chance to do that.

Ms. Nation - It is a pleasure to be here and I can tell you that we spent thousands and thousands, it seems, of hours and almost all of them enjoyable. It is one of our favorite projects and we are happy to be here. Thank you.

Commissioner Tate - Thank you so much. You know, it is just rare and in hearing Dr. Nesbitt, and seeing the

things that you all have done, it just really obviously touches my heart. I know it has everyone in the room, and we thank you so much. And rarely are we thanked or rarely do we get to see the fruits of our labors from some of the decisions at the FCC, and even though I know you have not embarked upon our particular pilot yet, or gotten your first check, and I know the State of Tennessee calls me about once a week to ask about that. So anyway, but it really is inspirational and it has been wonderful to be just a part of watching this. I cannot wait to follow it from now on. So thank you all, so much.

We are going to dispense with the question and answer period that we had originally built in, so we can move forward as swiftly as possible. And so now we want to move along to talk about the California Broadband Initiatives here, our host state. And so, with that, I would like to start by inviting Joe Camicia to come up, the Chief of Staff for the California Chief Information Officer. And then, from there, we will have several other individuals who are going to present on the California Broadband Initiative.

Commissioner Chong - And could we have the California panel come up to the chairs, please, so that they are set to go? Thank you.

Mr. Camicia - Good afternoon. Thank you for

having me. I am first going to apologize. I had all day to come up with a 706 joke, and could not come up with one, sorry. I am Chief of Staff to Secretary Teri Takai. She is the State's Chief Information Officer. And the CIO's Office was recently -- I think I will use the word -- "awarded" authority for broadband from the Business Transportation and Housing Agency. So we recently took over. But two years ago, Governor Schwarzenegger signed Executive Order 23-6, which formed the Broadband Taskforce, and shortly after signing that document, a committee comprised of representatives from local and state government, nonprofits, academics, and industry, was appointed. The Taskforce was co-chaired by reps of both business and state government, was headed by Dale Bonner, the Secretary of Business Transportation and Housing, and Charlie Giancarlo, who was then a Senior Executive at Cisco. The Taskforce began regular meetings to assess the state's broadband situation and investigate areas of concern in both availability and adoption. The Taskforce also focused on how broadband could enhance various issues of interest and education, economic development, health care, and a variety of other issues. A broadband mapping effort was undertaken and Commissioner Chong will talk about that in a little bit more detail in a few minutes. In all, a total of more than 70 Californians were involved in the work of the Taskforce.

In January of this year, the Taskforce released its report on the State of broadband in California, and that report summarized the work of the Taskforce, and included findings on broadband availability, a survey on prices, an analysis of actual speeds that were experienced by consumers, research on adoption, and much more. The Report found that broadband is widely available today in the state, 96 percent of households have access to one form of broadband or another; it is, in fact, difficult to find an incorporated city or town in California that is wholly without broadband. By comparison, Japan, which is roughly the same size as California, has 97 percent broadband penetration.

In terms of adoption, the Public Policy Institute recently pegged adoption penetration at anywhere between 50-55 percent. That is the most recent independent number that we have seen. While the report now is complete, and the Taskforce has disbanded, the work goes on in both availability and adoption. In regard to availability, in March of this year, the Department of Transportation and the Public Utilities Commission held a joint workshop that was attended by over a 100 folks on the rules, regulations, and permitting for broadband infrastructure. You know, if we were to offer broadband to those last four percent of Californians that do not have access, we are going to need

the cooperation and participation of a variety of Federal and State Departments and agencies who have authority over rural lands.

Also, as to availability, the California Emerging Technology Fund is coordinating meetings of experts to develop a plan encouraging wireless broadband deployment, and that report will be released soon. On the adoption side, the California Emerging Technology Fund and The Children's Partnership have combined efforts to address the problem of digital education with underprivileged youth. A.B. 2987, which is the Digital Infrastructure and Video Competition Act of 2006, or DIVCA, was put in place to speed competition in video and broadband. Cable was franchised for many years, at the local level, and for new large scale video providers like AT&T and Verizon, who obtained franchises, a time-consuming city by city negotiation process would have been required. DIVCA has streamlined that process.

And while I wish I could say that wired cable competition was now rampant in the state, the truth is rather mixed. The Southern California area is served by Verizon, and have been considerably more successful in providing competitive cable service than AT&T has in the northern part of the state. Recognizing this problem, California PUC Commissioner, Rachelle Chong, and State

Senator Alex Padilla, and others, have sponsored or authored proceedings and legislation that would provide 40% matching infrastructure funds for qualified providers, building broadband to that remaining four percent.

Encouraging competition among the 96 percent that is now deployed is one of the key tasks for California policy makers. Broadband is ubiquitous today in California, not because of Government leadership, but because of the threat of competition. ILECs must deploy cable TV and broadband or risk seeing their market share fall to cable's triple play or wireless broadband voice services. Cable has had to make dramatic improvements in its long derided customer service, to fend off Verizon's well-received FIOS service. It is, you know, as simple as that.

So, in conclusion, there are many people whose leadership has gotten us to this 96 percent. We have many folks we could thank. And I will be happy to take any questions you have. Thank you. [Applause]

Commissioner Tate - Thank you, Joe. And now I will turn to the woman who really was instrumental in having us here, and organizing today. And, you know, it really is true that you just can hardly imagine how large and diverse California is and how much that they have been able to accomplish, how many people that they have brought broadband to, and that leadership started at the top with Governor

Schwarzenegger, and then, along with many others in this room, and especially Commissioner Chong, and so now we will hear about the California Advanced Services Fund. And thank you so much again for all your help in organizing today.

Commissioner Chong - Thank you, Commissioner. We are going to try to whiz through this because I think it has been a long day. My job is to tell you the second part of the California story, which is about the Califiornia Advanced Service Fund. As you heard from Joe Camicia, in '07, the Taskforce basically said, "Look, we think investment in broadband is just as important as investment in roads and schools. It's infrastructure." And so we decided at the California PUC that we were going to try to get broadband out to that last four percent of California that does not have any coverage, or has what we call underserved coverage.

So Joe told you what the good news was, is California had 96 percent access to broadband, and a lot of states would be envious of that, but the bad news was there is still that four percent unserved. When we sliced and diced it, given California is a big state in terms of population, it turns out that means 1.4 million people and about 2,000 communities that do not have broadband. So we decided that we were going to do something about it. Now, half of Californians have access to speeds greater than 10

Mbps, so that is pretty good; but when we did the mapping in the Taskforce, we found that we were concerned about this last four percent, but in the big picture the speeds were not as bad as we expected, and that is the benefit of doing the broadband mapping, is that suddenly you realize maybe you do have more covered than you really thought, that is A, and B, you figure out exactly where you do not have broadband, so you can target your fund money and save money for consumers. The last thing you could do is you figure out how you are doing compared to South Korea and Japan and Iceland, which is always a fun statistic to debate.

So I wanted to give you an idea of the maps that we are using to figure out where to build. This map on the left shows you the big picture of California after the mapping project, so blue is really good, green is pretty fast, and anything other than that means not much at all. So we are a big state, so you will see that a lot of it is white and tan, which means not much at all. Now, a lot of people do not live in white, so that is okay, you know, we are not going to cover cows and rabbits, and lots of sage brush down south. But there are lots of places where we did have people. And then the right side map is a breakdown of a smaller area, but you can really see how discrete the coverage is. This area up in the north is one of our problem areas that we are trying to solve. There are some

state colleges up there that would like to get much better coverage.

So the PUC decided, look, we are going to do something about it. So we formed a California Advanced Services Fund, and we decided we were going to treat these gaps as market failure because, by golly, if we got 96 percent of the state covered , in a competitive market, that is pretty darned good, so there must be a good reason why the carriers are not going to that last four percent. And it turns out there is. You know, the reasons are that we cannot get the Internet POP (Point of Presence) close enough to these communities, there are geographic challenges, or these communities are so small, the companies cannot see a way to make the business plan work. It is as simple as that.

So in December, the PUC did something kind of bold, we decided to take $100 million in surcharges from normal telephone rate payer money. Now, remember, I am the state, I am not the FCC, I do not regulate broadband; but we decided that these new advanced communication systems are the way telephony is going to be delivered in the future, and that there was such an intense interest in broadband as an economic development and social tool, that we had to get it to everyone. So we decided to collect $100 million over two years from a .25 percent surcharge on the intrastate

phone bill. That is about a nickel a month for the average phone user. And we are going to grant the funds to broadband providers who agree to come in and build in these unserved and underserved areas. And we will cover 40 percent of the costs, and the carrier has to put in 60 percent, and then the carrier takes care of operating and maintenance costs thereafter. And we had a great help from the Legislature. Senator Alex Padilla stepped in and sponsored a bill to make sure that we had the appropriate legislative cover and appropriate oversight of the money. And here is just quickly, you know, what we got. We were going fast because we wanted to make sure we got this broadband up sooner than later, and we had the first set of applications submitted in July, and it was wonderful, we had 53 projects requesting $35 million of the $100, and what was interesting is that some of the applicants were CLECs and some of them were ILECs. We had three that were not traditional -- oh, wait, I have it backwards, -- six were not ILECs, three were. And the nice thing is, they were looking at pretty fast speeds. They were looking at about 10.7 Mbps, so good speed, and it would cover about 15,000 square miles of California, and the bottom line is that last bullet, which is my favorite, we would cover 102,000 new households with broadband who never had it before.

So what did we learn from the process? Well, we

first believe that speed is of the essence to bring broadband to people. By golly, they want it! And when they have it, they are so excited. So we decided moving fast was important.

We also learned that the traditional providers are not the only option. We looked there first, but frankly, we have some really interesting mixed projects of wireline and wireless, that are really enthusiastic and they want to do the job. So that is great.

We are now looking at what happens next. We are still taking CASF applications because we still have money left in the Fund, and we are going to take up the question of, in these really tiny unserved areas, you know, 100 people, 500 people, do we potentially need to have a bigger match to essentially pay for most of the infrastructure, and just beg someone to come in and offer service? And we will be looking at that input next year. And that is all I had. [Applause]

Commissioner Tate - Thank you for your leadership. And with that, I would like to introduce Susan Walters, who is the Senior Vice President of the California Emerging Technology Fund to explain the role of this non-profit organization here, in bridging the digital divide in California, and then, Susan, I will let you introduce two of the grantees in a third project, Great Valley Center.

Ms. Walters - Thank you. Yes. We are here at the end of the day. I am going to go through this very fast, not only because I am sure you want to get up and move around, but also because the Grantees that I want to introduce to you are a lot more exciting than what I have to say, and I think that you will feel it was worth your while to stay to hear them.

So with that, what I would like to do is just briefly talk about our purpose, our process, and our potential. And I will be around to answer questions. So we were created in 2005 with the mergers of SBC, AT&T and then Verizon, and MCI. As a part of that merger, the California PUC ordered the establishment of the California Emerging Technology Fund. What is really important is that the money that these companies put into the fund are shareholder dollars. They are not rate payer dollars. The mission was determined to improve access, affordability and adoption to broadband technology, and we were established as a nonprofit corporation. The other thing that happened is that the Commission appointed four of the seats, AT&T appointed three, Verizon one, those eight selected the additional four. You can also see that $5 million was designated to support Telemedicine, so we will spend that $5 million and probably some more on Telemedicine.

Just a couple things that really have been covered

already, I think, from previous speakers, so I am going to move on. The important thing here is the adoption in California generally tracks the U.S., we think it ought to be ahead of the U.S. And so it is really important, what we learned during our fact-finding stages was how do we really focus on adoption. You can see here a map of California, and the green is the highest adoption, and then it goes on down from there. The eastern, the most eastern part is the least populated, where the Sierras run through, and of course, the top of the state is less populated, but there are still lots of people. In Humboldt County, at the northern top, the largest grower of tiger lilies is in Humboldt. Their network went down twice at the end of 2006, and January of 2007, there were almost no tiger lilies for Valentines Day, and actually I guess, then later almost none again for Mother's Day, because they lacked no redundancy in the network, where they do have it.

So our mission, again, to promote the deployment and adoption of broadband -- what we have added to this -- in a way that makes California competitive. Our process here is to look at the Fund as a venture capital fund with a public purpose. What is really important, I think in this process, or in this framework, is that we work very closely with our grantees, we are very strategic, as Commissioner Chong alluded to earlier, in where our investments go. We

look at ourselves as stimulating the market, so we focus on stimulating demand side, and helping provide information to the private sector that they need to build out the supply side.

The other piece here, which some of our Grantees were a little taken back about, but we were very upfront with it, and we worked closely with them, is that we do require matching funds. We are 25 percent of all of our grants. As you might imagine, in a state the size of California, $60 million does not go far. These are some of the partners we have brought in to provide additional matches to grantees directly, or provide in-kind services. It talks just a bit about how we track supply side and demand side. We do have the framework around what we call the 5 A's of digital inclusion, because we are focused on that almost 50 percent of people who have not chosen to adopt, in addition to the 1.4 million who do not have any access. All of these A's, we think, are critical before adoption takes place, and we do have metrics that we track all of these by, that are grantees, you know, in the grants that contribute to these.

Our basic approach on this, it was we first started in our -- Sunne McPeak, who used to be in the Governor's Cabinet, was hired by the Board in December of 2007 to head the fund. By March, we had a convening of

experts and key stakeholders to review a draft of the Strategic Plan. We sent that through a number of iterations so that, by June, we had a complete strategic plan and our first RFP went out. What you see in front of you on this slide now is our practice, is what we do over and over and over again with whatever field we are working in. So collaboration is key, best practices are key, seeking out other investments to leverage, working with the private sector, holding ourselves accountable in a very transparent way, as well as our grantees and partners.

There are three primary consumer communities we have targeted. I am not going to go through all of this. The three communities are rural, urban disadvantaged, and people with disabilities. You have heard about two strategies, really, on this slide -- Telemedicine, the California Telehealth Network that you have heard about, the piece that is really key for us that was not mentioned, so in addition to those that have been mentioned about the Network, is the Network will provide an economic backbone for these local communities to create additional economic development opportunities for entrepreneurs. And that is very exciting as rural communities really do struggle with how to remain viable, and keep talent in the community.

The Aggregation of Demand Projects, we have seven of them throughout California. These are just indicated by

the different colors. Our first report from the Aggregation of Demand Projects will be Redwood Coast this Saturday, so we are very excited to see how their report comes out. I will be around to answer questions about that. I am just going to skip through quickly. But within each of those seven communities, there are at least 50 people working on those teams, trying to understand the needs across sectors, and residential. And many carriers are also working with them.

Our Urban Disadvantaged strategy goes in a number of directions. Two of the grantees here, who I am going to introduce shortly, will talk about what we are doing in the urban areas. What I will say quickly about our urban strategy that is also true about the rest of our strategies, is that everybody we have funded has a role to play in transforming the community, or the neighborhood in which they operate, and so that it is larger than the specific investment they are executing.

Our strategy around people with disabilities, a population that benefits greatly from access to broadband, but often is thought of very late in the process, Universal Design is a process that we like to evangelize in terms of thinking of this population early in the process. What we have done is taken a policy position that all of our grantees -- we will work with all of our grantees to

increase their outreach, as well as accessibility to people with disabilities. So we have under contract a team of experts who are just beginning to work with each of our grantees, to live this strategy out. We have committed as of today $18.5 million in grants. And just a quick break-out between the different priority focuses between the regional breakdown, and then, of course, according to our five A's.

The other strategies that we are looking at, there are two that I am going to highlight really quickly. One is digital literacy, which Joe alluded to. This involves a number of components, the most important one, and that we got terrific validation on today, is one we are calling School to Home, which is an initiative that will be led by the private sector, as well as the education community, to target underperforming Middle Schools in low income communities, that will train parents, teachers and students, and build a eco-system around actually improving academic achievement, so well beyond just getting a computer into the hands of the kids.

The other effort that we will begin in February of 2009 is a public awareness campaign that is related to what we call our Regional Roundtable Strategy. We are a staff of six people for the state of California. We have only $60 million and we are trying -- literally, our mission is to

close the digital divide and to get access where it is not. We obviously cannot do this alone. The Regional Roundtable approach is a structured approach to involve the civic leaders, the trusted messengers, the key stakeholders in these communities, where people are not adopting. There is a reason they are not adopting, and it is very related to content, as well as understanding the overall relevancy. And it is going to take more than even just an add campaign or a radio campaign to help the constituency who is not adopting today to understand why this is absolutely critical to the future of their lives, and their friends' lives, and their families' lives.

And so, with that, I would like to introduce to you Barrie Hathaway, who will speak first, who is the Executive Director of Stride Center, that has a terrific workforce strategy that we are looking to scale up across the state. Then I would like to have both Dave Master and John Perry, who are from The Acme Network, who have done what I have not seen any other community organization do, and that is corral our entertainment industry from A to Z, into supporting a terrific effort, which also can scale up. And then we would like to have Maria and Dejeuné also talk to you about a great application in Pixley, one of the rural areas that we are also concerned about. One of the comment elements in all these projects is, our job at the California

Emerging Technology Fund is to invest and to be a catalyst so that projects can scale up, so that we do actually touch people who have not been touched by everything that is out there already, to understand the value of adopting broadband. So, Barrie? [Applause]

Mr. Hathaway - We are almost there, everybody. It is getting very close now. I have to tell you, it feels really good to stand up. And if you have a desire to do so, I will not be offended. I was really feeling good until Susan reminded me of this match that is required with this grant! [Laughter] This is a very difficult challenge with this grant, but I am really happy to be here. Thank you, Commissioners. It is a pleasure to be able to talk about our program.

I was really pleased to hear Tom's presentation earlier. He talked toward the end of his presentation, if you recall, about mitigating factors. And among the mitigating factors he talked about were this income and equity problem that is a factor in whether or not somebody is having broadband access. He also talked about training and he talked about access to low cost computers. Well, that is what we mean by harnessing technology and changing lives, so that was a really great segue, and it also helped me -- it is really validating for me to see that contemporary studies still believe these are some of the

things that need to be fixed, and we are absolutely at the Stride Center working on that.

So I want to start off by talking a little bit -- can you all hear me okay? I think that the thing that I want you to know is, as you look at our issues, we are about alleviating poverty. That is what the Stride Center is doing. We happened to see technology as one of the most powerful leverages that we can lever, to help people who are living in poverty. But if you look at the issue that we are facing, we are facing poverty issues. Some of the communities we serve are as high as 39 percent of families living in poverty; unemployment is high, it is almost 19 percent, and I am sure that is higher right now -- this is last year's data -- and growing; we have technology deficits that you have been hearing about all day long, and certainly skills deficits. And so the work of the Stride Center is to alleviate poverty and help people who are stuck in this terrible cycle. Let me just draw your attention to something that is not on this list that we have been talking about all day, what is not on this list is broadband deployment, and that is because we do not see it as the issue, we see it as the solution. And I want to talk a little bit about what our solution is.

So the Stride Center is leveraging this thing called technology to help people in these low income

communities, very focused on a couple of areas; first of all, as we deploy broadband, and as we have technology be ubiquitous in our communities, there is a growing cross sector need for technology experts, and so we teach people to start jobs and careers in the technology sector. So we are using the deployment of broadband, and the technology sector, especially here in the Bay Area, to help people get out of poverty and start new lives. It is a great field for growth, it is a high wage field, and there are plenty of career advancements, so a fantastic field for our graduates.

There is also this big issue called access. Even when there is broadband in a community, there are issues with people being able to get onto the Internet. So we are helping Technology Centers, we are helping develop technology skills, and we are helping provide technology tools, so access is a key part of what we are trying to do in the world, and very importantly, and something you do not hear too much about, affordable, local technology support. And we are trying to dig into these new emerging markets and make a profit, and create jobs for our graduates at the same time.

This slide is really to demonstrate to you that, at the very center, everything we do is the individual, who we generally call the "student", but it also is a whole group of people who live in this community. The point here

is that we are providing job skills, professional skills, life skills, computer equipment, and we do not provide access, but that comes when a student is leaving our program, something that is very easy and unavailable to them. So the Stride Center is really surrounding the individual with these services.

We also have done something that CETF likes a lot, and we like a lot, which is Social Venture Business, that has been around now for -- we are in our fifth year. We are praying that we are going to make a profit this year. We have not done that quite yet, but we are doing a lot of interesting things with this Social Venture. We are a straight up tech support business, that is what we do. Our customers do not necessarily know that we also are a nonprofit business that is hiring and creating internships for graduates of the Stride Center's Programs. But in this business enterprise, we have an opportunity to be a honest to goodness community-based technology organization. And so what we are doing is creating jobs for a our graduates, internships, when a student comes out of our program with work experience, as well as technical certifications and all the life skills, they are going to go to work. And so that job experience, that work experience, is essential for them. But interestingly, and so interesting for me because I am really from and of the for-profit sector -- I spent 25 years

of my career in the high tech sector. To be able to run a business that at its core is trying to do something good and right in the community is just fantastic. And that is what we are doing. We are providing affordable, local, tech support, for those men and women who are in these underserved communities, finally getting access to the Internet, and their computer breaks down, or they have a virus, or they have a problem that they cannot stay on the Internet, they cannot stay accessing. And the business eventually will turn a profit, and it will become part of the match that we offer to CETF, and the way that we keep our organization sustainable.

So in the context of supporting the deployment of broadband, we are preparing men and women to start jobs using technology in the technology field. We are also providing general technology skills for people to adopt technology. We do have a refurbishing program, we are a Microsoft authorized refurbisher. Reliatech, our business, is producing refurbished computers, and we desperately need retired computer equipment, so for those of you who are representing big companies and big organizations, what we do is we take it for free, we refurbish it, and at very low cost, or free to the user, they get a very very fine quality, warranty'd computer from us. So you can help us with that. And then, once again, that affordable local

technology support.

With CETF's help, we are doing some pretty amazing things. We are going to grow our training locations from two to eight, and this year alone we will be at four by the end of the year; we are going to increase the number of people that we have trained and employed by four-fold, we are going to triple the number of jobs and internships that we generate through our social venture business. We are growing the number of low cost refurbished computers we put in the world to about 1,000 a year by the time we get there, and that is actually a very conservative number, especially if we can get supply. And we are increasing access to that affordable, local technology support.

I want to just very briefly show you the faces of some of the people that we are working with. Rudy Campos came to us with 16 years as a parking lot attendant, and a middle school age son who he needed to go to college, and he was no way going to be able to afford to do that on his parking lot attendant salary. Rudy is now a desktop support technician at one of our partners, Chevron, and he is doing fantastically well, he is now a permanent employee there, and he is very much on his way. Marissa, a recent immigrant from the Philippines, with no family network had never turned a computer on in her life, is now a help desk administrator at CitiGroup. This is Vernon Williams who

came to us two weeks out of prison, determined to turn his life around. After doing a couple of jobs for high tech companies as help desk administrator, he started his own company and now he is sort of mirroring what we do on sort of a smaller scale. So this is the kind of thing that happens when you give people the opportunity. None of these people have been given anything for free. Nobody in our program is given a hand-out, they are given an opportunity to do the work themselves, and sustain their own lives, and be in the community in a way that is productive. So I think, as Susan did, I will just take questions at the reception afterwards. And thank you very much for the opportunity to be here. [Applause]

Mr. Perry - Just while we are waiting, I am John Perry, and I have networked in education for a long time, and about 20 years ago, I [inaudible]

Commissioner Chong - A mike, somebody?

Mr. Perry - I am sorry. I will just introduce Dave. I am going to let Dave do the answering. But he is a longstanding educator, and so am I, and I was one of those Administrator types in a very very large district south of here, very very large. And one day I went to go to a classroom, just on a lark somebody told me there, and it was like an earth shattering thing, so it took me a long time to learn why all of this tremendous maturity and talent was

coming out of this regular high school classroom. And so [inaudible].

Mr. Master - Well, what we are going to do is we are going to show you a little bit of a story here, of what we were scaling up. Broadband has allowed us to connect students anywhere in the country to artists, professional artists, from 60 studios. That is just bottom line. And we have the major support of Sony, Pixar, Disney, DreamWorks, Warner Bros., all of these people have been part of this, plus smaller studios and game companies. What it has allowed us to do, and I am going to the end of the story, and then we will go back to the beginning, what it has allowed us to do is get over 1,000 students hired in a highly competitive industry. And we went to schools that had no previous experience, and 90-something percent of the teachers we worked with never did any animation before. And that was our charge. Our charge was to go where it was not happening and make it happen. And it started, the thing that we scaled up, was my classroom. For 20 years, I taught animation on the east side of Los Angeles, in the fourth lowest taxpayer school district out of 45 at the time in L.A. County. And we ended up being one of the five top animation schools in the world. We had -- actually, my last couple of years there, my last year there, we had more people hired than any other school in the world into the

business. When I left there, we had 58 people at Disney, and over 40 at Warner Bros. Warner Bros. hired me to run their Artist Development Program here and in Europe, and try to do the same kind of thing. Part of that initiative, when I went behind the wall, was to make this happen for kids because only one out of 1,000 kids' portfolios that were being sent in were being accepted. Now, if that was your child, or that was someone in your school, you could imagine all the hard work. I saw the hard work that went into these. It was on all the wrong stuff. So I am going to show you the first part here, how I corrected that in my classroom. We had the same problem -- my students all wanted to get into this business, and we had very few getting in, and after eight years, I started bringing in professionals every two weeks because I had close access. So this is what happened. I was National Technology Teacher of the Year, and I still have an argument with my toaster oven every morning. [Laughter] [Plays video]

Mr. Master - Okay. Now, what is significant about that was Burt went on, and he is now a top animator in the business. He is now a mentor on Acme, too, they all have to do that, of course. But over 100 of his classmates, including my son, who is in the background there, who is now the Editor for South Park, went on to get into the business. Now, what made this magic? Was that me, the great animation

teacher? No. I was a painting and drawing teacher, and I was working, teaching in a working class area, where the parents said, "Enough of this frills stuff, we want our kids to get jobs." Well, the jobs were in the entertainment industry, so I switched over, and I did not know anything about animation. These mentors taught me. I lucked out, I had Chuck Jones as my mentor, Frank Thomas and Ally Johnson, the Acme name comes from that, because when I went to Warner Bros., they said this idea would blow up in my face, so I could not resist. [Laughter]

And I actually called Chuck that night to say, "Hey, Chuck, do you mind if I call this Acme?" And he said, "No, but did they get the joke?" Of course not. So that is what we had to scale up. People came to me and they said, "Dave, can you get this into more schools?" Every state here, we get calls from people. And we cannot handle the demand. Our problem is not on the broadband, or any of this other stuff. Our problem is we cannot handle the demand of the numbers of people because we have an old website that we designed before MySpace and all these things, and it is really not Web 2.0, even though we are pushing it to be Web 2.0 every day. And we cannot grow the system, I will be honest with you. We have a commitment from the studios to give us 20 times more professionals if we can change our system, our website, but that is our problem, is on another

end, different than yours. We have something people want, we just do not have it at the point of access. Our spigot is stuck. Okay? So we started the program with one studio at Warner Bros., with eight classrooms. [Plays video].

Now, that is the key. What made our situation different was we had all these pros doing it -- these kids do it now also. And we have been able to -- it is not just feature films and it is not just games, even though those are big employers here in California and around the country, but there is also industrial film, scientific film, simulations, advertising, small hand-held screen devices. Somebody has to make all this content. And if companies cannot find the talent -- and I know because I went around the world looking for it for Warner Bros., they have to go overseas. They have to find this talent somewhere else. So, again, this is a big deal.

This is our growth so far on the teleconferencing end. We have not even maxed that out yet on the teleconferencing end because a lot of schools cannot afford teleconferencing, and cannot afford the T-1 lines going to the school. So we have not maxed that one out. So we started, we decided about six years ago to go online, and now we are in 200 classrooms, okay? And we are going to show you what that looks like. Oh, this one hear -- and we do not have time, but if art is no longer a frill, maybe it

was for my father or my grandfather in school, it was a frill, it is a major industry in this country. It employs a lot of people. It is one of our only exports that actually we have -- we are in the black. And it is -- you know, working class kids can get into and raise their level. I mean, the jobs are in six figures. The jobs are in six figures. And the game industry, the lowest paying job is $18,000 more per person than the median income of California -- that is the lowest -- that is called the debugger. I mean, it is like the bottom job is $18,000 more than the median income in California. So we need to get working class kids an opportunity in this. This is a big change in their lives. It happened in my classroom, too. I mean, this completely changed lives. Okay?

Mr. Perry - And this is three years ago figures.

Mr. Master - Yeah, these are three years ago figures, they are much -- because we mostly deal with underserved schools. [Plays video] Now, here is the great thing about it, online, it can be accessed. What he just told that student could be accessed by every single student at any level online. That is 8,000 middle and high schools, and almost 1,000 college students can access that, plus their teachers. Not only that, every time a pro makes a comment to a student, it automatically gets sent to the teacher, and automatically gets sent to every other

classmate in that school. That is also our safety device, that is why we have had no problems with security, or any problems with predators, or anything else, because it is a party line [laughter]. And it is incredible what -- look at the quality of the work. That is why kids are getting jobs, because they did not know what to do to get in this business. It was not that they were not working hard, they were not working on the right stuff. And we have to provide young people with the right target. We then realized we have to start teaching all the teachers. So this is ongoing, because you cannot land the plane. These teachers cannot just take off for two years and learn this stuff, so we train the teachers. We have a whole manual where we start them off and they get going, and then we train the teachers along with the students, every single time. So every comment goes to them and they can learn from it. Okay?

Essentially, what we have done is we are basically taking the same thing that worked in the Renaissance, and we have just put it on steroids. It is digital. And any kid, I do not care -- I have even got contacts in Barrow, Alaska, people up there would like to get on. We are doing a project right now -- we do not have any funding for it, but we are doing it anyway, with Navajo Indians. And basically, the Navajo Nation came to us and said, "We want to preserve

our language and we want to preserve our culture, and our stories, but the kids just want to do digital stuff, and everything else." So we set up a project in New Mexico, and we are doing it, where the young people are actually learning the stories from the elders, and creating them digitally with animation and all of that. Again, it is a great way to make something happen to the past into the present. And there are so many ways that this can work forward.

Now, the last thing I want to say is the way forward. The way we had to do this, to scale this up, because there are a finite number of professionals, and when you have mentors, you cannot do one-on-one, it is not efficient, okay, it works, but it is just not efficient. For every pro we have on, the way we have crunched the numbers, ten college students get mentored for every pro we bring on. But here is the magic. Those ten college students form our Pixel Corps -- they are like the Peace Corps -- and they earn the access to all of these pros, so they have to mentor ten middle and high school kids, and the computer tabulates it, keeps track of it, they earn those points, and they can spend them to get comments in our pro review and pro advice. Well, it works. We have been doing this now for all these years, and it works. And the only crunch now is, we have less than one percent of the pros.

The studios have told us they will get us 20 times what we got, but we just need to upgrade the ACME website.

Mr. Perry - Can I just say, likewise, the kids in middle schools and highs schools, they are learning to mentor, as well. Everybody on Acme is a mentor. If you are an artist, you are a mentor.

Mr. Master - Everybody mentors everybody else. It is called peer to peer, and then when they finally get a big question they cannot answer, they go to the next level.

Mr. Perry - So the kids, the young kids, what they want is a mentor from college. Or, you know, that is where their next step -- right? So they are learning about all these colleges around by showing their work to them. And they are doing the same thing. They have got to mentor their peers and less advance kids to get the college comments. And so, after a while, that is why nobody leaves Acme after a while. All the kids that are now in the business are still doing it as pros.

Mr. Master - Yeah, we even have kids who are migrant, you know, their parents move around, and we keep them on the site. We just keep them on the site because they are so interested. As long as they are really interested, we just keep them.

Mr. Perry - For anybody that is an educator in the room, everybody is used to, you know, multiple pathways for

kids, and career development and stuff, the kids' membership goes from class to class to class, as long as the kid wants to take it and has a teacher who will take them, you know, they go.

Mr. Master - We are also doing a thing in Physics with San Jose State University in this city, with the Physics Department there at San Jose State, and we are trying to use the same type of thing. We have DVD's of what we are doing, and if anybody would like it, it was actually produced by George Lucas, so it is really cool. And it shows our program because the whole California entertainment industry has been really really great to us. But we want to spread it to the whole country. And that is our goal because talent -- and I went around the world for Warners -- talent is geographically spread out evenly; broadband access is not. That is the only difference.

Commissioner Chong - Thank you. [Applause] And our last project is Pixley (phonetic). We are having Dejeuné Shelton come up. Are you going to come up and do some, too, Maria? Okay. All right, we are going to have Dejeuné do it. And this was a project that the AT&T Foundation principally funded. And it emphasizes rural deployment. Did you guys like that last one? I thought you would. It is very California. [Laughter] How many states are you in that you have schools in, besides California?

Mr. Perry - We have six other states, but there is only like 25 in that, and we have got schools in that, and we have 175 in California.

Mr. Masters - But one year, our two top students came from Birmingham, Alabama.

Commissioner Chong - And there you have it. So you would like to continue to spread, assuming you get your website issue dealt with?

Mr. Masters - Oh, yeah. It would be very easy to do, actually.

Mr. Perry - Our benefactors are from California, as well.

Mr. Masters - It really works out to about $25.00 a student for a year. It is a Big Mac among friends.

Ms. Shelton - Well, I can see that everyone is happy to see me as I am the last speaker, and I am glad to be up here also. I am with the Great Valley Center. Maria Velásquez is the Project Coordinator. I am the Senior Program Manager. And I am going to be talking about a program called Pixley Connect, and it is bringing technology to rural communities.

Pixley, you cannot really see, is located between Fresno and Bakersfield. We are in the Central Valley, and it is a very small community. And so I am sure you are wondering, why did we choose Pixley. Sixty-five percent of

the adults are English language learners, 91 percent have no basic computer skills, 100 percent perceive technology as a tool to improve their lives and community. And so we thought a way that we could really change their lives would be to bring technology to them and help them to understand exactly how they can use it in different areas.

Commissioner Chong - How many people are in the city, Dejeuné?

Ms. Shelton - Pixley has a population of 3,000. It is 46 miles north of Bakersfield, 64 miles south of Fresno, there are 650 households. It is unincorporated and there is very limited access. It is a very small community. Everyone knows everyone. Everybody knows everything that is going on. And everyone knows exactly what we are doing, whenever we are doing it. [Laughter]

It is part of Tulare County, and Tulare County, just like the Central Valley, is growing rapidly. And so, in order to take advantage of that, we are really trying to bring change, positive change to different communities. And Tulare County really reflects the growing diversity of the San Joaquin Valley, and that is another reason why we chose Pixley, because of the diversity, and we knew it was really important to reach out to communities that really are not as represented.

Among Internet users, Latinos trail behind overall

averages, and the Latino response to "how often do you use the Internet, or E-mail" was 64 percent never use it, 14 percent use it sometimes, and 22 percent use if often. So compare that to other communities where the Internet is used by most people in the family. You have six-year-olds now going online, trying to find out what Dora the Explorer is doing. And there is a whole host of community members who are not using the Internet. And that is something that we really believe we can change with this program. The challenge? Ensuring access to technology in rural parts of California. The solution? AT&T and the Great Valley Center came together to form a partnership to bring high speed access and training to Pixley. And we called it Pixley Connect. Our vision? To bridge rural communities in the Central Valley with technology access. Our mission? To promote the community's social and economic development through education and technology training. Our goal is to promote community and economic development through technology, and training and education. We have staff on the ground, we have a community training center. We have local residents who we use as experts, and we received a $600,000 grant from the AT&T Foundation.

Commissioner Chong - Thank you, AT&T. I know you are here.

Ms. Shelton - This is a three-year project. And

it is coming in phase. We are in the third year of the three-year project right now. And the first phase was really community, education and training; the second phase was community, technology center, and participation; and the third phase is Pixley Economic Development.

Phase 1 really was to get the community to believe that Internet and computers and technology was something that they should use, and so we brought in high speed Internet access, we brought in a computer lab, and we started training 5th through 8th grade parents and students.

Phase 2 was really to do a business survey, find out what we could do in the community to get people excited about it and see how their incomes can grow based on it, to provide some community services and some training centers, and to really get teenagers to be involved and become digital connectors. And our digital connectors are something to us that are just really exciting. The digital connectors help facilitate the use of broadband technology in the homes of Pixley residents. In essence, what we are saying is, it is wonderful. We had you come out. We are going to teach you how to use a computer. And then we send you out on your way, and then you open it and you cannot figure out what you are doing, or something breaks down, or you are trying to navigate, or you do not know how to troubleshoot. And so we thought, how could we make sure

that someone in this rural community would be able to come out and fix computers when they needed it? And so we decided to train teenagers to learn how to assemble, disassemble, troubleshoot, and do all of the things that you needed to do in order to fix computers, stay within their community, and really help their neighbors. And it has really brought a lot of community support, belief in each other, a lot of teen support, and a lot of people feel very happy with the idea that these teens are not only learning about computers, but they are able to fix their parents' and their neighbors' and their friends' computers.

The last phase was the business model. And this phase is really what we are doing right now. And we are planning on holding a business pavilion, we are doing some economic development, and we are going to continue Phase 1 and Phase 2. And when I talk about a business model, I am sure some of you are thinking, well, you know, we will have home based businesses, that is something we also want to do, and we are going to teach them how they can learn what they have used, and go out and get better jobs. But another thing that they brought to us is the idea that they have no bank in Pixley. So they have no way of banking. They have to drive out of their community in order to go to a bank, a simple thing that you and I do all of the time, by going to the bank to make deposits, to do what you need to do.

Imagine how the businesses feel that they do not have one. And so we have decided that maybe we can help them find a way to bring a bank in. And so we are working with them to see if we can make some contact to encourage a bank to come in. Maybe it will be at a storefront, or however we can do this, just so that we can see that kind of economic development, a small thing for them. It is really exciting for all of us. And I really like this because, when they heard about us coming, before we came, they had a lot of problems. There were no computers, things did not work. And one person said, "Pixley is still in the 20th century. This project will bring us closer to the 21st Century." And that is really the truth. You can just imagine living in a community of 3,000 people. You are still kind of left behind. You are very rural. And now they believe that they are a part of society because they are online, and they can be just like us. They can reach out to anyone. They can talk to their neighbors. They can talk to their relatives in far off places. And they are very excited about that. And this, I just wanted you all to see, is this is Main Street in Pixley, and so you can just really get an idea what a small town rural community is like. This is the hub of the community, where everything happens. And so it is just very exciting, as you have heard from the other different speakers about why we do this as nonprofits, as

people who really work for the community. We do this because we do want to make change, and we do this because we believe in that. And we do this because we know the next generation, those children who are coming up, can really make a difference. And just like this 4th grader said, "Computers are fun and help me do my homework." And we want to encourage that. We want them to believe it is fun. We want them to do their homework. We want them to be successful. And this program is really making a change, and we are very proud of it. And I thank you very much for listening. [Applause]

Commissioner Tate - You know, it has been an amazing day. We started out with complex technologies and charts and graphs, and then we kind of got down to state and towns, and now we are at little Pixley. And then we have got all the way down to one little boy whose life was saved, and then we circled back again to think about how Acme is going to help kids get a job and, once again, circle back into the economy and the U.S. still being a competitive leader in the world. So I think it has been a terrific day. I want to thank WCA and Fred Campbell for allowing us to co-locate with his wonderful conference here in San Jose. Obviously, I want to thank all of you panelists and our esteemed panelists from all over the country for sharing your stories today and, of course, my colleagues who

traveled from all across the country to be here. This will be transcribed and I am not sure about a date, but we will have it on the FCC website, and we also have a 706 home page that will also have all of the materials and contact information for all the presentations that were made today.

And so thank you all for your attention and for being here, and we will look forward to seeing other great projects coming online soon. Thank you. [Applause]