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REVIEW AND DISCUSSION OF BROADBAND DEPLOYMENT RESEARCH

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Introduction of Workshop:

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Panel 1 - Berkman Report: "Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World"

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Respondents:

HAROLD FELD
Legal Director, Public Knowledge

THOMAS HAZLETT
Professor of Law & Economics, Director of the Information Economy Project, George Mason University School of Law

Panel 2 - Citi Report: "Broadband in America: Where It Is and Where It is Going (According to Broadband Service Providers)"

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P R O C E E D I N G S

(1:15 p.m.)

MR. WALLSTEN: Thanks, everyone, for coming today to our workshop discussing broadband deployment.

And we're starting with our first panel, which is on the Berkman Report, "Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World."

I'm going to give very, very short introductions, because people on the panel need no introduction. But in case, for you, they do, read them in the agenda.

We'll first have a presentation of the report itself for about 20 minutes, and then discussions by two discussants.

So, Professor Yochai Benkler will present the report. And he is the Berman Professor of Entrepreneurial Legal Studies at Harvard, and faculty co-director of the Berkman Center of Internet and Society.

So, Yochai, please.

MR. BENKLER: Thanks so much for the invitation to come and speak and present the report. The report, just to set the context, we were asked by the broadband -- by the task force to take a look and see what's been happening in other countries, and what, if anything, we can learn, either from things that went well or did not go well elsewhere.

What we did -- or let me jump right into the key findings, since at least two things were controversial and got comments. So let me identify the two things that were identified after significant research.

The first thing, as I'm sure most of you know, there's been a good bit of question about what is the condition of the United States. There had been a statement, for example, by the President about where we are and how good a performer we are. And there's been criticism of that.

So the first thing among our key findings is that we went in and we spent a

tremendous amount of time developing new data about the benchmarks, and about how we know what countries have done well and what countries have not done well, using various independent sources, in particular adding a lot on price and speed, not only penetration. And for that, the critical thing is to put facts before interpretation.

First of all, what are the facts? Then let's talk about what the causal relations may or not be.

The second finding -- there are other things, but this is the one that drew the attention so that's what I'll talk about now. And, of course, we can talk about others later -- is that open access policies, a bucket of policies, were important in the first generation transition, and that they're widely regarding by policy-makers as part of the toolbox for their next generation transition. Critical things that we need to keep in mind. This is done in addition to and complementing facilities-based competition, not instead of. It's not seen as a diametric

opposition.

Second, the core idea is to find a policy framework that enables additional entrants. In particular, we see entrepreneurial entrants alongside one or two large players with their own infrastructure. That's the core target.

More things that I'll focus on today are, first, that the background literature is a lot less determinate and a lot more supportive of the positive effects of open access and the absence of negative effects on investment than is widely thought, including by me four or five months ago before we went more deeply into this.

Second, that we spent a lot of time looking specifically at detailed country and firm case studies that support mixed models, not purely intermodal, but with a complex interaction. And, critically, this is not a solved problem. We need to continue study, we need to continue experimentation, we need to do this with an open mind.

So, first of all, the benchmarking.

Three outcomes measures: Quantity, quality and price -- basic and important -- quantity measured by penetration, quality by speed, and price is price, of course. Important to understand.

OECD data -- much maligned data, it's still the best most comprehensive, with the longest time and the most comparable countries, "comparable" in the sense of "like us," along relevant dimensions. We also added independent sources, particularly to prices and speeds. We looked also at wireless.

The result is that what we are presenting is a diverse set of sources that are reasonably well correlated with each other, confirming that when you observe through this way and through that way, you find a similar set of findings.

So this is obviously the best-known model -- the best-known measure, the penetration per 100, and we all know the United States is 15th. Throughout these, what you'll see is the United States will be in a red or an orange so

that we see its location relative to the other countries.

The critical point here that's helpful is that this is a measure that has been available for many years. It comes through reporting of number of subscriptions. And essentially, in 2002, we were top quintile. And this basically shows you the top quintile countries and where the U.S. has been, from being in that to falling out of that.

Many others say, no, we should be looking at households rather than at per capita penetration, because that penalizes countries with large households.

What's important to remember are two things. First of all, by the metrics as supplied by the national statistical agencies that are the formal numbers that are collected by the OECD, the U.S. is 14th rather than 15th. It doesn't make a difference. In general, the two measures are highly correlated.

Second, it's important to understand

that households are a survey-based method. They get updated less often. They don't include small business uses that buys consumer-grade broadband. So they're, in some senses, exactly the target we want. But on the other hand, they're updated less regularly, not always at the same time with all of the other countries, so they have some costs.

So we prefer to use both, understanding that each one has advantages and limitations. And, in the case of the United States, that they confirm each other very well. Even if theoretically, at 100 percent penetration there might be problems, these have been good predictors of each other more recently.

Then we move to speed. And here, let me focus on the things that we did that are newer, the actual measurements of which -- in the report, we report on one, and since the report we've added another. So these are speed test measurements. They measure at the end-user machine, downloading and running a machine. We looked at 41 million records from the last quarter of 2008, from the 30

OECD countries. We ran filters to try to clean as much data as possible.

Here, we see the United States is 11th in speeds. And, again, there was some pushback that speed-test is not a fantastic source, even though we worked with it quite carefully to try to clean it up. So since the report, since the comments, what we've done is also looked at Akamai. Now, it's important to understand that Akamai measures and speed-test measures are done in completely different places in the network, and they're done by completely different companies. And the United States is 11th on Akamai measures, as well. And the two measures are very well correlated. So what we see is that you look from two -- you ask two completely different people, using completely different method to observe the same fact, they converge quite closely, we get a higher level of confidence that this is not nonsense, this is probably the truth.

So we have penetration and quantity. We have speed, or a measure of quality. Now let's

look at prices.

In the initial draft we used two independent sources: OECD, which does its own pricing study, and a market analysis for Tele-Geography. Since then, again, people have come back with but I've seen a price here, like this, and price here like that. We added yet a third independent market source, Point Topic.

In total, we have 950 unique observations from the top four providers in each of the countries, 115 different companies of actual research done by three separate entities in three separate studies that are very well correlated with each other.

And what's the picture they show? The picture they show is that on the very low speed -- 768 kilobits up to 1.5 megabits, more or less, the U.S. is doing well. We have decent prices at the very low end of the offerings.

Once you start moving higher up, to more what would count today as contemporary acceptable speeds, and then once you move up from there to 8,

10, and above megabits, the U.S. is much less of a good performer. We go to the mid-teens when we're looking at today's and just beyond the horizon, tomorrow's numbers. Once we look at the most predictive of the future, at the very high speeds, above 35 megabits, the picture is a lot less attractive. Essentially what we're seeing is that in the United States, relative to other countries, very high speed is a luxury good.

So another way of looking at all of these data is to take all of the points, look at where the price is. And essentially what we're seeing is exactly confirmed when you look at all three data sets together. At the very low speeds, the U.S. is doing fine. Once you move to today's speeds, prices are expensive but middling of the pack. Once you get to really high speeds, it gets enormously expensive.

Another way of looking at the same data is to look at a subset of the offers -- just the high, the next generation type offers as they're available. And these ones -- each one of these is

a flag that marks exactly the best offer available in the three data sets from each of these four -- from each of these companies.

And what we see -- so, on the bottom right-hand corner, what you see is "Expensive and Slow," on the top left-hand corner what you see is "Cheap and Fast." That's easy.

What you begin to see is that countries start to cluster. If we clear out the countries that are in the "Cheap and Fast" cluster, and keep the North American market, what we see is, actually, a nice clustering in several countries of "Cheap and Fast," and an unattractive -- if I may be so bold as to say -- description of the price-speed tradeoffs in the U.S.

So that starts -- so those are the facts. Now we can start thinking about what might have caused the effect.

So, obviously, there are things that everybody agrees are important. Urban concentration is important. Income is important. Education is important. Poverty we think is

important, and there's evidence for that. People throw different things at it to ask the questions.

The basic question we need to ask ourselves is: Does that mean that policy is irrelevant? How much of the performance is talent, just your basic endowment? And how much can you do more, with sweat, to get better?

So this happens to be one way of doing it. This includes those factors that we just talked about. Others have done others.

Fairly regularly what you see is that the U.S. is performing as predicted. There are countries that are performing worse than predicted, for sure. But there are countries that are performing better than predicted. And the question is, what can we do, beyond relying on the natural endowment, to say what can actually work?

So let's just take an example. One way in which we were able to use the speed data is to look at particular cities. So we looked at the top 55 cities. In the OECD we had data for 55 -- but top 2 cities, capital and largest city in the

OECD 30. We looked at top download speed, at average download and average upload. New York is not on the top 20 of the OECD, in terms of download speeds. It barely makes it to 13. Washington is in the mid-30s. Here you're not talking about urban density. Something is going on beyond this.

So what we did was to look at the detailed country-level case analysis of the political economy of regulation and at the level of what firms entered, when they entered, how they entered, how they responded to regulation. And we looked at about half of the OECD countries, at 14 case studies, to do this.

The key findings that are relevant today, I think, are that open-access or unbundling facilitated competitive entry in many countries, including -- and this is important, the United States is not unique in this -- including where facilities-based alternatives are available. What access entrants do there is they play an important catalytic role.

Facilities-based and access-based competition complement each other at the system level. In particular, we see entrepreneurial competitors that tend to enter through unbundling. It gives them greater control, greater room for innovation, instead of just re-selling. We see this also, by the way, as an entry across borders from the incumbents of one country to become entrants in another country next door. We see the Nordic incumbents doing that to each other all the time. We see France Telecom doing it to some extent. We certainly see a Telecom Italia Tiscali doing it.

So, again, if we try to do this, here's how the incumbents look on the same framework. And this is just incumbent telcos.

Then what we see is that the cable entrants more or less cluster around, with here and there differences, more or less cluster around their incumbents. When we add unbundling entrants, what we see is that, first of all, obviously they're all playing on price. They're

all up at the much lower prices. But, second, in the higher performing countries, they're also pushing on speed.

And so you get a complementarity. And in these same countries, at least, in some of them you also get additional facility-based entrants. Some of it, like in Sweden, is municipal utility type places. Other places it's electric utilities. But you see this complementarity, instead of this idea of either-or.

So the question is: What's the theory? First of all, the best known -- and, in some senses, I think, for most people, the most intuitive -- is investment deterrence. This the Houseman '98, "and later rates are going to be too low, you're not going to get investment."

On the pro side, there are a variety of theories. The most well known is "investment ladder" -- start small, build the market, have cash flow. This we see in Norway. We see it a little bit, at least, in planned deployments in Illyad. And particularly we see it in shifts in

various European countries from the lower investment incentive bit-stream to the higher investment intensive local loop and bundling.

Another is the question of, yes, maybe we'll get delayed investment, but is it worthwhile in terms of long term welfare? Let's say you get investment five years later, but then for 30 years you have more than 2 competitors, you have 3, 4, 5, instead of 1 or 2. Are the total consumer welfare effects sufficient to justify that? That's a question. It needs to be looked at.

There are arguments that greater competition increases uptake, and that increases cash flow, and then investment. There's a brand new interesting paper from Johannes Bauer, basically coming up with a new Schumpeterian dynamic model. That is to say, large incumbents, badgered by small innovative entrants, that's the market structure that you want. You want it to be not too concentrated so that you have some competitive discipline, and not too dissipated so there are no rents to invest.

To do that, you need to do a lot of dynamic fine tuning, and that's the particular role. Which is to say, again, it's not one policy implemented on a particular year in the U.S., it's a family of approaches that look at this problem.

Then we have the question: What's the existing evidence? And the answer here is -- this, we were criticized in the comments and we've looked at 50 papers, and we'll hand the task force the memo outlining -- the draft memo outlining these. And we'll include these in the final reports either today or tomorrow. I mean, not the final report, the memo.

We looked at 50 papers, 14 on penetration. We found six of them had open access had positive effects, two had negative effects, six had both positive negatives. Four of the ones that we looked at had either old data or, in one case, the methods were problematic.

There were 21 papers on investment. We used the (inaudible) as the basis. We added another -- this is the brand new, most recent

literature review that came out in telecoms policy.

Again, we analyzed them. We'll offer all of this. It's about a 50-page addition to the report. Two positive, one positive, one negative, two no-findings, one negative. Fifteen are either empirical or conceptual, or they have real flaws. I'm not stacking the deck. They're about equally divided between the two sides, but they're problematic.

Another few things. Why is this happening? It's happening because there are two many factors -- demography and geography, local market conditions, regulatory decisions and strategic behavior.

Effective regulation, not just formal, is what we're looking for. There are financial market effects. There are regional diversity, there time diffusion effects. Too few observable observations to account.

What is need is much more micro-level analysis, single country -- even more locally.

Natural experiments.

There are a few papers in the last couple of years that have been trying to do it at that level. But otherwise, you have a large risk of overstating the result, of missing influential points, of masking anecdotes as evidence. It's a real problem.

We also looked at 15 qualitative studies, looking at single-country or multi-country. Eight of these were positive, one negative, one positive and negative, and five had "no effect."

Important to remember: 20 of the 35 quantitative papers were self-published. It doesn't mean you don't read them on their merits, but they don't have that particular layer of constraint.

Sixteen of the 35 quantitative papers were industry sponsored. Two-thirds of the papers on investments were industry sponsored. It doesn't mean you don't look at the evidence. Of course you do. It just means you have to read it

with a caution.

So what's the evidence? Qualitative case studies that look in detail at what, in fact, happened in different countries and different markets to different countries, other regulators' experience that says this was important, it helped us, and an econometric literature that is largely ambiguous.

So the last couple of minutes, what's the transposition of open access to next-generation connectivity?

First, you see access rules and their transposition, their translation, being important to next- generation networks in other countries, in terms of their planning.

Critical, you see that the high cost of rolling out next-generation is pushing both countries and companies to find ways to share costs so that the price of entry into the market doesn't have to be being able to have backhoes all the way to the home and the slow moving expensive elements. And muting, to some extent, the

emphasis of the benefits of having redundant facilities as a hedge against regulatory failure if you had the monopoly. The tradeoff essentially is between market failure in a necessarily concentrated market versus risks of regulatory failure with a monopoly infrastructure.

There is a range of approaches currently, ranging from very aggressively regulatory to very cooperative that needs to be seen within this toolbox. There's open-access transposed. People are looking whether there should be incumbent-only duties or symmetric duties, whether you look at the size of the cabinet in fiber-to-the-node implementations. How you do it exactly in transposition, where you require active or only passive and how it's done, those need to be studied.

Functional separation, surprisingly enough, after the UK implemented it in late 2005, had very powerful results on the price competition side. Now it's diffused, either in formal or in semi-cooperative form to six other countries in

the OECD.

We're seeing more voluntary and raised-eyebrow voluntary arrangements, like the KPN-Reggefiber arrangement in the Netherlands, like voluntary sharing and deployment, very interesting -- SwissCom essentially saying I'll roll four fibers in my regions, you roll four fibers in your regions, we'll flip, and then we'll compete in both of these markets, rather than having the government regulate us. Very interesting. And all of these, I think, need to be brought in.

There's new openness to government investment. If there's government money, there has to be open access. There are new models of market-viable public-private partnership that absorb some of the risk, but nonetheless are market-based.

To conclude, there is a lot of experimentation and experience going on around the world. It's important to learn from it.

U.S. performance, overall, on all of

these measures, is not the kind of level that we can say whatever others are doing, we're clearly doing better. We're doing okay. We're not doing better.

What we need to understand, that the transition to next generations is a transformative moment. We're looking at infrastructure that will be put in place for decades. What we do now will set the basic market structure of next- generation connectivity.

And the basic question we have to ask ourselves is: Is a market where the price of entry is backhoes all the way, trenches and PVC, are we going to get a competitive market? Is two enough? Or do we need to experiment with one of these ways to get the three or four or five -- something more than that?

And there does seem to be, as we look at the things carefully, a role for well-designed policy.

Thank you.

MR. WALLSTEN: Thank you very much. So

before we go on, just let me say after the discussants, we will take questions. And for people who are watching online, please do submit your questions because we'll try to ask some of them.

So the first discussant is Tom Hazlett, who is professor of law and economics at George Mason, and is also director of the Information Economy Project there.

Tom.

MR. HAZLETT: I fear, Yochai, if folks did not have 100 megabit per second connection they may have missed some of that. That was a very impressive summary.

And I've been asked to comment on the Berkman Center study, and I've got just a few minutes. I'm happy to comment. This is not going to be a top-to-bottom review. And I, in fact, have conducted no such top-to-bottom review. But I am happy to share a few things here.

Could we --

MR. WALLSTEN: Oh, yes. I'm sorry.

MR. HAZLETT: I guess this goes that way. So, I pick out three areas to discuss, because this is Washington, D.C., and you need three areas. So every talk has to have three. You know that, that's the rule.

So there are some economic and econometric issues that are right there in the paper. I did not read it with, I guess, the same conclusion jumping out at me that Yochai did, to put it mildly. And, in fact, I think that the econometric issues are quite severe, and I invite folks to read the record the FCC has opened up and maybe that will keep expanding as comments come through.

But, in fact, there are very large problems with spurious correlation from omitted variables and when, in fact, the data samples that are used are expanded the results vanish or reverse. And this is important. This is robustness checks that are absolutely standard. And particularly in an important proceeding, with the important conclusions that are being reached,

we don't need a point estimate that ignores alternative methods of analyzing the data. We certainly need confidence intervals, and that includes a lot of commentary from other parties.

Now one thing that's very important to note is that the paper does -- as has been presented, I think correctly -- talk about this relationship between broadband penetration and some sociological variables, but does not really take into account demand. There are, I think, income variables considered. But markets are structured such that demand is important. And when we're looking at how much and how fast the broadband products are in the United States versus other countries, you do want to take into account the fact that, for example, we have a lot of -- a relative lot of -- a relatively high degree of dial-up service in the United States due to our unmetered local usage. We could eliminate the 8 million dial-up customers by metering local usage like most other countries in the sample and get somewhere close to 8 million new broadband

subscribers. And that would, in fact, jump us up so our performance was better. But it turns out that the dial-up is a cheap and easy substitute for some part of the market, declining as it is.

We also have fairly unique circumstances in Canada and the United States who seem to do very poorly in these comparisons, because we have very successfully opened up competition to terrestrial broadcasters. And we have an enormous amount of programming, video programming, that goes to households through cable and satellite. That, all else equal, would tend to lower demand for high-bandwidth products in the broadband space, one would think. And so that really has to be considered. I didn't see that it was.

I would just touch on the fact that I think -- I certainly agree when Yochai says that we want to have the facts go first and then the interpretation after. It is very distressing that within the econometric model, the data that's used to run that is, in fact, adjusted such that data that has been long considered part of the

broadband regulation landscape and, in fact, has been reported for years by the OECD and other sources used by the Berkman Center study, is just reversed. So you end up with South Korea becoming a country that, in fact, has unbundled since 1997; in fact, that's been reported as beginning an unbundling regime in 2002. And the United States is counted as a country that is not unbundled, even though the United States as considered to be a very vigorous pursuer -- in fact, an international leader -- on the unbundling frontier early on.

So those are just a few little things that I think people should consider and get a wide view of the universe here. Because, in fact, the facts do matter and it is good to get those facts right.

Here's one little experiment that I ran -- well, here are couple of other things that I'm going to mention here, then -- if this works.

Is this this way or that way? What do you think? This way? That way. It's sleeping.

Okay. Well, we don't have to do PowerPoint. I'm in a 12-step program, so I'll be able to not do PowerPoint soon, but I'm still grasping at the button here.

There it is. There we go. So I wanted to mention just briefly this issue about the horse race. That's something I do agree with the Berkman Center report on. And then I'm going to talk a little bit about the U.S. experience, and then I'll be cut off and thrown out of the room.

So -- grasping at electronic devices. Okay, so as an experiment, a very simple experiment, a couple of months ago, I decided to find out where the U.S. ranked in international broadband penetration. And I went online to get the first sources for -- the first reputable sources I could find to show me what the answer was.

And for theoretical reasons, I used the per 100 households. It's certainly theoretically the correct measure to use. I don't know why the OECD or Berman want to bother with the other.

There are a lot of other problems, as has just been mentioned, that are problematic to the data, but that doesn't mean you can't get that right. Theoretically you want to use households as the measure.

So at any rate, I want to do per 100 households, and I wanted to rank 5 top countries, because the U.S. does have a peer group -- countries like the UK, Germany, France, and England -- well, I counted England twice -- Japan. And so in that group, how does the U.S. do?

Well, it turns out if you use data from Point Topic for the most recent quarter, and you use some CIA data on households -- excuse me, on population, and UN data on households -- average size of households, the United States comes out first in its peer group. And this was not adjusted for a multiple -- you could accuse me of laziness. I took the first data from Point Topic, which is a reputable source used by Berkman and others. But the fact is that the countries are fairly well clustered and this is the way those

data come out. So maybe in some of the correlations run by Berkman you don't see a big difference. Maybe here it's more of a difference. I don't know.

The point of this is not to say that the U.S. Leads the world, and it's not to say the U.S. doesn't have any policy issues that need very much to be adjusted by information gleaned from U.S. or international markets. But it does point out how volatile these rankings are and, in fact, how you have to be very careful about using any one ranking system and jumping to conclusions about that, particularly when you're cutting out demand factors and other things mentioned.

Anyway, I wanted to just jump to the U.S. Experience here. And the Berkman Center study can say, well, you know, we were supposed to look elsewhere and so we didn't look much at the U.S.

But, in fact, many markets are described and, indeed, the details are taken from what's happening in those markets, and the U.S. market as

characterized as not having much of an unbundling policy and dismissed. But the interesting thing about that is the fact that we've had a very rich mix of policies in the broadband and, in fact, also in narrowband, is an opportunity for social science. You get natural experiments when you change the regulatory structure.

And so here we have some wonderful observations of what happens in terms of market reactions, right here in the U.S. market. And they're very important to take account of.

So if you start with this cable modem versus DSL competition, which typifies the broadband marketplace, the fact is that cable modem service has never been regulated through open access. But over time we have three different regimes for DSL. And, in fact, up until first quarter of 2003, there was an open-access regime, and there was activity in that market certainly.

And then in first quarter of 2003, the FCC, in a surprise vote, decided to end

line-sharing. Now, line- sharing was really the price reduction that made that market attractive in terms of open access for entrants. When that was eliminated the growth in that market for third-party use of the existing phone company structure for DSL service to retail customers collapsed.

So after that, after that you go to this less- regulated environment for a couple of years. And then on top of that, in the middle of 2005, the FCC decided to declare the DSL networks to be information services, and that put them in parity, in a deregulated environment, with the cable modem services.

So if we go to the videotape, we have three periods to look at. In the first period when, in fact, cable is regulated with open access and DSL is -- excuse me, cable is not regulated in any of these periods. DSL is regulated with open access -- you get about a 2-to-1 lead in subscribership all through that period. Here in '99 through 2002 data the cable modem

subscribership is in black, DSL in red.

And then, when you eliminate the line-sharing pricing, very favorable pricing structure for entry in the market -- by the way, I should say that there was causality asserted by the FCC. It's important -- and this will be in my written comments -- but the FCC did say specifically we're not going to impose open access because we want these networks to get built. So there was causality asserted there in terms of cable doing well because of a lack of regulation.

Now, when you eliminate the line-sharing regulation on DSL, you can see that the red line after the vertical regime shift, the vertical line denoting the regime shift, starts kicking up very significantly from trend. And, indeed, cable modem subscribership continues to grow at about the same place -- it actually picks up slightly.

But the real uptick is in DSL growth. And that's noticeable after the end of line-sharing.

Now, you go all the way through this

period, you actually get, by the end of 2006, a 65 percent increase in trend for the DSL subscriberships. That means in year-end 2006, you had 10 million more -- you had about 25 million DSL subscribers from a predicted level of 15 million DSL subscribers predicted by the extrapolation of the pre- deregulation trend. And that includes both deregulation periods. There actually is a bit of an incremental uptick for the second part, but I won't show the data here. The data here encompass both deregulatory periods.

So this is actually quite interesting, that indeed there was a very positive reaction in terms of subscribership to the end of open access regulation. And it's extremely important, I think, to take a look at this.

So this is just the same numbers. Now, the last part here is that to get fiber, the really -- the next-generation network out there to the home -- I don't think there's any real doubt that the investment will not, in this structure, in this institutional structure, be made without

what the FCC did, very explicitly, in October of 2004, and that is preempt unbundling obligations for fiber networks. That's when we got the kick-up in fiber to the home.

Now, the causality is also asserted by analysts in the market. This is a projection of fiber optic equipment sales rendered in late 2004 by Gartner Group that looks at the market and actually adjusted the new forecast outwards, explicitly on the grounds that the FCC had preempted regulation through open access rules of the fiber networks.

This is extremely important to take into account. It is data that goes right to the heart of what happens in this institutional environment, and should be included by the FCC, certainly, in its deliberations as to what policies are rational, reasonable and pro-consumer going forward.

MR. WALLSTEN: So, next we'll have Harold Feld, who is legal director of Public Knowledge.

MR. FELD: I just -- since I'm looking at a smaller screen here I just want to check,- that last slide was actually a projection about fiber-to-the-curb, not fiber-to-the-home, right? "Fiber to the node," I think that was --

MR. HAZLETT: (inaudible) fiber to the node (inaudible) DSL (inaudible).

MR. FELD: Right. Well, I just wanted to make sure we were comparing things.

The second to the last slide was, I thought, a measurement of fiber to the home projection, and the last slide, which was the investment causality slide was actually projecting a growth of -- is that --

MR. HAZLETT: The last one was FTTH.

MR. FELD: That one's FTTH, right?

MR. HAZLETT: Yes.

MR. FELD: And then one after that, that was the Gartner project, says -- I think it says, "Fiber to the curb node equipment."

MR. HAZLETT: No, no. Well, that's "equipment."

MR. FELD: Right. Okay. I just -- which, to some degree, serves as a segue to what I want to talk about, which is my name is Harold Feld. I'm not an economist. I'm not a technologist. Among lawyers, I try to pass for ones. So I will not try to dispute with either Tom or Yochai on the merits of the analysis. I do, however -- would point out, one, Public Knowledge, we actually filed written comments in response to the Public Notice, where we thought, for the reasons stated therein, that this report was an extremely valuable piece of work; that we supported its conclusions; that these conclusions seem to be consistent with other information which we've cited; and that we thought the FCC had the legal authority to proceed to restore an unbundling regime under its existing authority without any further act of Congress, although we recognize that the D.C. Circuit may not agree.

That said, I would like to talk instead about how I think the FCC ought to be dealing with this report, and what role it should play in the

record and recommendations, and what I would hope that the FCC will do and continue to do.

First, I would hope that we would all agree -- whether you agree with the conclusions or not -- that this was an enormous piece of work; that it adds tremendously to the available data; that they conducted meaningful comparisons, even if one thinks they are flawed or believes that there are other comparisons that could be drawn that would be more telling.

And, most importantly, it has provided a point of reference in what was previously an intractable problem. We will remember, for years we have argued not just about the OECD rankings, but every other set of rankings that has ever come out, and we were proceeding without any sort of common frame of reference or common understanding of what we were doing.

Love the report, hate the report, you know, think they used the wrong terms -- at least we have a significant document which has undertaken to try to provide a framework in which

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some intelligent discussions around this issue can occur.

Obviously, there will be disagreements. I think that's to be expected and it's very appropriate. No study can be comprehensive. The data are often subject to multiple interpretation. The question of correlation and causation is oftentimes difficult and needs to be tested through multiple trials. And we should all recognize that.

I don't think this report claims -- and, certainly, Yochai in his summary made clear, he's not claiming that this report is more than it is. But at the same time, I think it's important that we approach this in the spirit of appropriate inquiry, and not as, unfortunately, some -- not Tom, but some have -- with an attitude of either dismissiveness or, sadly, of ad hominem. I think that it is not at all helpful to cast aspersions on the motivations of researchers any more than I find it helpful, when I am arguing against incumbents, to make an argument solely based on

the fact that incumbents obviously file stuff that is going to further their own economic interests. You still have to respond to the merits.

And I would certainly hope that we are all capable to do that here. Further, that even if there is some aspect of the report in which the FCC conclude the analysis was not what it should be, or is not telling, or whatever, that certainly does not invalidate the rest of the report.

Each of the aspects that are raised here for comparison need to be evaluated on their merits and the evidence presented.

Which brings me to my next point which is, I mentioned earlier, the evidence available, especially at a public level, is imperfect. It is dynamic. It is changing. And, most of all, we are limited by the protection of proprietary data especially in this country. The FCC in particular has been extraordinary solicitous of the need to protect carrier data, and this raises problems for a number of us. But I would urge the FCC, to the extent that objections are raised, to compel data

where necessary to test the underlying assumptions here.

You have that authority. This is too important to rely on unverified assertions when actual data can be obtained by the FCC through its legal processes and through appropriate inquiries.

Ideally, that information should be made as public as possible. Obviously that's not going to be possible for all data. And given the amount of time that is available to test these I would reluctantly concede that erring on the side of, you know, setting up procedures by which proprietary data could be accessed under protective orders may be more necessary here simply to expedite the process.

But again, if we are to test the underlying validity of these things -- to test the investment assumptions, to test the expenditures -- then we must have real data. In point of fact, you must have real data and you should not shy away from using your power to compel, particularly where objections have been raised by carriers who

have full possession of the data and who choose to submit data which is supportive of their arguments, but do not necessarily submit data which is less supportive of their arguments.

I would say that in evaluating this study and the evidence presented by all parties, what is important to remember always is that policy is tradeoffs. I think that the report does a good job of highlighting some of these. I think some of the objections that may be raised to the report and its potential impacts are very likely to have some validity, in terms of what impacts there might be on deployment. But it is important for us to keep in mind that there are tradeoffs, just as there have been tradeoffs to the adoption of the exiting regulatory regime.

And here is where I will disagree to some degree with Tom, and say that in evaluating our own experience with clear eyes, it is important to observe that we have expanded investment, certainly. There has been investment. There has been greater adoption. But it has not

been uniform. And it has not been properly measured and validated, which has led to the mandate to create a more accurate national broadband map.

We do have a real problem, in terms of evaluating how well our policy has worked, with the quality of the data that we have. But even with what we have, we can see certain very visible things.

Let me take the deployment of fiber to the home as an example. The single biggest investment in fiber to the home is Verizon's FiOS. And certainly Verizon gets credit for doing this. They did it in the face of punishing stock devaluation by Wall Street analysts who were looking to the next quarter rather than to five years out. It's only now that their investment is being validated. This has had positive effects in requiring the rollout of Doxis 3, pushing Cablevision to provide both WiFi coverage in its footprint to retain customers, to switch to an all-digital system. All of these are, indeed,

positive aspects of competition in the largest, most dense markets in the United States.

Once you move out from the I-95 corridor or, on the West Coast, from the concentrated urban areas, the situation changes dramatically. Verizon has, in fact, shed 10 million lines in order to avoid providing them with fiber and to ensure that it has an appropriate rate of return. And it has stated that the last 10 million customers who are not getting FiOS service are not going to get the fiber to the home service, that they will continue to rely on DSL to service those customers.

So our reliance on intermodal rather than intermodal competition has had consequences and costs, particularly for those who live in urban, rural areas. Furthermore, the franchising system for cable and how that works likewise accentuates it, because cable, while they have been required to serve everybody in their franchise area, their franchise areas for the largest cable operators have included the largest

and most dense population centers. They have left the provision of less-densely populated area to smaller providers who do not have the same resources, who are struggling. And therefore, in our rural areas, our policy of "let the market sort it out," don't require any sort of competitive requirements, has had a consequence.

Now, would that consequence have been changed by unbundling? I think that's a very good question.

But the report does not claim that. The report claims -- and this is the next most important point -- that you use that strategy in synergy with others, and that the companies that have overcome the urban-rural gap and have been most successful about it have used, you know, direct government subsidy and direct government ownership of networks in some cases, and other strategies that have addressed this in a very clear fashion.

The final point I would make is that open access and competition, while very important

and, we think, you know, convey a great deal of benefit, do not resolve all issues. There will still be a need for consumer protection regulations, disclosure regulations. We feel network neutrality or some other sort of, you know, common-carrier obligation somewhere in the system that ensures that carriers receive, you know, our -- that the critical position that a carrier occupies with regard to its residential customer is noted and protected against as we have in the telephone network, and as we have to some degree with the cable network.

And therefore, in evaluating this report, it is important to recognize that even if, as I hope, the FCC adopts its pro-competitive recommendations with regard to unbundling and some of the other solutions here, it does not lose sight of its consumer protection mandate, either as part of the National Broadband Plan, or as part of its general oversight of the broadband sector.

MR. WALLSTEN: Thanks, Harold. We need to go to questions, but before we do, Yochai, do

you want to take a few minutes to respond?

MR. BENKLER: Thank you. So I'll just actually say a couple of words so that people have a chance to talk. On the question of the econometrics that's drawn so much heat, I think what's important to understand is -- we said it several times in the report -- we were not using the econometrics to prove a point, we were using it as a heuristic to explain some of the systematic problems with these cross-country studies. We focused on influential points, we focused on formal versus effective regulation.

What we do now with the more formal literature review that analyzes all of these problems is try to provide a more systematic so that we don't confuse this question of are we saying this is the reason to do it as opposed to not.

There's a real problem with econometrics more generally. There are real values to qualitative study. That's what we need to focus.

If you look, for example, at the points

Tom was making, so that exhibits two of the problems with the data, for example. So you look at the DSL curve, and that looks impressive. But then you note, you think about time- diffusion effects and S-curve of adoption, and you see that DSL gets adopted later than cable, how do you account for S-curve effects in terms of rate of when this is happening?

If you look at the question of strategic withholding of investment in the context of a regulatory negotiation, that's part of the problem of how you account, right? That's part of the problem, that's what makes econometrics in this area so hard. There are so many variables that go into it that are very hard to characterize and harder yet to use with so few points of data. So this is not anything particular, this is something that's systematic to the genre.

The second thing is the point -- and, again, this is important -- the point about Gartner.

So what's the datum? He datum is that a

particular firm changed its projection based on its assumptions on what companies would do given their response and investments to an understanding of a regulatory environment and how that would effect. How much of that is genuine straight incentives? How much of that is projection and reflection of a certain set of beliefs? That's very hard to tell.

And the last point, people keep saying this about all of the massive growth in fiber as somehow being an evidence about the regulation. It's important to understand, fiber to the home in the U.S. -- and I'm not going, Harold, where you went about Verizon not doing it.

Fiber to the home in the U.S. is Verizon, right? It's 3.3 million homes as of the last relevant data that we have from Key One 2009. It's Verizon. If you're asking regulatory environment or competitive environment, the question, if you're genuinely trying to treat this as data is: Why not AT&T? Why not Qwest? Why not Bell Canada? Why not TELUS? Companies that

are in the same regulatory environment or in a regulatory environment that is somewhat unbundling but very, very weak, but in the same cable telco competition, who haven't chosen to make that particular choice.

It's an interesting case study, it's an interesting thing to point: What's interesting about this firm that's doing something that we care about and think is wonderful? It's not data about fiber to the home in the U.S. versus other countries. It's an interesting case study, if it's not said as said as such, it's an anecdote.

MR. WALLSTEN: All right. Let's go to questions. Okay, Dave first, and then we'll go there second.

SPEAKER: (inaudible) the data we're looking at is so bad and so unrelated to the (inaudible) you want to answer (inaudible).

And I've read Yochai's study. It's pretty clear that unbundling worked pretty nicely in some places in (inaudible), right. But we're trying to figure out what to do in 2011.

And in 2011, my gut -- and this is what I want to ask you about -- is, really, all of these studies are essentially (inaudible) problem that we have (inaudible) -- that once you get to a certain size and scale, so now it's 65 percent (inaudible), it's particularly unlikely that a new entrant (inaudible) customers (inaudible).

MR. BENKLER: Do you want --

SPEAKER: Yes, sure.

MR. BENKLER: So I'm going to do my best not to go beyond what I actually have done here rather than talking about other kinds of policies.

I think that one of the interesting entry strategies -- assuming -- so there are a couple of -- first of all, I'm not sure that I buy the assumption that if the costs for an entrant are not including the back hoes, that it's the same barrier --

SPEAKER: (inaudible)

MR. BENKLER: The primary model that we've seen, particularly as there's been more consolidation of entrants, is incumbents from one

country moving into a neighboring country. So if you look --

SPEAKER: (inaudible)

MR. BENKLER: Well, you said how do I project from my --

SPEAKER: (inaudible) sold out in France and Germany. (inaudible) and there's no cross-border entry interest in Europe in the last three years.

MR. BENKLER: I would say that Telenor in Denmark and Sweden is very interesting and growing.

SPEAKER: (inaudible) that one, I don't know.

MR. BENKLER: I would say that still interesting and out, not clear what's happening with FastWeb in Italy, but that's hard, more generally, because of the regionalization to identify. They've already done a lot in the areas that they care about.

If you try to abstract one layer up, the basic question then becomes what sort of framework

do you set up to allow the existing incumbents that are very regionalized and have the basis and the knowledge to enter each others' markets through open access.

MR. FELD: (inaudible) I'd like to take a crack at that for a minute. Because it seems to me that you're -- part of the problem with the question, and I think it is a good question, that is to say, but there are two elements to this question. One is a question of facilities-based entry, and the other is a question of if you did functional and structural separation, would you get the resale non- facilities-based competition in which there is --

SPEAKER: (inaudible)

MR. FELD: I'm sorry?

SPEAKER: (inaudible) may be there. But what I'm trying to get to the question is: If --

SPEAKER: Could you speak into a microphone, please?

SPEAKER: (inaudible) -- that it's not likely to have new entries.

MR. FELD: But this is what I'm saying, is I'm saying you -- the question is what do you mean by a "new entrant?" And what you -- it seemed to be that what you were defining a new entrant as was somebody who comes in and overbuilds.

SPEAKER: (inaudible) No. No, no, no. It's now more expensive to do customer acquisition than build --

MR. FELD: Right. This is the --

SPEAKER: (inaudible) I need $500 million to start a new entry in the U.S., and everybody on Wall Street tells me nobody would ever fund it.

MR. FELD: Right.

SPEAKER: That's the issue.

MR. FELD: This is, indeed, part of the question. I mean, this is, to some degree, is switching (inaudible). We faced this is in the cable marketplace. To a certain degree we faced it when we did long-distance competition. And we started in a fairly mature market, where everybody

subscribed to AT&T long distance. And there was an incredible acquisition cost. And it took many years for AT&T to drop down to below dominance level in long-distance residential.

The experience of these providers, it seems to me, is somewhat multifold and needs to be evaluated.

One is the question of is there value in having presence in the market, even if one company is still going to have dominant market share? This was one of the economic models that Yochai referred to as one of the emerging ones. This is the neo-Schumpeterian, you know, little incumbents badgering the giant so that -- take France, for example, where France Telecom's ISP service still has a tremendous market share.

The question is, do you do things to try to minimize the switching cost to facilitate switch? Do you say that, well, you know, there aren't a lot of little guys, but that's making France Telecom behave in a particular way that is valuable to have the regime in place, even if

they're not, you know, gathering a lot of customers? Or do you give up on it?

I think the answer is that your question is a complicated one that is not answered easily by either the pre-2005 factors or the post-2005 factors.

Finally, I'd have to say that, you know, in this country we still have a significant problem with -- what, we've got 60 percent adoption at the moment?

SPEAKER: (inaudible) it's somewhere around 65. It's not going to go up because you have wireless substitution.

MR. FELD: Well, you know, again, there's a parallel here to what was the cable market like in 1992? And, you know, we can ask the question of whether it was worthwhile to do things to create the possibility of DBS entry into the market, and whether that's been successful or not.

But much as I think the story in cable is also very complex, you can't deny that in 1992,

we had 60, 65 percent cable penetration in the country and no DBS providers. And today we have, I don't know what we're given for the market penetration of total MVPDs, but we have DBS providers who have at least reasonable shares of the MVPD market. So a new entrant survived in that environment.

So at least in other sectors of the economy where there were similar issues at play, at least enough, there is at least something there to give some confidence that it is possible for new entrants to emerge.

SPEAKER: (inaudible)

MR. WALLSTEN: Wait, let's get Tom. Tom wants --

MR. FELD: That's part of the question to answer.

MR. WALLSTEN: And then we'll go to more questions.

MR. HAZLETT: Yes, I did want to give a quick answer.

Just -- look, before you get the new

entrant it always looks impossible. And I know you've done this for awhile.

In 1987, I was sitting at a conference at the University of California at Santa Barbara, and we were talking about the possibility of cable TV competition. And the coup de grace question, the rhetorical question was: And so I suppose you think phone companies could compete?

That was 22 years ago, okay? Today there is facilities-based competition in the United States for fixed- line phone service.

Well, you know, lower your expectations for a minute. Twenty-two years was that entire transition, basically. Where did it come from? Existing networks went intermodal on each other.

And, of course, we look around -- in fact, if you read the Berkman report, you are thinking about things like, you know, apartment ownership in densely populated areas. You know, this has worked pretty well in places like Japan and Korea, so that you can get more contracting and investment perhaps. You know, and the Swedish

model, you know, sort of comes in there in a funny way, as well. The power companies have been very, very helpful in some areas with their own fiber networks and so forth.

And so you think about where that can come from, the obvious place it can come from is what you just said: Wireless substitution.

So we really should be, at all times -- no matter what 2011's going to look like or not look like, we should be figuring out the barriers to entry there that are currently in place, particularly in spectrum where it's so obvious that there are constraints on the market because we control the flow of the input for, you know, radio spectrum rights through the FCC. That stuff should be out in the marketplace in a very abundant way so we can get that competition without the constraints.

And then you'll be surprised, wherever it comes from. But it will come from somewhere.

MR. WALLSTEN: Okay. So the question there, and then we'll take a second question

before we do answers.

MS. HELLERSTEIN: Judith Hellerstein, Hellerstein Associates.

While I loved your report on the open-access requirements and on regulatory reform, I was left wondering why you only concerned yourself with OECD countries, and why not look at some, like Singapore, who have really been leading in broadband and have integrated broadband access in all levels of the government, from education, medicine, to mobile government to also have gotten a lot of other new ventures who spread out from the government's involvement in broadband.

And I thought that we could see a lot of new best practices and new ways to adopt their methodology into our studies.

MR. WALLSTEN: And a question right there?

MR. CHAFFEE: I've actually been in telecom since 1982. So if you see the gray hairs, that's where these have come from.

SPEAKER: (inaudible)

MR. CHAFFEE: It would seem as though a U.S. Broadband plan could be simplified for our unserved population by opening up fiber that has already been installed by another carrier.

From what you know, would other nations open up such fiber for the sake of the broader population because of the savings in the overall cost and the access that would be provided by doing so?

MR. BENKLER: So, two answers, and I'll try to be very brief so as to make sure that there's time for others if they want to, as well as others here on the panel.

We looked at the OECD because these are, broadly speaking, the most comparable countries that have a period of data that's collected in a serious way that you can look at. So in the country case studies, for example, we didn't look at Iceland, because Iceland is just too different.

Singapore, in that regard, given the political economy, given the regulatory frame, given the density, I would be very wary about

trying to draw conclusions from a country with the political and geographic characteristics of Singapore for a country like the U.S.

And the OECD, there are a good number of countries that are plausible -- some closer, some less close -- and interesting, and there's good consistent longer-term, a little bit, data. And good public records, and relatively enough things to look at to get a sense of what's going on.

So that's really the reason of trying to do that. That was just a choice to try to get better quality data.

The question of fiber for unserved areas -- mostly what you're getting -- so there are several answers. Let me try to be brief. It's hard. As you can tell, perhaps, from the report or from the memo, I tend to go on. But there's lots of details to look at, so it's worth it, often.

First of all, most of the countries that have done serious planning have essentially a two-tier target. They're looking to 2 megabits

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per person throughout the population -- in the UK, for example -- and then they say -- and to some large portion of the population, we'd like something that really is tomorrow's speeds. Some places are more ambitious because they come from places where they can get more. So it might be 10 megabits as opposed to 100. But that's the first thing, is you can't think of one policy for everything. You can. People do.

It's not uncommon to say we want, really, two things. We want all the population to have really good connectivity. And then we want as much as is feasible of the population to have cutting-edge, next-generation, the thing that will drive the best applications and the economy. And in that regard, most of the thought in fiber is in that second bucket rather than immediately going into the first in the current area.

The second is, very interesting, the European Union just came out with new guidelines a couple of months ago -- actually, as we were just finishing the report -- on state aid. That is to

say -- and it's important to remember, the EU, because they're set up very much as a way of avoiding some countries that have a history of helping their companies against competitors from other countries, are very strict about state aid. They don't want countries to invest a lot, because they worry about benefitting; they nonetheless went there.

And they went there for unserved areas. Very interesting definition, by the way, of "unserved areas." "Unserved," for purposes of high-speed, could be if you don't have two facilities-based competitors offering 28 megabits per second, with real plans for deployment within the next 2, 3, 4 years or something like that. I can't remember the exact number. That's a very different view of what we think of "unserved."

The second thing is, they've basically said if you do have state aid for those areas, it's got to be open access.

And so in that regard, those are the most relevant things for us to learn and take from

here, is what's the conception of "unserved," in regard to what kind of competitive market counts as unserved. And how widely accepted open access is that it's considered to be within the state aid.

MR. WALLSTEN: Okay. Well, we're completely -- we're into negative time, unfortunately, even though we started late.

So please join me in thanking the panelists for speaking, and for the Berkman Center report.

Thank you.

(Recess)

MR. KOUTSKY: Are we good? Okay. Okay, I'll start the second panel of the day.

My name is Tom Koutsky. I'm with the Omnibus Broadband Initiative at the FCC. I'm seated here with Thor Kendall, who also works with me on the deployment team.

And we have the pleasure of welcoming Bob Atkinson and Ivy Schultz of the Columbia Institute of Tele- Information, who have put

together a study, also at the request of the FCC, related to the broadband deployment and investment plans of broadband service providers.

They were actually requested to provide us expert information and advice with regard to either publicly state plans, or what other types of plans they could kind of dig up. Hopefully, they can give us an indication of their methodology on that, in terms of letting us know where broadband is today, where we expect it to be in the reasonably near-term future.

And it is actually -- the report, "Broadband in America," was posted a couple weeks ago on the FCC website and received a number of comments. And I think, based on the prior discussion, where we noticed that there was a fair amount of disagreement about the results of the findings, this is actually a study where I think a lot of people found lots of reasons to agree, in the comments, but sometimes for different reasons they were agreeing. That's just one way of thinking about how FCC proceedings go sometimes.

Bob Atkinson is actually an FCC veteran, and a veteran of the telecommunications industry for several years. He has been with the -- he served a Columbia Institute for Tele-Information since 2000. And prior to that, he was in this chair, basically s deputy chief of the FCC, what was then called the Common Carrier Bureau. And before then, like I said, he worked for a number of telecommunications companies and, in fact, some of the original competitive entrants, TelePort Communications Group, principally.

The study co-author, Ivy Schultz, is the research manager at the Columbia Institute for Tele-Information. And she worked the research assistants and the directors on a number of the projects, including the "Broadband for America" report. She received a master's degree from Georgetown University, so she's basically revisiting Washington, D.C., again.

And to comment on the report we have Lee Rainie -- we're fortunate to have Lee Rainie -- who's the director of the Pew Internet and the

American Life Project, which is a nonprofit. And he has had that position since December of 2009 -- or he's had -- I'm not sure how long he's had that position, but since 1999, the Pew Center has examined how people use the Internet, and how that affects their families, communities, health care, education, civic and political life and workplaces.

Lee is a prolific author, and actually is a very important and a very significant independent voice on telecommunications and broadband adoption, on use policies, in the United States. So we're very fortunate to have Lee here.

So I will turn it over to Bob and Ivy to give a presentation on their findings.

MR. ATKINSON: Thank you, Tom. First of all, sort of a disclaimer. CITI itself as an institution doesn't "author" reports or papers. So Ivy and I are the authors. We are responsible for it.

Ivy and her team of researchers did all the hard work, in terms of gathering the data.

And so all the good data she gets credit for. All the mistakes in interpretation, I'll take -- where there are mistakes. And if there are mistakes which, inevitably there will be, or errors or incomplete information -- one of the things we've always said in any communications we've made on this project is please send us better information. And I think, hopefully, one of the purposes of this kind of report is to smoke out better information.

So to the extent that any company, any trade association, et cetera, has better information, give us and give the FCC that better information. And we actually have some experience of companies' giving us better information that Ivy will mention.

But if you have better information, here in the room or on the webcast, please send it to CITI-Broadband at GSB -- that's Graduate Business School -- GSB.Columbia.edu. And I think more and better information is always better, and I look forward to seeing that.

Let me, in fact, turn it over to Ivy so she can explain our methodology and how we got all the good information.

MS. SCHULTZ: Thank you, Bob. And thank you for the opportunity to present here today.

I'd also like to acknowledge some of the research team. We had a lot of help from a lot of people, but specifically Max Muller, Chris Scheubel, and Harry Siebenweiber were key researchers in our efforts.

And I'd like to start with a summary of the tasks that the FCC requested. We had three main tasks, which became the three sections of our report.

The first was a listing of all the publicly- announced broadband plans. And I'll show an example of that in a few slides.

The second was a comparison. And here we were asked to look at what was announced and compare it to the performance of the broadband deployment.

And, finally, we were asked to make a

future projection summarizing the investment analysts' forecasts.

Next I'll talk about the data sources that we consulted.

We had, for the first two sections, mostly company data as a main source. And this includes quarterly reports, annual reports and company press releases.

For the third section, which was a future prediction, we relied mostly on analysts' reports and record research reports.

We also made a choice not to use data already submitted to the FCC. And in the case where the data is similar, it validates both. And in the case where we have disparate data, it demonstrates the need, or signals the need for further analysis.

And this is a list of the broadband plans that we reviewed. There are 33 companies listed here. And the last three, or last four or so, are industry associations, which provided a way for us to get aggregated data of the smaller

companies.

And this next slide is an example of a company in our appendix. The categories here are somewhat difficult to see, but we looked the announced timeline, the coverage, deployment and footprint -- the expected coverage, deployment and footprint -- the states covered, the capital expenditures. The expected broadband performance, which came through as transmission speeds and, finally, the expected average revenue per user.

And once we completed the research for each category we sent a draft of this chart to the individual companies for verification. Some companies responded with additions or corrections and some did not. The example shown here is Time Warner Cable. And this is an updated submission, subsequent to our report's release.

We think that this information is useful. And if it is, indeed, we think it would be useful for the FCC to keep receiving updates from companies on their broadband plans.

In this chart we developed a way to show

the performance of a plan, compared to the announced completion date. The diamond that you see represents the project's goal, and the red shading represents a late completion, while the green shading represents early completion.

And as you can see, the companies are separated by industry, with cable at the top, followed by the wireless, wireline -- sorry, wireline, wireless, and satellite companies. And although the chart doesn't represent all of the companies or industries, there is a general observable trend that the performance varies on the type of technology project. So, for example, the cable industry's recent upgrades from Doxis 2 to Doxis 3 have been early or on time, while the deployment of entirely new infrastructures have been less like to be completed on time.

And I'll turn this back over to Bob to talk about some of the other broadband trends we found.

MR. ATKINSON: Thank you. Our report itself has 21 figures, 15 tables, and I'm not

going to go through all of them. I'm just going to try to hit some of the highlights.

And I think this chart, which shows a forecast of wired broadband subscriber growth to be one of the most important ones, because if it were flipped over would show the end of the proverbial S-curve for broadband adoption. And I think quite important, the forecast out at 2012 is that you're looking at less than 2 percent subscriber growth for wired broadband.

And presumably, if that trend continues -- and I think the analysts would say it's likely to do so -- you know, you're looking at basically little or no real growth in wired broadband.

More importantly, what's left of wired broadband -- to the right of the chart -- in subsequent years, it's the least attractive customers. It's customers in the what we are often, I guess, calling the "unserved areas." It's people who are "price sensitive," i.e., you know, they want a really low price. It's the low or slow adopters, non- adoptions, the "non-tech"

people, people who have difficulties with computers. It's -- you know, there's a whole variety of subscribers who aren't subscribing but, from a service providers point of view, they're probably not really, really attractive.

But at the same time, you see this low growth for the number of subscribers, there are other data that indicates the existing subscribers are going to be demanding ever more capacity. Morgan Stanley, in our report -- that's page 50, if you're following it in the book -- but a 360 percent growth in per-subscriber usage of broadband from 2008 to 2013. That's from less than 20 gigabits a month per subscriber to over 80 gigabits a month per subscriber.

So while you're not seeing a growth, a substantial growth, in the number of users, you're seeing very high growth in the usage per customer. And that, of course, has its implications in terms of prices, in terms of capital investment, and those two trends are, in a sense, in many cases, pulling in different directions.

So the new demand, by the way, obviously, is, you know, video induced. And that obviously seems to be the trend for broadband. Will broadband support video, and ever more video -- and even 3-D video as we look further and further ahead.

Another, I think, just sort of base line chart is, you know, a snapshot of Internet penetration of U.S. Households. And since it's measuring households, this is basically wire service. Because the other thing that becomes obvious in our report is that households are the measure for wired broadband, and "people" are the measure for wireless services, generally.

And what this chart looks at -- 2012, the last bar -- 27 percent of American households, according to this forecast, would not be using broadband, with 18 percent simply not using the Internet at all, and 9 percent still using dial-up or perhaps some fixed wireless or some other kind of things. And then you have the major suppliers, cable and broadband.

What that shows, of course -- and, you know, there are different reports that kind of show some slightly different numbers, percentage-wise, about the non-adopters, the non-broadband users. But there's still a substantial market opportunity to sell broadband services, 25 percent 27 percent. It's still a lot of additional growth available.

So the challenge for both the operators and, I guess, from government policy is how to get more people to use this existing plant.

Let me just quickly summarize the two basic points of the report. This is in there, from our Executive Summary.

At the end of the day, basic conclusions: 95 percent of U.S. homes will have access to low-speed broadband -- you know, a few megabits, 5 megabits, roughly, or more, but, you know, moderate speeds. And 90 percent will have access to 50 -- advertised speeds of 50 megabits in 2013, 2014. And a lot of that high speed is going to come fairly quickly cable Doxis 3.0, 92

percent of the homes by 2013 -- and that's a 50 megabit service, basically. Even a lot of the cable companies are doing Doxis 3.0 upgrades as we speak, and much of the country will be covered by Doxis 3.0. You know, your two largest telephone companies, AT&T and Verizon, just between them, 50 million homes, 10 megabits or better by 2011.

So, you know, in the relative near term a lot of homes are going to have pretty decent broadband availability from, in most cases, at least two suppliers, a cable company, a telephone company, nothing new.

Wireless broadband -- thinking of wireless, it's the 4G, 3G, includes WiMAX in here. Speed's getting better. We're looking at, if you believe the companies that are putting out these systems, 12 megabits is probably a reasonable number that they seem to be talking about in terms of subscriber service. But it could be less, could be more. These are shared bandwidths. But that's 94 percent of the population by 2013 -- the 94 percent being Verizon coverage. They cover --

they claim to cover 94 percent of the POPs in the country, and they claim that they will have their LTE 4G service up by the end of 2013. So that's the big picture.

And throughout our analysis, the downstream speeds are always emphasized by the service providers, because that's the nice headline number. Downstream speeds, I think, I guess, inevitably seemingly forever, are always going to be faster than the upstream speeds. Some of that's for, obviously, technology reasons. But when we listen to and think about speeds the headline is on the downstream side. Upstream is being improved, however.

So, you know, the good story -- we just heard the good news.

The bad news. You know, you get up into the 90 percent availability, that still is leaving 10 percent -- maybe 5 percent. But it's still a substantial number of households in this country are going to have an inferior choice in broadband, with "inferior" for some people meaning no choice,

and other people, a slower speed. And the choice may be satellite, whether or not satellite is fully substitutable for a wireline broadband services -- in many applications fully substitutable, in some others not. But generally, satellite service should be available, you know, over the contiguous 50 states, Puerto Rico, Alaska, I think, an Hawaii, et cetera.

The interesting thing that I got out of this, though, in a sense was, you know, the conventional wisdom often thinks of rural America as the place that has no fiber, has no broadband. And one of the things I learned doing the report was, there's actually a fair bit of -- a surprising, to me at least -- amount of fiber in rural America. That's not to say everyone in rural America has fiber. But there is a fair amount of fiber in rural America.

For example, the Tier 3 telcos, which tend to include, you know, the really small independents, telephone coops, et cetera, have over half a million fiber-to-the-home subscribers

-- page 15 of our report. And analysts who are looking at this actually are suggesting that in 2009, 2010, in this sort of down economic time, the two organizations that are going to be still doing fiber to the home are Verizon and Tier 3 telephone companies.

And then, of course, you know, I think that part of the conventional wisdom also tends to overlook WISPS -- wireless Internet service providers. And there's at least 2 million locations -- homes, I guess -- locations served by WISPS. And that's not an insignificant number.

And so while rural America, I'm sure, has less ubiquitous, less serviceable broadband than much of urban America, or well-populated America, the thing I've got out of the report so far is that there is a surprising amount of fiber in rural America, nevertheless. And I think that's a useful -- to me, an observation that I had not really focused on up until that point.

Adoption, which really is perhaps the bigger problem. Because if we're looking at 94

percent availability of good speed broadband in the relatively foreseeable future, you know the forecasts are that adoption is going to continue to lag behind the availability -- by a fairly wide margin. The numbers we have or the numbers we mashed together from a variety of sources and sort of average out to about 69 percent of the households are going to subscribe to a wired broadband service by 2015, and a little over half of the population will have a broadband wireless service by 2013.

Again, one of the things I sort of observed, a little observation going as we gathered the data and I looked at it and thought about it, I did see, you know, pricing obviously has to have an impact on adoption. And one nugget that I thought was very illustrative was Cablevision, major cable TV company in the New York metro area, and very much focused solely in the New York metro area -- it has the lowest, as far as we could tell, broadband pricing amongst the cable industry, about $37.00 a month, with the

average cable industry being in the $40- plus, mid to low 40s.

And it faces competition from Verizon's FiOS, head to head. It faces competition from RCN, a complete over- builder, offering fully, complete bundled package. And there are quite a number of other independent suppliers and competitive providers in the New York metro area. And yet, by having the lowest price, Cablevision has a 52 percent penetration for broadband of its customer base versus the, you know, 37 percent average penetration for cable as a whole. And I said, oh, they give low prices, better penetration rate, so maybe there's a correlation there.

But pricing might be a problem. One thing we point out in our report -- page 61, if you're keeping track -- analysts are actually looking at pretty stable broadband pricing. In fact, one analyst said, "2010 should represent an inflection point, with a turnaround in the price deflation we have seen." And another analyst basically saying -- looking at about a 1 percent

increase in broadband pricing over the next few years.

So you're not seeing pricing initiatives and certainly the analysts are not anticipating pricing being a driver for adoption.

So, putting what I just said into a graph, these show the curves, at least for the broadband, excuse me, wireline broadband availability and adoption. This is, again, an average of data supplied to us by a number of analysts, as a well as a number of market researchers and support. So it's largely a mathematical average. So there are some reports that have it slightly higher, some slightly lower. But all of the reports are pretty consistent in terms of the big numbers -- you know, the 60s, 70s in the percentages, and certainly in the trends.

One thing I'd point out here which drove us crazy, so I think it's worth -- you know, when the FCC looks at these numbers, particularly when they're looking at adoption and deployment, deployment is generally described as "percent of

homes in the area," total homes. Adoption, for some people, is expressed as "percent of occupied homes." But in other cases I've seen data where they use the same metric, total homes, for adoption.

This chart, we've attempted to get it down to adoption of occupied homes. There's about, from what I saw, 7 or 8 percent difference in the number of homes if you're looking at all homes or occupied homes. So it's, first of all, if you see some data inconsistencies, that would be one thing to check. But I think also it's probably -- I would recommend, you know, that "occupied homes" is the right metric, but, in any case, have a consistent metric, whichever you choose.

Wireless broadband penetration -- again, this is an average of the various analysts forecasts and from other information that we have. It doesn't include short-message service. That's not a broadband service. And it does include laptop wireless cards in the metrics.

And what you're seeing is a pretty strong growth forecast through 2013, getting up to over half the population age 14 and under. We cut it at age 14. It happened to be a population number that came, that the Census Bureau has. It didn't seem to me that, in the same way that you shouldn't really be looking at "unoccupied times" in terms of adoption, you know, three-year-olds with data services just didn't seem quite the right metric. But it's, again, something to think about in terms of how you actually -- what you measure, your denominator, numerator always make a difference.

Boy, now this is a tough subject, capex. First of all, the service suppliers themselves, the broadband network operators, for some very logical reasons, business reasons, don't give much forecast of their capital expenditures. And that's for competitive reasons, for Securities and Exchange Law reasons, in terms of future looking numbers. And also, frankly, you know, investors keep an eye on that forecast. And until the

company really knows that it's going to incur a massive capital expenditure, it probably isn't going to say much about it.

And looking ahead, you know, three or four years in this business, it's kind of hard to make really strong predictions about -- unless you're going to do something like a FiOS project, where you're literally going to be tearing out one kind of network and rebuilding, putting in a new one. Absent that kind of a mass initiative, you're probably not going to see too many forecasts.

The result of that, the reason I emphasize that is, the tendency for analysts and for investment looks at broadband or capex, telco capex, it's always going to have a tendency to be pretty flat in the out-years, unless there's some well known inflection, change, coming.

I mention that because, in fact, our forecast that we have here, which is based on, in the early years, various analysts forecasts and other data, but extrapolated, it tends to be flat.

And I will explain, I think there are some reasons why flat may not be the -- or there are things that could change where substantial growth could happen. But generally speaking, we're looking at flat numbers.

So, you know, the carriers themselves, the service providers don't -- rarely, unless they're only in the broadband business, they're multi-product enterprises, at most, they talk about their total capex, and then you have to kind of derive what is broadband capex.

Now, recently, AT&T, for example, did say that two-thirds of its capex, both wired and wireless, was for broadband. So that was an interesting data point. A market researcher that supplies market intelligence to the manufacturers of broadband equipment, and therefore provides market data and surveys, did a study, and that's the -- for telco capex for broadband, the assumptions, so the 48, 52, 54 percent, 58 percent, numbers you see in the "telco" section, the third like down, that was a market research

estimate of how telco broadband is being set out.

But all of these are, in a sense, fairly subjective, rough allocations in a multi-product line business. And these are best estimates, I think, by the analysts, and best estimates by our team on what to expect for broadband capex. And there's a whole bunch of footnotes and explanations in the text of the document. I will not summarize them. But if you're interested in actually knowing how we derived each of the numbers, I believe it's self-explanatory.

That chart, in a graphical form basically shows flat, relatively, broadband capex -- in the $30 billion a year range, though. That's not chump change. And the total capex declining, but then flattening out, declining to in the mid-50s. So the legacy, if you want to call it that, networks are not being funded. They're not growing. That makes sense. And the broadband networks are growing, are being funded.

Now, my earlier comment was that the actual numbers of subscribers for wireline

broadband isn't growing very much, but volume is. So, for example, if we go to the next chart here, which breaks down the total capex into the three industry sectors, wireline, broadband -- cable broadband, and wireless broadband -- I'm colorblind, so all I can tell you is the telco is the diamond, cable is the square, and wireless is the triangle. For those who have color, you're fortunate.

What does this show? It's another iteration of what I've basically said -- but showing wireless, which is the growth business, we saw that both wireless adoption still has a long way to go in the next few years. So there's obviously going to be a lot of wireless investment -- 3G, 4G, is coming out being -- 4G presumably is almost exclusively a broadband investment, not really a "telephone" investment. How much of 3G investment you would want to allocate between broadband and telephone might be debatable. But you see the wireless is growing because wireless capex is growing, broadband capex

is growing, because wireless broadband is a fast growing business.

Cable broadband, telco broadband, pretty flat. No new, there's no new big Verizon announcements in the telco sector. The cable industry itself has a very low capex requirement for broadband. The major -- Comcast expects to have its Doxis 3.0 project finished by the end of this year? 2010, I think. That's 50 percent of the country, right there. And the upgrade for a cable company to get up to Doxis 3.0, you know, is $15 to $30 for the network upgrade, and then another $65, roughly, for the modem at the customer premises. You know, a hundred bucks, plus or minus, for a cable upgrade. And most of that -- 92 percent of the cable industry -- is going to be fully complete by the year 2013, which is that little dip on the rest of the cable. And then after that, presumably you've got maintenance and just general upgrades and things like that for the capital.

But, but, but flatness may not. It may

turn out that the capex isn't flat. The question really is, is 50 megabits, where most users are going to be by 2015, which is sort of the end of our time horizon -- because the flatness in the forecasts could well be just the natural place in the cycle. We've invested from, you know, the 1990s and the early 2000s, billions and hundreds of billions of dollars in broadband. It was a big peak. That is a cyclical -- these things are cyclical. It comes down and it kind of flattens for a while. All these cycles flatten for a while because the investor is now trying, the organization and investors trying to reap some of the financial benefits of that investment. But then, for a variety of reasons, a new cycle begins.

So the flatness that our forecasts show may be attributable to simply because it's the companies and the analysts don't yet want to forecast capex increase for financial reasons and strategic reasons. Or it could be it's just the flat part of a cycle.

And what I gathered from, you know, reading the materials and trying to digest them was that, you know, I think there's sort of a -- 50 megabits becomes probably a pretty important breakpoint. Because DSL, you know, DDSL-2, 4, you know, whatever, you know, DSL can be stretched and can be improved. And I guess the good news for the telephone industry is that there are a steady loss of POPs lines is freeing up an awful lot of copper lines that can be redeployed as DSL services.

But it gets to be pretty capital intensive, labor intensive to, you know, keep doing DSL, DSL, DSL. So maybe 50 megabits at least seems to be a limit that I'm hearing about, or reading about, from the technology for DSL.

And similarly, Doxis 3.0, it can go higher than 50 megabits per subscriber, but only by continuing to make the Ethernet rings shorter and shorter and shorter.

And so at some point, I think both the telephone companies, the DSL-oriented phone

companies and cable, if you go much beyond 50 meg as the demand, the baseline demand, fiber to the home starts to look like a pretty logical way to go, or they get pushed to do that.

So when and if -- my conclusion sort of is, when and if 50 megs, the 50-meg barrier has to be broken for competitive reasons, for marketing reasons, or because it's simply time to deploy a new technology because the old technology is getting obsolescent and two hard to maintain, et cetera, et cetera -- until you get to that point, you're going to probably keep these sort of flat capex.

Personal view? Longtime CITI view? We think the future of the world is ultra-broadband, which we define as a gigabit to every home. So we think in the long run, you're going to get a lot of capacity to most homes in America. By the year 2015? Probably not. But I don't know anything about 2016 or '17.

I think another useful thing to think about when we talk about capital is we're in the

middle of what we think is about a trillion dollar decade. And a trillion dollars has been invested or spent on broadband in this country, not only by the service providers, but by the service consumers. And we, as individual consumers, have bought modems, we've bought routers, we've bought computers, we've bought software. Businesses have done the same, all to take advantage of broadband.

And all of that really has -- the total network broadband infrastructure, the whole broadband ecosystem, has to include what individual consumers have spent. And it's about -- you know, we did some math and looked at the numbers of various of these devices that have been purchased over these years, and they're in the millions and tens of millions. And, you know, we come out to about a billion -- excuse me, a trillion dollars, both what has been spent in the last five years, and looking ahead in the next five years. And that's not an insignificant amount of money.

So, you know, for a country this -- you

know, I think we've done pretty well spending a trillion dollars, actually.

Some quick observations. We have eight observations. I'll only just quickly mention two. And I've already mentioned this one, so it hardly bears repeating.

Rural America may not be as underserved as expected. I see -- as I say, I was surprised to see so much fiber, so much WISP activity, in rural America. This is not to say there isn't a big problem in rural America, but there are parts of rural America that are doing very well in terms of broadband. And I was originally quite skeptical of the whole idea of the broadband mapping program. I'm now, after looking at this, going, yeah, it's probably not a bad idea to figure out really where broadband is very sufficient in rural America and where it isn't, so we can really focus on just those places. Because there's a lot of places in rural America that have pretty good broadband.

I've pretty much covered all of my other

observations. Anyway, they're in the last two pages of the report.

The only other observation I'll mention is another relatively traditional CITI view of the world, which is we just can't quite -- as much as we would like -- and I come, in my background, from the competitive side of the industry, with the (inaudible) industry in the late '80s and throughout the '90s. Professor Eli Noam has been a longtime advocate of competition, both academically and when he was a commissioner at the New York Public Service Commission. And we, unfortunately, can't figure out how there can be many more broadband infrastructure competitors in this country. And we would like it to be so, we just haven't figured out how it's possible because of, you know, basic economies of scale.

We see that -- and the reason I bring this up, this was not -- the report reinforced our previous thinking about this. There's nothing we saw in our research that indicates there is, you know, a new major thing coming. Clear-wire would

probably be as close as you'd come to a new infrastructure operator. WiMAX services. But only in, I think, 40-odd markets across the country and kind of affiliated with the incumbents. It's not truly a new entrant. It's a wireless, it's the wireless arm of cable incumbents and Sprint.

So while we would like to see infrastructure entry, for lots of reasons, we just don't think it's that likely, and we think the report kind of heads that way. And we also always note that further concentration is always possible.

Thank you.

MR. KOUTSKY: Thank you, Bob. And now I'll turn it over to Lee Rainie of Pew for a few minutes of response.

MR. RAINIE: I'll take my cue from Tom Hazlett and do three things.

First of all, I think this is an impressive report. The assignment from the FCC was shrewd. I mean, you have lots of data from

lots of other places, and this kind of direction was useful, and produced useful information that is sort of unchallengeable, at least at the level of (inaudible) reporting and doing the analysis of it.

My one quibble is the projections that the analysts gave about the penetration rate itself. Right now, or as of the spring of 2009, we saw 63 percent of people -- so our unit of analysis is people rather than households. But 63 percent had broadband at home.

We're collecting data in the field now. It looks like it's a little bit higher in December than it was then. I gather that there are independent surveys going on that also put it in the mid to high 60s in some places.

So my guess that the projection that penetration of broadband in households won't even reach 70 percent by 2015 could be low. It's what you heard. I absolutely know that that's the facts you're reporting. I just don't see it so.

And partly, it's because --

MR. ATKINSON: And you are actually looking at occupied homes.

MR. RAINIE: Well, we're just talking to people who talk to us on the phone. They're occupied bodies, for sure. So, just alone, just looking at sort of simple projections.

We also have not ever seen the kind of substitution that's been referred to here and elsewhere, where there is no net new gain. We saw massive substitution through 2000s, in people moving from dial-up to broadband, obviously. And we are seeing sort of new entrance into the field coming through mobile connections. There are people, particularly in minority communities, and particularly in relatively lower-income households, who are starting their Internet experience on their handheld devices. And it's very likely to be a pathway to the richer experiences that you get on more robust devices, with more robust connections.

And so there's a portion of the population that we are not really sufficiently

even capturing now with our data that I would guess would be going on-line.

There's always sort of churn in the Internet population. But interestingly enough, there has been less pullback from the Internet in the period of the recession, according to our data, than there has been from other telecommunications things. There are more people who are changing their cable plans than are changing their Internet plans.

So to the degree that they are sort of voting with their pocketbooks about what matters more to them in the long term, it seems like the Internet is the bet that they're placing, rather than other kinds of information expenditures.

And so I dispute the sort of -- or I wonder if we'll be sitting here in 2015 and having as low a penetration of broadband, just by the natural force of things as you are documenting.

What I did deeply appreciate about that chart -- the Figure 17, where the availability curve was so different from the adoption curve --

is that it highlights things that we all know about Internet users, and have consistently seen in our data from the time we began to study non-users -- which is there are significant numbers of people for whom availability is not the issue. They are not Internet users for a variety of reasons. And we've broken them down into four buckets.

So, you know, right now we're saying 63 percent of American adults have broadband at home. Among those non- users, about half of them say that it's simply the relevance of the technology that matters to them. They say they don't want it. They say they don't need it. It wouldn't improve their life in any measurable way, or they're happy with the life circumstances and technology that they've got.

About a fifth of them cite price itself. It's too expensive. They lost their computer. Their capacity to pay providers is at issue.

Seventeen percent of non-users say that availability is an issue. So there's something

going on when there's that much availability and people don't know it. With all the marketing that's being done, with all the ways that sort of our culture is aware of what's going on in this space, there are just people who have it in their communities and don't know it.

And so I would hold that out as one of the sort of public policy challenges that the FCC will face and be smart in addressing as it's thinking about bringing broadband to more people.

The other sort of related point -- to digress just a little bit -- it's fine to think of the household as the unit of analysis, particularly when you're looking at investments, because that's where you're taking it to. But interestingly enough, in the user population, there are a notable portion of people who live in households with Internet connections and consider themselves non-Internet users.

Since 2001, we've looked at this 4 times, and the most current data we have are 13 percent of self-described non-users of the

Internet live in homes with an Internet connection. Other members of their family are going online, oftentimes as a secondary sort of situation going on here, where they are getting members of their family to do searches and e-mail exchanges and document gathering and research and stuff like that for them. But I would just point out that bringing it into homes isn't necessarily going to get you everything that you want in terms of the benefits of broadband.

And the final way that we see people, non-users, being reluctant to embrace these technologies is usability issues themselves. They're scared of the technology or they've had bad experiences and they don't want them replicated because it's expensive when you're computer goes down. And it's hard to fix sometimes, and it's not very consumer, you know, friendly technology at times.

In addition to thinking about non-users, there's a third point I would make is that beyond the demographics that Yochai was talking about

before, we also see non-users falling into two other groups of people who are independently sort of disconnected from the Internet in general, and broadband in particular -- the disabled. Those who have significant disabilities in their life, even if they have the economic resources and, potentially, the education, are sometimes not users just because it's too hard to master, or the extra expense of the technology to make it usable is too great for them to bear.

And in America, those who don't feel comfortable speaking English are much less likely to be Internet users. Language alone, language proficiency alone, if you hold steady for other demographic factors like education and income and stuff like that, language proficiency alone is also an independent predictor. So it's something for you guys to consider.

And I guess, for my last point -- point 3.a, maybe -- would be the most interesting stuff to me in this is the degree to which we're thinking about communities, and households, as the

recipients of policies and changes in the way we are deploying these technologies.

It's still true that a lot of people don't yet know all of the benefits that these technologies can bring to them. It's certainly true of non-users. And when we ask them sort of what do you think the Internet is, very often they cite all the problems they've heard about in the media: It's full of pranks, it's full of fraudsters, it's full of predators, it's full of people who are going to steal your money. Why would I want to bring that into my life is their basic argument.

But there's another portion of people that we haven't quantified but we talk to them often enough to know that they're out there, who simply do not know that there's quality health information to be gotten online that will change your relationship with your doctor, and change the nature of the health care you can bring to yourself.

There are people who don't know they can

interact with their government online. There are people who don't know that they can embed themselves more directly in their communities.

And so I would hold that out as another piece of the public education effort, or even the commercial education effort that goes into encouraging people to think that these are a set of tools that can bring real change to their lives.

Thanks.

MR. KOUTSKY: So both reasons for optimism, and reasons for concern.

Do you have a couple questions?

MR. KENDALL: Yes, so first off, I'd like to thank you guys for I'm sure what was a lot of work and a great job, building a great fact base for us to use in the National Broadband Plan. I think it's going to be very helpful.

But I did have a couple of questions, more about your opinions of what you think is the reason for some of the conclusions.

So one of them was, why are Tier 3

operators deploying fiber and not Tier 2 operators deploying fiber? Is that because there is more favorable economics in their areas due to lack of cable competition? Additional USF support? Is it just a different capital structure.

Is there anything that you would put forth?

MR. ATKINSON: Well, I flipped to my report. Page 16, the research firm that, you know, sort of gave some data on rural Tier 3 ILECS said, "drivers for the rural independent telcos to deploy fiber to the home include aging copper lines in need of replacement." But that probably also applies to Tier 2, and even Tier 1, "the opportunity to deliver video, given a more robust platform." Well, that also applies to other telephone companies. "A pioneering tradition," that's probably pretty unique for the Tier 3 companies. These tend to be almost family-owned or cooperative telephone companies, so these are people who have, you know, a real stake in the enterprise and, you know, they were, their parents

or grandparents laid the wires, and strung the wires when the telephone service first came. So they have that sort of a family or community tradition of that.

And then it says, "And in some cases, subsidies, such as rural broadband loan programs and universal service funds." I have to think that those two factors are what distinguish the Tier 3 phone companies from a lot of the Tier 2, and certainly the Tier 1 phone companies. And in a sense, you can say that the government programs -- to the extent that rural loan programs and the universal service funds, in fact, are the "different" factors that apply to those Tier 3 companies, the government has done a tremendous success. But maybe it's time to stop, for some of them.

I mean, I did a B-top review for the NTIA, and it was for a -- I can't get, obviously, into the details, name of the company, et cetera, because it's all confidential, but it was from a rural coop. And in its plan -- and this was for a

public computer center grant. It was very proudly saying it's a hundred percent fiber to the home. And their finances are -- I would like to own that company. They are doing really, really well.

And so I -- you know, I just looked at it and went -- I was stunned, actually, to read this company's financial information.

MR. KENDALL: Did they have really high penetration?

MR. ATKINSON: They have 100 percent penetration. I mean, they are the only -- they had the cable company and the phone company. They are the only thing in town -- and it's all fiber, and they've got a great -- it's a number of towns in a very rural part of America.

MR. KENDALL: So I had one other question about -- as you had the second section, I believe, of the report that talks about announcements, and how well companies have done in meeting those announcements.

And just where do you think LTE might fall, as you look at some of the -- you were

saying -- is that more like a Doxis 3 that is an upgrade, and so clearly they're going to hit that? Or is that more like a facilities-based upgrade, so it might fall more into the category of the satellite or like WiMAX, or some of the 3G?

MR. ATKINSON: (inaudible) it's going to be a bit of both. To the extent that it's just putting more radios on existing towers, then it's just a facility upgrade, largely. And, you know, many of the towers are going to be fiber-fed. And if fiber-feeding to a tower is critical, then there could be delays. And if new towers are needed, there could be delays.

And I have some recollection, in one of the reports, of reading that, you know, the basic 4G rollout is going to require quite a few thousands, tens of thousands, possible, of new towers.

So new towers, and even running fiber to old towers, you get into all those right-of-way issues, siting issues, et cetera, et cetera, et cetera. And those would be, I would think, the

risk to the schedule for LTE or any -- and also for WiMAX or anything else.

If the tower exists and is fiber-fed, no problem. If it doesn't exist, or probably needs fiber to accommodate the increased capacity off that tower, siting and right-of- way problems could be a problem.

MR. KOUTSKY: I have two very quick ones. One that was actually an outgrowth of the rural income (inaudible) point. You mentioned that there were instances where rural telephone companies were also the cable company. Did your research ever -- did that reveal or give us any indication to (inaudible) with that?

I've seen or heard of situations that perhaps as many as 30 to 40 percent of smaller cable companies may be affiliated with the incumbent LECLETs in town.

MR. ATKINSON: Not -- no. I mean, we got some data from the American Cable Association. And, you know, I think they have 483 -- I never remember numbers, but that one popped in. So, I

think 483 small cable companies. And then we have the NTCA -- yes -- NTCA, small rural. And they, you know, there may be overlaps. They may be operating in parallel. I guess I would expect there to be a fair bit of overlap, where the ACA member might be part of a rural co-op. Certainly a lot of the co-ops are providing video, but I don't have any data on that.

It's probably worth trying to look at the ownerships and see, or go co-op by co-op, and independent phone company by phone company and try to map that out.

Maybe that's one thing the broadband mapping with show.

MR. KOUTSKY: And my other question, actually related to this, the capex percentage slide that you had, which actually I thought -- I just had some questions, because it showed that cable spent about approximately 20 percent of its capex on broadband, I think was the number that you had. ILEC was around 45 to 55. And wireless was at 60 to 80.

Is this because -- I actually found that to be, I haven't seen it presented before until I saw your paper, and I thought it was interesting to see that. Is it because we're at different deployment, stage of the deployment cycle there? Or is it a function of the fact that wireless is a fast-growing business? Because they're the ones that kind of leap out here as being, you know, significantly higher than the wire-line competitors.

Is it something about wireless that requires them to plow more of their capex dollars into broadband, as opposed to wireline?

SPEAKER: (inaudible)

MR. ATKINSON: Well, I will tell you that we looked at the numbers. The cable numbers, I'll be honest, they look way too high. If you took, you know, if you said, well 50 percent of cable is now broadband, I mean, what percentage of cable is television service versus telephone service versus broadband service? And that's a tough allocation.

We tried to do a bottoms-up, though. We took the numbers that we had on the cost per subscriber for the network upgrade, which was the $15 to $30 per subscriber, and then also added forecasts for replacing every cable, or giving every Doxis 3 subscriber a modem at their home. And we used a figure of like $65.

And so we did a little bit of a bottoms-up and said, okay, that's going to be all done in the timeframe 2009 through 2013. And so we said, doing it that way you're actually way less then 20 percent.

But then one of our other sources said that the cable industry spends around 13 percent of their capital on network improvements, upgrades and extensions -- replacement. And so we added that to the mix. And I guess that's how we ended up with approximately in the 20-odd percent range for cable for the broadband.

It seems low, because then I sit there and go, well, that means 80 percent of cable capex is for television and telephone. Again, a lot, 50

percent of cable capex is for customer-premises equipment: Set-top boxes, DVRs, cable modems. And maybe DVRs and set-top boxes are way more expensive than cable modems, so maybe that's part of the reason that you can expect these relatively high numbers. Or that the remainder is apt to be allocated somehow between telephone and television.

But that really goes to the whole point that these are allocations.

SPEAKER: And even (inaudible), on the wireless side, the consumer purchases the handset, so that -- because there isn't a capex component to that.

MR. ATKINSON: Actually, I believe cell companies include -- because they're really leasing you the phone, the handset, I think their handset costs go into capital, although I'm not an accountant and don't pretend to be.

The other thing I would say is that, you know, with -- as I think I mentioned in the remarks, you know, 4G I would allocate almost 100

percent to broadband. That's its purpose. So the allocation to broadband for wireless in the high numbers, in the 80s I guess we get up to, don't we -- yes, 85 percent -- that made intuitive sense to me.

The cable 20-odd percent, I go, hmm. I'd be interested to hear from the cable industry, if you'd like to provide more detailed information about capex, please send it.

MR. KOUTSKY: Questions from the audience, and we'll try to keep this to just a few minutes. But let's go there.

Him first. He beat you.

SPEAKER: Yes, a clear point of differentiation between the two reports this afternoon related to FTTH, Yochai said that, you know, he kind of equated the Verizon FIOS build-out with FTTH in the United States. And you also mentioned the rural component, which is quite active. I think Michael Render, in fact, said that there's more than 400 providers in one form or another providing FTTH.

If I could get you to think outside the box maybe just a little bit, what kind of implications would you see in terms of broadband policy going forward, knowing that there's an energetic, active dimension in the rural community bringing FTTH?

MR. ATKINSON: Well, if I were to be having the horrendous job that these guys have, I would actually try to figure out what makes, why are some of these companies moving ahead, why is rural, this co-op that I looked at 100 percent FTTH and, you know, the one down the road, or across the state zero? What is different about them?

Because clearly some of them have the money, the will and the market demand to push out fiber to every rural home. It may be demographic. It may be financial. It may be management will. It may be -- you know, there's hundreds of co-ops, there are hundreds, thousands. I think if you add them up there's probably, what, a thousand small independent phone companies in America? Co-ops

and truly independents.

Each one of them is different. They're going to have a very different -- but they, hopefully, they would fall into some boxes and so you say, ah, look, these fiber guys have these characteristics, now how do we try to get these laggards to have the same characteristics? Particularly if it's financial or management, or something that government policy can work on. You know, the government can't change mountains and the geography aspects probably, but there's a lot of things a government policy could affect. So that's what I would do first.

MR. KOUTSKY: Actually we have a question from the Internet that's somewhat related, so then I'll ask that one and then go.

Actually, through the magic of the Internet, Professor Bronwyn Howell from New Zealand has submitted us a question. And I last saw her here at TPRC. So I was glad that she's online and listening to us.

She mentions something very, a similar

type dichotomy. And we'd like the panelists' comment on the extent to which New Zealand experience can inform U.S. Policy.

And she mentions that in New Zealand, there was relatively widespread availability of ADSL, with some entry, but generally had a slow broadband uptake on the demand side. So, in essence, she summarizes and says that there is negligible supply-side problems, but considerable demand- side problems in New Zealand.

And she asserts that regulation has been impotent in addressing the demand-side issues, but has arguably led to some substantial demand-side distortion, such as withholding investment, or strategic gaming between participants, and slipping on absolute and relative performance.

I've actually -- that's a rather educated question, but it seems to be somewhat related the question Bob just raised, which is how do we begin to think about whether companies will make investments. You know, do you agree that there's the potential for some distortion or some

mismatch between the economics of supply and the economics of demand, particular in some of the more rural and insular areas of this country?

MR. ATKINSON: Well, the first thing is, I would have to go to New Zealand and do at least a three or four week on-site analysis.

Do businesses react, any business react to regulations and the possibility of regulations? Sure. But they are ultimately wanting to, you know, thrive and survive. And I think what we've seen, I've seen, over the last 30 years in the telecom industry is that, you know, the companies are pretty agile and very creative. And, you know, both new entrants and the incumbents, in dealing with whatever government throws at them. They want to survive.

And I don't think people -- the company I worked for didn't make our investment decisions on the government policy, per se. We made our investment decisions, I mean, we had to be authorized to provide the service. But after that, once we're in, had the certification, all of

our investment decisions were simply made on business, you know, customers, serving customers. And the government was like, yeah, yeah, yeah, we'll work around it. We'll do whatever we have to do.

I think most, in a competitive marketplace, you really can't spend a terrible amount of time worrying about the government, because that's the environment, you're dealt the hand you're dealt. You've got to play in that hand.

Will, more or less? I guess it's possible. And I've certainly seen a lot of the studies and arguments that government policies can incent or disincent investment by companies. I personally think that companies do what they have to do. And what that tells me is they will not invest if they -- that's why this 50-megabit breakpoint to me is, why I emphasize it is, you know, there is no incentive for any company right now to make major new investments in, you know, a new, in fiber to the home, or big investments, as

long as they're doing, getting as much revenue as they can from the existing plant. When you have an existing sunk- cost plant, you want to milk it for as long as you can, and make it pay for as long as you can.

And until the existing plant -- and that little quote I just read about rural America. You know, if your outside plant is deteriorating, the operating expenses are extremely high, then you start saying, in order to make more money, make higher profits, I need to replace it with something bigger and better. And then at that point you simply say, I'm not going to make an incremental addition, I'm going to make a big change, because I can see financial benefit to me. Then they're going to do it for business reasons.

MR. KOUTSKY: Thank you.

SPEAKER: (inaudible) substance of my question is how to get past that fork in the road. What's going to spur companies to do that, pass that 50 megabit per second (inaudible)?

MR. ATKINSON: Well, some companies, of

course, have the ability today to offer more than 50 megabits. The question is will customers flock to those services? So if Verizon, for example, you know, pushes the envelope and offers some really high-speed services at a pretty low, relatively low price, and customers march with their feet and their wallets to 80-megabit or 100-megabit or 150- megabit services that are priced only 10 percent, 20 percent more than -- that's going to cause everybody else to go, darn, it looks like we're going to have to really spend -- particularly if I'm a cable company in an area where Verizon also serves.

At the same time, if you're a DSL-oriented telco, for example, and you see that it really can pay, well, there would be a tendency to do it themselves and start rolling out the speed.

So there needs to be, someone has got to start a cycle going. And all these, the businesses and the marketing and consumer adoption are a series of cycles within cycles. And right

now there's no impetus, no one has yet started the really high-speed cycle. And we'll see where it goes.

MR. KOUTSKY: Do we have further questions? We have time for one more question, so Stagg gets it.

Stagg?

MR. NEWMAN: (inaudible) markets where they're already operating (inaudible).

In markets where they're really offering these really high speeds, is there any evidence of different, substantively different, usage patterns, applications use or anything like that?

MR. ATKINSON: I don't have anything like that. No. It would be useful, but don't have it.

MR. KOUTSKY: All right. Thank you, we are well over our time. But it was a very interesting afternoon, and I appreciate the participation of Bob and Ivy and Lee today. And also appreciate everyone in the audience for participating.

Just to note, both reports are posted online. And the Commission does have, has put them in the record, and parties are free to submit their comments, responses, supplements, gripes and platitudes into the FCC record, as well.

And so we definitely appreciate the vibrant public debate that we've had about these.

Thank you.

(Whereupon, at 3:42 p.m., the PROCEEDINGS were adjourned.)

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I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

/s/Carleton J. Anderson, III

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