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P R O C E E D I N G S

MR. WEST: Good afternoon. I'm Darrell West, vice president of governance studies and director of the Center for Technology Innovation at the Brookings Institution. And I'm pleased to welcome you to this forum on improving spectrum access through reverse auctions.

In its national broadband plan, the FCC called for the identification of 500 megahertz of new wireless spectrum over the next decade. The Commission also proposed that spectrums should be reallocated from over the air broadcast television to mobile service providers. The FCC did this because wireless broadband is growing at a rapid pace. There's been a tremendous growth in smartphones and people using mobile advices for communications, healthcare, education, energy savings and a wide variety of other uses.

Congress passed legislation that was signed into law in February giving the FCC authority to hold reverse auctions for broadcasters with unused spectrum. But there are many design and implementation issues yet to be resolved.

Today we are hosting a conversation about how auctions should operate, so among other topics we will analyze how the auctions should be conducted. What are the best design features to maximize broader societal benefits, and how do various rules and procedures affect the likely outcome?

To help us understand these issues we're pleased to welcome a number of distinguished speakers. Thomas Power will provide opening remarks. He is currently the deputy chief technology officer for telecommunications in the Office of Science and Technology Policy in the Executive Office of the President. He advises the president on a wide range of technology and telecommunications issues. Previously he served as chief of staff for the National Telecommunications and Information Administration.

After he speaks we will have a panel discussion with several experts. Thomas Hazlett is professor of law and economics and director of the Information Economy Project at the George Mason University School of Law. He also serves as a columnist for the New Technology Policy Forum hosted by the *Financial Times*. He is an expert on spectrum and the author of a new paper entitled, *Incentive Auctions, Economic and Strategic Issues*. And we actually have copies out in the hallway, so anyone who did not pick one up can get one after this event.

Peter Pitsch is executive director for communications and associate general counsel for the Intel Corporation. In that position he manages Intel's global spectrum and telecommunications policy team. Prior to joining Intel he was the president of Pitsch Communications and represented telecommunications clients before the FCC and Congress. And from 1981 to 1989 Peter also served at the FCC as chief of the office of plans and policy and then chief of staff to the chairman of the FCC.

Chris Guttman-McCabe is vice president of Regulatory Affairs at CTIA. He joined that organization in 2001 and works on spectrum regulatory issues and homeland security.

Our last speaker will be Mark Fratrik who's vice president and chief economist at BIA Kelsey. He manages the firms numerous proprietary databases and conducts primary research on various trends as they affect radio and television broadcasting.

So first we will hear from Thomas Power. So please join me in welcoming Mr. Power to Brookings.

MR. POWER: Thanks. Thanks a lot and good afternoon. I'm going to try to jump right into this. I normally -- when I start talking about spectrum I start evangelizing about the impact on the economy and jobs and productivity. I think I'm

preaching to the choir on that one so I'm going to kind of talk about two things.

One, a couple of years ago the president issued a presidential memorandum directing NTIA to work with the FCC to identify 500 megahertz of spectrum that could be repurposed from either federal or commercial uses to wireless broadband. So I want to kind of give an update on that. There's so much going on in this area, I thought, just to sort of reset where we are on that.

And then secondly, the concept of spectrum sharing is gaining a lot of currency recently and I kind of just want to make a few remarks about how we look at spectrum sharing.

So starting with the 500 megahertz search, the president's memorandum came out in June of 2010. About four or five months later NTIA served up the first batch of spectrum, if you will. The idea was to sort of move through the band sequentially. Find bands that were both susceptible to repurposing and attractive to the commercial industry. So the first swath was two bands actually totalling a 115 megahertz, the 1695 to 1710 band and the 3550 to 3650 band. And those were then sort of handed off to the FCC to figure specifically how to make them best available on the commercial side.

All these bands—there are always challenges with them. And I'll describe them because it actually will help inform when I talk about sharing in a couple of minutes. So just as an example, in the 3550 band, one of the obstacles there is that the existing federal uses include these big naval ship born radars that use spectrum for their radar systems. And when NTIA put out the report, they include some maps that showed what would be the presumptive exclusion zones. So those would be areas where the federal systems would operate and commercial systems would not be permitted to operate, just presumptively.

And the exclusion zones that sort of draw on that map sort of assume

that you have ships ringing the costs all the time blasting their radars 24/7. That doesn't happen. In fact when the ships are in port they don't use their radars. And so it was sort of a first take at what kinds of protections we'd have to think about, but once you start figuring out where the ships are really located and when they actually use their radar that map could look a lot differently. And so again, as it relates to sharing then I'll talk a little bit about it more.

You know, it's not necessarily the case that we have to have exclusions. The problems with those exclusion zones is that given the characteristics of the radar they could be 50 or 100 miles in from the coast. And so if you think of drawing that line, you know, down the east coast across the Gulf of Mexico and up the west coast you've hit all the big major metropolitan areas. Not real appealing for the commercial guys, not a lot of value there because of the limited population that would be left. So but is there a way we could shrink those exclusion zones or otherwise work to make that more useable. And those are the kinds of things the FCC is looking at now in that band.

So that was the first 115 megahertz. We then shifted the focus to the 1755 band the -- that -- the NTIA issued a report looking at 95 megahertz from 1755 to 1850. The commercial industry was very interested and remains very interested in the lower 25 megahertz of that, and for good reason. It pairs up well with a separate band, 2155 to 2180, so you can have the uplink and the downlink. It's internationally harmonized, which is very important for basically scale purposes. It means you're -- you've got more equipment being built driving down costs that is -- fits into that band.

But there was this issue of the lower 25 versus looking at the whole band. On the one hand you'd think well if we could just focus on that lower 25 and move as quickly as possible in that that would be great. That would solve a need. There was a way to do it. From the administration standpoint, you know, we were shooting for 500

total, and so we wanted to take a bigger look at it at the whole band. And also there were systems that operated in the whole and for, you know, up and down the whole band. And so for some agencies the idea of looking at just the lower 25 you sort of had to look at the whole 95 anyway.

So we're doing that, I mean, but the risk is, you know, are you biting off more than you can chew. Are you, you know, does thinking big actually slow you down. So to attack that, what we've done is created five working groups of agency and industry teams that are being put together right now. To really dig in and to look at this and again to come up with solutions kind of like what I was talking about with the ship radars.

How do you get -- make this really useable for the commercial side while still protecting the federal interest. It -- we have five working groups because the array of federal systems in there vary quite a bit and so the way to work around them is going to vary quite a bit. We have some fixed microwave systems that can be relocated in a fairly short period of time. But you have satellite systems where the satellites are, you know, destined to operate for 20 or 30 years. And those are going to stay there. Those are going to be there. You can't send a technician up, you know, to switch out some hardware. At least that's what they tell me. I actually thought well maybe you could and I called Comcast, because they do truck rolls, right? And they said they could send somebody, but there would have to be somebody up there between 2:00 and 4:00 p.m.

So anyway, we're now really focused on that 1755 band and, you know, back to this issue of getting into that lower 25 that seems workable. The fact that we're looking at the whole band doesn't mean you have to solve for the whole band and have everything coordinated simultaneously. So there is ways to transition systems in ways to have auctions that are staged and commercial entry that is staged and commercial exit that is staged. And to solve for the whole band and that way that hopefully, you know,

our goal here is really to expedite entry and we think that's the best way to go. And it's been great to see the involvement on the commercial side and the agency side coming together with these teams to make that happen.

And then although that's still going on, we have launched the analysis of the next band which is up in the five gigahertz range. It's where there's a lot of unlicensed use today and we'll be pursuing that over the next few months to figure out some solutions there to open that up as well. We're sort of doubling down on our homework there because we're still -- the complexity and the urgency of the task with the 1755 we're still working on that, but we wanted to get started on the next five gig range as well.

So those are sort of the work streams that are in progress, and I should mention in talking about the industry involvement here on behalf of the industry with CTI's support, T-Mobile filed a request at the FCC a few weeks ago seeking special temporary authority to operate their systems in the vicinity of federal systems to really start testing -- and again, it kind of goes back to this idea of sharing, you know, is there tolerance that can be sustained even if there is some interference. Is it as bad as we think, or how can we engineer around that? Verizon committed $5 million to sharing technologies and to testing these technologies. So that's all great. It's coming to very -- together well.

I said I also wanted to talk a little bit more specifically about sharing. You know, we do it today in the form of exclusion zones. Those exist all over. So you've got some federal operations somewhere. Essentially draw a ring around it and when commercial entities are licensed they're not licensed in those areas, but they are licensed elsewhere.

Sharing has taken on a lot more meanings than that in the TV white spaces that the FCC is implementing. That's a form of sharing, you know, probably the

longer term. There's a lot of development going on with agile radios, smart radios that can sense out where they are -- where frequencies are, where the device is, figure out what's usable and between them, you know, obviously a little bit more longer term, but that is a form of sharing. New architectures with smaller cells is a form of sharing. It allows a lot more reused. These can all be types of sharing and I think sometimes when we talk about sharing it seems like we are talking about creating obstacles or producing spectrum that's really not the same as the spectrum that the commercial carriers need and that consumers and businesses need.

We want shared spectrum to be just like cleared spectrum to the carriers and to the users. There'll be some more work involved, but the whole point here is to encourage and build on the great productivity and innovation we have seen in the deploying of spectrum and all the investment that the commercial carriers are doing. We just want more of that. And so this is intended to make it really usable if the technologies are not here today, then that's not something we're relying on today. But to the extent there are ways of sharing today and that that makes for a more efficient way of getting spectrum in the hands of commercial carriers. That's what it's all about.

Sharing does not mean I'm licensed, certainly. You know, just like today some auctions are, you know, you acquire spectrum at auction and it's subject to these exclusion zones. That's sharing, but it's licensed and it's auctioned. And I should also point out that, you know, the challenge we're facing here is, you know, skyrocketing demand on the commercial side. We've seen those numbers. The same thing happens on the federal side. You know, you can pick up the papers and see the use of unmanned aerial vehicles. The drums that are used—they're used overseas, but they're tested here. And the testing here requires lots of spectrum. And the demand just in that one area has multiplied many times in the last ten years. And that takes spectrum as well. And there

are lots of important missions that the federal government is using.

And so this comes down to physics. The reason we're talking about sharing is because we have a finite resource in the form of spectrum and more and more demand coming from both sides. We have still identified opportunities for clearing and when that makes since that's the right way to go. And as I said, in the 1755 band there is -- there are systems that we can move out and move out rather quickly as part of the solution here.

And we understand that from the commercial side and actually from the agency side too, any of these sorts of new approaches are -- there's inherently some uncertainty around them. And so folks, you know, are -- have a little trepidation about it to say the least. And they can be at cost, right? If you're talking about small cell architecture and new architectures like that that, you know, that requires investments. And if there is a cheaper way in the form of say clearing spectrum that makes more since, then of course that's the way you would point to. But it is a finite resource and we are going to need to look at new approaches and I'm very optimistic. It's been great that the industry has been supportive of this. There's a lot of collaboration going on. And I think we're going to get there within the president's ten year timeframe.

We also of course with the help of a number of people in this room put a lot of work into the recent spectrum legislation, which gave rise to the auctions that we're going to hear about shortly. I will just say on that we were very pleased to see that legislation passed. There's going to be a lot of hard work, but Chairman Janikowski and the team over there, you know, these are the folks that just like we have shown leadership and the industry has shown leadership in the 4G world and deploying that.

I think the FCC is seen as the leader in spectrum auctions and so we're looking forward to that. They've got a great team over there with Gary Epstein and Ruth

Milkman and the rest of the team. So we're very much looking forward to that. So I just wanted to lay that little predicate. I know these guys will be able to inform us a lot more specifically on the great work that's going to be coming up on the spectrum auctions. So thank you and thanks to the Brookings for having me. Thanks.

MR. WEST: Okay. So in our panel we're going to focus on the reverse auctions and Thomas has a new paper out on incentive auctions and we have a copy of the paper. So I know you cannot summarize all the details because there are lots of design and implementation issues associated with that, but I was wondering if you could just start us off by identifying what you see as the major challenges and what some of the highlights are of what you think we need to do?

MR. HAZLETT: Thank you. This a real audience? These aren't Pixar drones are they?

MR. WEST: Not enough bandwidth.

MR. HAZLETT: No this is a human audience. Well, that's very nice. How old fashioned. Anyway, speaking of old fashioned my name is Tom and I'm a PowerPoint user, but no PowerPoint today. So I'm going to be challenged. I had some great slides. I'll describe them to you, all the graphics. By the way, the title of my talk: Occupy Spectrum.

MR. WEST: See, it works.

MR. HAZLETT: You needed the graphics. You needed the graphics. So yes, more spectrum please. There is tremendous incremental social value to getting more liberally licensed spectrum in the marketplace. And there's some question about well, can't the carriers do something to cope with the mobile data tsunami? And yes, the carriers are doing lots of things to cope with the tsunami. And you want them to do all of that and more and they can do more if they have more bandwidth. And the National

Broadband Plan from 2010 makes a very good case on this. I recommend it highly. I think it's a positive step.

But documenting the rigidities of the current system does not end them and we're still confronted by them and certainly we're looking to many places. We just heard about many of the initiatives under way at the Department of Commerce. The mother lode is the TV band. And so it's not surprising that that is where attention has focused and the FCC has put forward a particular strategy to try to unleash some of the opportunities there with the incentive auctions.

I just want to put this in historical perspective. We were talking about this type of two-sided approach in November of 2001 at an AEI-Brookings Joint Center for Regulatory's Studies Conference. Okay. So this is what's considered a brand new idea in Washington.

There are other options and I recommend again the National Broadband Plans discussion of many of them, including overlays and some other things beyond that broadband plan. Third party audits that might really help get more spectrum, more bandwidth into the market. And I think those initiatives really should be remembered as the next step and the next step and the next step. We don't want to back everything up until we get through this incentive auction opportunity.

And we do need to think a little bit about transaction costs, because it's very important in this process and it's going to be important in all the processes. And part of the opportunity costs of the incentive auctions are this session. More specifically what we could be doing if we weren't in this session. Okay. And don't let me get you started on that just stay with me for another three minutes. But there are lots of things we're doing here that are costly. Reducing the reallocation that may have started at 100 -- well, it started at 294 megahertz. That's the TV band. Then it went to 120. It may be shaved

down further than that. Anytime we reduce that reallocation we're essentially lowering the opportunity society has from getting the spectrum repurposed. And of course nothing is perfect.

There's no zero transaction cost solution. It's going to be procedurally expensive to get this done. That's part of that game, but we want to look at other opportunities that may be out there. And I want to just put that on the table.

So talking specifically about incentive auctions—it's complicated. The goal now should be expeditious and efficient. Okay. And just that we have a paper that I wrote with David Porter and Vernon Smith, who have been around the block a lot on auctions and market design. And we try to just in a nuts and bolts way elucidate what the general flash points are as we go through the process.

At a very high level, this is actually a five stage process; at least we characterize it that way. First, there's a reverse auction. And that's the broadcast TV stations offering to move or share based upon what they think the value of that option would be to them.

Then the second stage is relocation, where the FCC looks at its maps, its computer contours and so forth and it figures out based on part in pricing information from that reverse auction how TV stations can be relocated in frequency space.

Then the reallocation is stage three. That the FCC having made some spectrum available will allocate that spectrum to flexible use licenses.

Stage four is the forward auction to assign those flexible use licenses to the highest bidders. And then stage five is actual license assignments where TV stations would presumably move or exit and/or share and new use could be made by these flexible use licenses, presumably for mobile communications, but perhaps for other things as well.

So that's a lot to think about. We do have a paper that tries to, you know, as I say hit on the basic choices here and I just want to say in deference to my beautiful slides that I do have a beautiful picture of Dr. Evil as a broadcaster holding up the world for $1 gazillion. And I want to make it explicit that that is absolutely not the way to think about these auctions. Okay? That is not the way. Unfortunately, there's been a lot of that around and I just want to make it clear that I consider it the audacity of hutzpah for regulators to blame the broadcasters for operating under the rules the regulators put in place. And that's exactly the tone of some of what has historically gone. I think it's filtered out pretty well. I hope it has, but the point is this is not about beating the broadcasters up. It's about creating very cooperative games here where there can be positive some transactions and stakeholders who are part of this process can become positive cooperators in input.

So that really is the goal now. We need a lot of cooperation. It's a complicated process. That's a great slide; isn't it?

MR. WEST: That is. I can attest he has wonderful slides.

MR. HAZLETT: Thank you. You would have really loved that. Thank you very much.

MR. WEST: Thank you. So, Peter, you manage global spectrum issues for Intel, what are your thoughts on reverse auctions and particularly the mix that we need in terms of licensed versus unlicensed uses.

MR. PITSCH: Okay. Hi and low. First off, we love incentive auctions. Intel and Hi-Tech, hitting much of the hi-tech industry, actually formed a coalition to help support this legislation and we're very pleased with the result. We're not an altruistic company. We have -- we favored this because we wanted to see broadband, mobile broadband become more widespread, higher quality and more affordable. And we know

there's a huge demand coming and furthermore, technology is only going to increase the opportunities to benefit.

And as Tom alluded to, getting spectrum in the marketplace is not easy. It's hell; it's not easy in any country. I spend 80 percent of my time worrying about spectrum reallocation in other countries besides the United States, but having been around the track many times on this it takes a very long time to try to take things back from people who have it. They're using it legitimately. It's a free country. They could hire lawyers and lobbyists and the rest is delay.

So instead of that it's much better to create something that looks like a win-win-win opportunity. And the incentive auctions do that. That's the fundamental logic. No trade is going to take place unless it occurs voluntarily and implicitly the parties to the transaction that is the participant in the reverse auction, the broadcaster, and then ultimately the participant in the forward auction who is prepared to pay more. Our -- acting as if that transactions going to be efficient. It's going to move from a lower to a higher valued used. So that's just absolutely crucial. It makes it voluntary. It solves this huge political problem.

But the other thing that's important about it is that it's going to free up that spectrum in a low cost way, because, as Tom said, when the broadcasters put in their bids for relocation, or sharing, or moving to a VHF or whatever it is they're going to be indicating, hopefully if it's designed well, Tom, what the value of their business plan is and then the Commission can turn around and pick the low cost -- that is the low cost to society, the low cost to the broadcaster options and therefore, minimize the cost of freeing up 60, 80, up to 120 megahertz.

The other thing that's going to happen if it's properly structured and it's competitive and I think it hopefully will be, but it should be, there will be a residual over for

the taxpayers. And let's face it; the political reality is auction legislation always gets passed because of the political impetus coming from the budget process. So that in a real world sense is what helped drives us through. I'm a realist. You know, I wish we didn't have to dig deep holes for oil, but we do. And I wish we didn't have to work the political process the way we do, but we do. And then the reality is that incentive auctions are able to tap into that -- the gains from trade and push the process forward.

And the last thing and the far and away the most important thing about incentive auctions is that there's every reason to believe that the benefit to society, that is consumers, the gains that they're going to get beyond what the cost are to them are going to dwarf all these private costs that we were talking about. And maybe on the order of ten times. In fact, Dr. Hazlett has done research in this area as suggesting that in fact the consumer surplus gains will be on the order of ten times the auction revenues.

So that's a why we're in favor of incentive auctions. Now, Darrell, in deference to my other panelists I think I'll come back to the unlicensed issue in a second round.

MR. WEST: Okay.

MR. PITSCH: That seems fair.

MR. WEST: Yep, no. That's fine.

MR. PITSCH: Okay.

MR. WEST: So, Mark, you follow the radio and television broadcasting industries very carefully and certainly one crucial ingredient in all this is how broadcasters respond. So what is your sense in terms of their interest in the auctions and likely participation?

MR. FRATRIK: Thank you, Darrell. I think there will be a number of television broadcasters who play this game who will volunteer either to share or actually

give up all six megahertz. The prevailing prices of wireless spectrum now and in the future when we talk about the TV auction we got to remember that we're not talking about next year. We're talking about a few years down the road.

If you look on a price per power per megahertz, which is the general metric, it's a little bit -- it's a lot higher than some of the values of these stations that are actually operating. If you value their stations on a price per power per megahertz. So I think a lot of television stations, commercial and non-commercial television stations will see an opportunity here to either share with another station or actually go out of business. Give up all of the six megahertz and to see that part of the spectrum. And I think there is a number of them.

I will say that I don't think that there's enough to free up 120 megahertz. I think there's a lot of stations in these markets that are utilizing their spectrums and you can pick them out and you know which ones they are. They're multicasting. They're getting involved in mobile DTV and other opportunities, but I think there are a number of them.

I will say though that there is a cost involved in that and I remember Dr. Hazlett's ten times the value in terms of consumer surplus paper. There is a cost in the reduction of diversity of some of the broadcasting options and may see some of their spectrum because in the since these typically lower revenue stations, lower profitable stations tend to be ones that may be in multi-language and other types of diverse programming. That's not all of them, but there are some that are provide the programming.

So it isn't just a clean, clear, as you mentioned, Peter, win-win-win, there is some sort of reduction in consumer surplus, but if we believe what Tom did a few years ago that would dwarf it. So I think there is the opportunity there.

We already are seeing a lot of investments in television stations. A lot of purchases of stations that are clearly spectrum plays. They are stations that were sold in the last six to nine months that had been sold two or three years earlier and the price that they were paid for in the last six to nine months would substantially higher than what were sold two to three years earlier and you can see that investors already involved in these transactions in anticipation of these spectrum markets coming through.

So I'm somewhat optimistic about the activity of broadcasters who voluntarily will participate in these spectrum auctions.

MR. WEST: Okay. Chris, what are your thoughts on reverse auctions.

MR. GUTTMAN-MCCABE: Sure. Darrell, thank you. It's rare that I get on a spectrum panel where I can say after being the fourth speaker that I actually agree with everyone before me. I think this is the first time I've had a panel in the last two years. It's also rare that I get the last word since I have a wife and two daughters. It's actually rare that I get any words in.

You know, we, at CTI, we represent the carriers, the manufacturers, the vendors, content providers, sort of all of the above. And we're the organization that coined the term looming spectrum crisis because we looked at what was happening in the mobile market in terms of demand and usage and the evolution of the networks and the products and the services and saw the trend line was like a hockey stick. I mean, it had been slowly going up and then data took off and it almost went vertical.

And then we looked at the spectrum that was in the pipeline and thought wow, this is not an equation that makes sense for continued innovation and investment and growth. And so then we thought, well gosh, we're in Washington how do we get people's attention. And we stepped back and started think as marketers do and we branded it. We came up with this phrase looming spectrum crisis because it was looming

and from our perspective it was a crisis, because it didn't really have any focus.

And what we did is then we kind of looked around the world and tried to get a since of what other countries were doing. And as we looked at every country that we would want to compare ourselves to from a broadband perspective and additionally from a mobile broadband perspective, every single country that we were looking at had hundreds of megahertz in the pipeline, or were about to put hundreds of megahertz in the pipeline. So South Korea, UK, Canada, France, Italy, Germany, Japan, you know, they all had identified a great deal of spectrum to reallocate. And if you look at -- and this is -- was an economist by trade before I went to law school so this is a little bit of rough justice, but if you look at the population of those countries the closest is Japan that has about a third of our population. And yet they were bringing hundreds of megahertz to market. And we had about 25 megahertz in the pipeline.

So when the National Broadband team came up with this idea of an incentive auction -- of a reverse auction we thought it was fantastic because we began to look at ways to repurpose spectrum and we were excited about market mechanisms that would take what otherwise wasn't subjected to a market environment and, you know, facilitate that. So we were excited about the idea of taking, you know, applying this sort of a mechanism to the broadcasters and allowing them the opportunity if they chose to monetize an asset that they otherwise might not have an opportunity to monetize.

We particularly liked it being applied to the broadcasters because we looked at the 294 megahertz of spectrum. I think Tom mentioned that earlier. If you look at D.C., D.C. has 19 high power operational stations. I would challenge anyone to go past and name more than seven in the D.C. market. But there are 19. And that's 114 megahertz of spectrum being used. There's 294 allocated. So there's 180 megahertz in D.C. that isn't being used. It's actually being used as a buffer because of operations in

whether it's Richmond or Baltimore. And so we were trying to figure out well how do you squeeze out that excess spectrum? How do drive a little bit more efficiency? And sure enough this incentive auction idea will allow the FCC to pay some broadcasters to exit or channel share. And then they apply some very intelligent algorithms. They get some smart people to think boy if we can pull out, you know, a half dozen here and four here and six there we can repack these.

The other way of driving sort of an addition to clearing, which the incentive auction will help do, is sharing. And you heard Tom Power talk a little bit about that. And sort of simultaneous with the effort to clear bands of spectrum, we're also looking at how you can share. Share in a geographic sense, or a temporal sense, or, you know, having two compatible uses at the same time. And for us that sort of all of the above needs to be investigated because we're seeing all of the predictions that we saw about data demand were premised on sort of underlying data which is already being outpaced.

The actual data usage is exceeding what was the underlying principles of the analysis that was done for the predictions that said we would have 1315, 20 times increase in data usage over the next five years. And so for us it's, I think, Tom, what did you say? Expeditious and efficient?

MR. POWER: Yeah.

MR. GUTTMAN-MCCABE: We like to think sort of in the John Wooden—you know, be quick, but don't hurry. And so that's where we are. We think all of the above. It's going to need technical solutions that will come from companies like Peter's at Intel and Qualcomm and others. Small cells, pheno cells, pico-cells, but it also take the repurposing of a great deal of spectrum to keep us sort of where we are. We're in a position of envy right now around the world. We have the hottest selling handsets

launched here first. We have about 70 percent of the world's LTE subscribers, even though we only have 6 percent of the world's mobile population. We have the Epicenter, the apps world obviously and so it's a sort of a perfect storm which is positive. We want it to stay that way.

MR. WEST: Thank you. Thomas, in your paper you throw out a number of very interesting ideas, such as not having a maximum reserve price in the auctions, making announcements in terms of future auctions, setting timetables for the release of flexible use licenses. Could you talk a little bit about some of your particular recommendations on how you think the auctions should operate?

MR. HAZLETT: Sure. And I thank you very much for these interesting comments. I've been paying attention and learning something here.

MR. WEST: No new slides though, huh?

MR. HAZLETT: Always be quick, never hurry. That's the John Wooden quote I think.

MR. WEST: Yeah.

MR. HAZLETT: Wonderful. I should have used that one in my PowerPoint slides. Yeah, so the no reserve prices. So let's talk about the reserve auction. I don't think we like the reserve prices in either auction, but in the reserve auction seems to be some kind of an issue about this that's already burgeoning. I want to say that of course we're all in essence speculating about what the structure is. We haven't gotten much guidance from the regulators yet. It's not a critical comment, always be quick never hurry. It's been four months since the legislation so something will come out in due time, but we hope it's not too much time.

Anyway, what we talk about here is all of just high level thinking because we don't have something to react to at this point. So reserve prices. We want the

stations to state their prices. We don't want to give them a limit at which point we cut them off. We want to see what all the actual demands are in terms of what they'll take for payment.

Now of course the FCC is going to take that information and the way I read the legislation they're going to have to make sure that everything pencils out at the end of the day. That there actually is going to be money coming in, in the forward auction to pay. So that's all the reserve -- or that's all the backstop you need on the demands of the broadcasters. There certainly could be a situation where the broadcasters are asking very high prices to move and there will be very little spectrum reallocated—as we'll find out in matching those bids.

So there's no reason to truncate that process with the reserves prices. By the way, on the other side of that the forward licenses this is more controversial I think. I don't think the forward licenses should have reserve prices either. And I've written a lot about this. The reserve price means that the government wants to bid on the spectrum and if a certain price doesn't come in they're going to keep it -- they're going to have a spectrum warehouse where the spectrum will do nothing. And the government thinks it's a better owner, or shepherd than the market, with those rights out there in the marketplace. The prices may go low at some point and they may get higher at other points that may be traded around in ways that don't look like they're stimulating a lot of value, but that's actually a big advance.

So I -- we actually in a -- if somebody is interested I'll send you the paper -- but we've actually estimated in some places -- some countries they've actually withheld spectrum from the market because certain bids did not hit the reserve prices and they've cost their consumers millions and millions of dollars in consumer surplus because they put less spectrum out in the market that withholds capacity and raises prices, restricts the

amount of competition there can be. So reserve prices are problematic.

Timetables, yes. When people bid on a resource they want to know when they get the resource. And if the regulator is going to hold resources back for some number of years that's a problem. It creates uncertainty. It makes bidding problematic. And it leads to kind of quagmire kinds of political disputes down the road. So you want to set some timetables and stick to them.

Now, timetables themselves are not -- they're not all that easy because sometimes people can be in a situation where if they hit a timetable then certain things are triggered and now all of a sudden you're back to square one. So you've got to be careful even on the timetable, but the idea is to get a path here that does tell the bidders when they're going to get the resources and if they don't get the resources then there's some recourse for the bidders.

Did you ask about the relocate -- the releasing the plans ahead of time?

MR. WEST: Yes.

MR. HAZLETT: Yeah. So another thing we recommend is that when the TV stations are going to make their offers bidding in the reverse auction that they have some idea, hopefully a good idea, of what the FCC has in store for the repacking. And so that means that the FCC should be transparent about that. Put that on the table and make bidding a lot easier and presumably the price is lower for the exit or the sharing.

Sharing -- I don't know if this has come up -- I don't think I caught it if it did. Sharing a -- station sharing -- channel sharing, rather, by stations will, if this is done right, almost certainly be a very important way of clearing spectrum. Okay. Because it's a fairly low -- it seems to be a fairly low cost way for stations to continue doing what they're doing now and yet put spectrum for a price in the marketplace. Something I missed?

MR. WEST: No, I think that pretty well covers it.

MR. FRATRIK: Can I just make one comment?

MR. WEST: Sure.

MR. FRATRIK: On just your last comment, Tom, about the sharing. I agree whole heartedly that it's a great aspect of the reverse auction and planning, but I really I think that -- I think it's more than just a low cost. I mean, it's going to be very complicated and so far as about which stations can share with each other in terms of still being able to serve their community of licenses. And to say nothing about relocating antennas and towers and all the technical, I mean, it is engineering, but it isn't -- I don't think we should minimize the steps that need to be taken, even when a stations are shared, but I mean, it can be done but it's not an easy problem to be overcome.

MR. PITSCH: May I add one thing?

MR. WEST: Yeah, Peter, if you want to chirp in.

MR. PITSCH: Yes, just briefly. First, I want to incorporate by reference all of Tom's remarks. I think he's spot on in terms of the direction. Now, we don't know what the FCC is going to do and I reserve the right to get smart around this stuff, but one thing I have learned as I go around the world trying to get spectrum in the marketplace. Government warehousing spectrum is a huge problem. And frankly, some of the biggest proponents of governments warehousing spectrum are incumbents. And so if they aren't ready, if they haven't bedded revenues that they're concerned about, if they fear a new competitor, if they fear a new technology and don't want to update their technology, they're all too willing to go to the government and say, you really shouldn't move now. And it would be country after country would be better off if they got the spectrum in the marketplace, someone would buy it, face the opportunity cost of sitting on it and not moving to a new technology. And so I think it's really important to keep that front and

center.

MR. WEST: And, Peter, could you also address the issue of license versus unlicensed?

MR. PITSCH: Oh, right. Yeah. That -- I think that's a very interesting issue and maybe helps thinking about spectrum in general. One of the issues is well, okay once we free up this spectrum at the -- through the reverse auction, what do we do with it? And as you've heard from all of us I think, even Mark, that the value to society from licensed, high powered, 3G, 4G type services is likely to be enormous. And so the question is should any of this spectrum be unlicensed. And in the legislative discussions and policy discussions and I'm sure this will be a big important part of the FCC discussions.

There will be a question about well, should any of this be used and unlicensed? And one of the ideas that people kick around is, oh maybe we can use the duplex gap. I guess the FCC goes in and says we decided should be paired spectrum and there would be a duplex gap. And some have argued well this is a low opportunity cost way of creating unlicensed. And I want to just put out there that we need to be thinking about this very rigorously because I would submit there is a lot of evidence to believe that any duplex gap, if in fact one exists, doesn't have to be relegated to a low powered use. All you need to do is look at what AT&T bought Qualcomm's media flow spectrum for, roughly $2 billion, a dollar megahertz pop. And they're going to pair it -- this is UHF spectrum -- they're going to pair it with their spectrum at higher bands because in fact there would be a problem using it down in the UHF band, but they could use it at 800, 1.9, wherever and giving the new releases for LTE, the long term evolution spectrum that we've been referring to, this is entirely possible. And that's why AT&T was prepared to pay a dollar a megahertz pop for this spectrum.

So as the FCC goes forward I hope that we have a rigorous discussion of what the value -- the most valuable uses for this spectrum will be and in that context, I strongly suspect that none of this will go to unlicensed.

MR. WEST: So Chris, if you're -- let's put you in the role of advising the FCC. So what advice would you give them in terms of some of things we've been talking about?

MR. GUTTMAN-MCCABE: Be quick, but don't hurry.

MR. WEST: I've heard that before.

MR. GUTTMAN-MCCABE: Yeah. No, I mean, this is -- so and I know they're doing this, but take this enormously complex effort and break it into bite sized pieces. So there are elements of the forward auction that they need to focus on and I would say with regard to the forward auction, the auction two of the ultimate new licensees -- new holders of this spectrum, I would say make sure you don't replicate some of your mistakes in the past.

Their recent 700 megahertz auction was just a -- it was just -- it was poorly designed in the sense that there were no licenses that were fungible. It was difficult for an entity to come in and say I'll bid on, you know, the A-block or the B, or the C, or the D. One had a public safety obligation. One had an open access obligation. So just make sure that you don't try to sort of tailor make the auction for certain business plans, the forward part of it.

The reverse part of it is get out as much information. I think we're all sort of talking off the same song sheet, but get as much information as you can to the broadcasters as soon as possible because likely participants in a reverse auction from the broadcast community are not always going to be those with the most personnel and financial resources. So you're going to need to really do a good job educating them as to

why they may want to participate, why they may want to monetize an asset that this may be their sole opportunity to monetize it in this environment.

And then make sure you make the process -- that the complexity isn't such that it overwhelms parties on either side of the equation. I know some economist may think and ultimately the Commission may decide that a simultaneous reverse and forward auction may make the most sense. I could see someone's head exploding as they're trying to bid on something that they don't know whether or not it exists. And how do you value that and so trying to make the process one that is understandable for both sets of participants, because for -- there is sort of a multitude of reasons, but this is the entirety of the regulatory and policy world is watching the United States to see if this actually works.

And it's important that I works, not only because it can be applied to other potential bands of spectrum, but it's important that it works because we're running out of cleared bands of spectrum, sort of green field bands of spectrum that can be auctioned. So we've got to think of ways of bringing spectrum to market. And a couple of people danced around this a little bit, but one thing I missed is that in addition to clearing spectrum whether and sharing spectrum you really need to have a robust secondary market. There needs to be an understanding at the FCC that to the extent that parties can move spectrum assets from A to B it really needs to be facilitated. It doesn't mean there shouldn't be rigorous reviews, anti-trust reviews, and things like that, but what I'm saying is there needs to be a mechanism by which spectrum -- that whether it's after this incentive auction, or after the auction of some of the government spectrum, but that it can be put to use.

The reason why the government is getting involved in the broadcast spectrum is because it doesn't do a lot of good to clear one six megahertz channel in

New York and then to clear a different six megahertz channel in Chicago and a different one in L.A. You know, the FCC is acting as the entity that will sort of repackage and then repurpose this spectrum. But there are a lot of opportunities where you don't need a government entity to get involved. A secondary market transaction will do just fine.

And we continue to say all of the above. Technology, then repurposing of spectrum is what's going to allow us to sort of continue to innovate and invest.

MR. WEST: Okay. So Tom had a comment on combination bidding, then we're going to open the floor to questions from the audience.

MR. HAZLETT: Yeah, thanks, Darrell. I should have mentioned this before and that is the one thing that does come up and it follows on this idea that it should be expeditious and efficient and not too complicated and so forth, it's time for combination bidding. Okay. Now, in the year 2000 the FCC had a very nice big conference on this out at White River and talked about how they're going to do combination bidding. And they to this day they have not really done it. There's been a little bit sprinkled in, in places where it didn't make a lot of difference.

Combination, or package bidding as it's sometimes called, makes the bidding process for the bidders a lot easier. The irony is it could make figuring out who wins for the regulatory agency, the auctioneer, more difficult. And the FCC has shied away because they don't, you know, for obvious reasons, they don't want too much information burden on the agency. And they're afraid of that, but it's time to cross that threshold and get serious about the bids.

On the reverse auction, you almost have to have combination bids because of these -- I think Mark was talking about all of these stations across over various markets. So putting in a bid just to clear out of Washington, D.C., or Richmond or whatever doesn't make a lot of sense. It has to really, I mean, you could do it that way,

but it's a much more economic and efficient process to have combination bidding. So we certainly pitch that strongly.

The economist are all, I think of that opinion, but it's not a situation where the economists, unusual as it may sound, it's not where the economist are out in outer space saying this really, you know, this really tracks well on our formal model. It's also in the real world with real bidders a big convenience to be able to put in a package bid.

MR. WEST: You should explain a little bit what combination is.

MR. HAZLETT: Well, you if you have multiple TV stations you can put up a bid in that you're offering a certain price for all of the TV stations to exit or share, or you can put a bid that you're going to exit from say two or three different markets because that's where your crossovers are and so it's not just exiting one market. So that it's not just a market by market, station by station bid. So it's a combination or package. And the FCC will have to define that. Again, there are lots of places to screw that up. So, you know, you don't want to just say do whatever you want. You've got to be careful through all of these things. But it is time to go to combinatorial bidding.

MR. WEST: Quick comment, then we're going to move to the audience.

MR. FRATRIK: Sure. I wanted to talk about the combinational bidding and would relate it to the television station. I read it in your paper and I agree it would be nice to have that flexibility, but I don't think that's so necessary for groups of television stations in so far as that they do believe -- they look at themselves as broadcasters and individual markets and if they determine that they want to sell their station, or share their station in Boston that might not affect how they operate in Richmond. I mean, they are distinct markets. So I think it's a nice -- it would be a nice little flexibility, but I would only -- I mean, I think it would just add a lot of complexity, but --

MR. WEST: Okay. Let's move to the audience. We have people with

microphones. We have a question in the very back. So if we can get the microphone over there. If you could give us your name and organization please.

MR. SCHNEIDER: Yeah. Jim Schneider from Isolan and Harvard University's Edmond J. Safra Center for Ethics. So the subtext of the panel is that Washington, D.C. is so corrupt that the only way to get this spectrum used efficiently is to give tens of billions of dollars of rights to the broadcasters. Now, I imagine in ten years from now if a historian comes and asks members of this panel at least several of them will acknowledge yeah, this was all make believe. I was in a panel at Brookings and we engaged in this make believe of win-win-win. I really knew that this was a huge giveaway, but it wasn't in my interests, maybe interest of the public to acknowledge it so we sort of pretended the issue didn't exist, but --

MR. WEST: So Jim, is there a question in there?

MR. HAZLETT: Yeah, really.

MR. SCHNEIDER: Yes, there is. So the question is equity. I'm asking you, many of you are known for making some heroic assumptions and predictions. Your prediction for what percentage of the windfall from rezoning the broadcaster's spectrum giving them flexibility a huge increase in the value of the spectrum. What percentage of that windfall will go to the public versus the broadcast when the dust is settled and the auction -- I know we don't have a lot of details, but again, there's a lot of heroic assumptions and predictions that have been made? Why not have one on the equity argument? I know some people like Tom denied the validity of the assumptions behind my question. And of course I loved his statement that there's no such of an element as regulatory capture. You used those words, but the broadcasters were really a victim of the FCC rather than the FCC being a creature of broadcast lobby over the decades.

MR. WEST: Okay. So that's good.

MR. SCHNEIDER: Anyway, that's an aside. So my question is very precise. Give me a prediction of the percentage of the windfall.

MR. HAZLETT: Just for the record I did not use those words. I said it much differently than that.

MR. SCHNEIDER: I understand.

MR. HAZLETT: But there is no windfall here. Okay. The windfall is already out there. And it's been out there for some decades. And the shareholders that were beneficiaries that windfall, God rest their souls. Now we have a situation where we have a market that looks like this and if you have a better way to do this, okay, you know, put it in the record. I do have a better way to do and I've put it in the record. And they went this way, but if you really want to attack the windfall, put a bill into Congress saying we're going to tax the broadcasters after this is all said and done we're going to take away all their money. And that would be the way to do it. Do it separately and see how that flies, but if you want to do something for society and for consumers, you'll go with some process that's going to reallocate with the cooperation of the broadcasters.

MR. PITSCH: And I would just add first off, it's important for the people in the audience to realize that the vast majority of commercial broadcasters are not the initial licensees. They went in the marketplace, they bought their license. They paid a marketed clearing price for that property. It reflected the imputed value of the spectrum. Okay. So that's for starters. Okay.

The second thing is, is that as Tom and many other auction experts have discussed indeed in our pleadings on this, or documents on the hill, we pointed out this could be structured in a competitive way. So if -- just very briefly, if in fact the market is structured -- the auction is structured properly and there are multiple broadcasters they may get something close to the broadcasting value of this property, because if there are,

let's say ten stations, and the Commission says -- I see a puzzled face so I'm going to try to dive deep on this because I think it's really important point. If there are ten stations that are given market and the Commission may need three, or four, or five to clear.

And they say, okay, everyone give us a bid that you would take knowing that everyone's going to get the price of the cleared station -- the last cleared station. So they get ten bids, for example, and they get ranked from one to ten and the Commission says okay, for -- we can clear -- we can buy out these four stations. All four of them are going to get that price paid to the fourth station. If that process is competitive because if I know that I -- if I get to greedy as a broadcaster, I may not be one of the four. That means that they are going to get something related to the broadcaster -- the fourth broadcasters.

And what's a -- by the way, the beauty of this is you pick the least valuable broadcasters and the value to taxpayers could be in the tens of billions of dollars. You don't have to take my word for it. CBO, who tends to be pretty rigorous about this and has always underestimated the auction revenues generated, has estimated that $24 billion will come to the tax payers.

MR. FRATRIK: Can I? I want to --

MR. WEST: Oh, yeah.

MR. FRATRIK: In your preamble before your question you sort of -- you somewhat disparaged all of us, but let me just speak for myself. Okay.

MR. HAZLETT: Thank you.

MR. FRATRIK: Well, no, I just want to say that -- and I'm going to echo what Tom said, I mean, we're dealing in reality in 2012 whether it's a looming spectrum crisis. I hope you trademarked that phrase.

MR. GUTTMAN-MCCABE: We did.

MR. FRATRIK: Okay. Good.

MR. GUTTMAN-MCCABE: No, I don't think we did.

MR. FRATRIK: I mean, there is a demand and there is this way of getting some spectrum back to other alternative uses. That's the reality of it and the reality is that there will be some broadcasters who will bid to give back their spectrum. Whether it's a windfall, as you suggested, or just an appropriate re-compensation, that's the reality and that's what we're going do it. Outside of that, as Tom suggested, come up with another plan that somehow appropriately and fairly gets that spectrum as quick as you can. I think he wanted to respond to you comment.

MR. GUTTMAN-MCCABE: Yeah, so I'm going to speak loud so my friends at NAB down the block can actually hear me defend them.

MR. FRATRIK: Well, there's some here.

MR. GUTTMAN-MCCABE: Oh, yeah, yeah. Okay. There we go. Yeah.

MR. WEST: I see some over there.

MR. GUTTMAN-MCCABE: Listen, so let's take your premise at its face. So where is the windfall, right? You're asking stations that have actually invested money, build out and are operating to exit the market. How would they exit the market? They would see to someone else. We're asking them to sell to us and the intermediary is the FCC.

In terms of windfall, I would say and Peter talked a little bit about the CBO scoring. I'll throw out Em Health and Intelligent Transportation and Smart Grids and, you know, I'm wearing an Em Health device on my hip at this moment. My house has been transferred to a Smart Grid house. My children in public school in Arlington using mobile education. They have four or five different types of mobile devices in their school. So facilitating that is a windfall for the United States.

So the calculation doesn't begin and end with the transaction at the auction, right? It's what happens after that and the tens, if not hundreds of billions that will immediately flow from that and so what goes to the broadcasters as part of that transaction is a pittance compared to what goes to the American and American economy as a result of that transaction. Whether it's directly to the Treasury or beyond.

MR. SCHNEIDER: I have a factual correction, if I could?

MR. WEST: Sure, quickly.

MR. SCHNEIDER: The CBO estimate, I've seen that at Congressional hearings --

MR. WEST: Can you give him the microphone please?

MR. SCHNEIDER: -- he gave the figure of $24 billion. There's two problems with that. One, I talked to the CBO, the person who gave the estimate. I could give you her name if you wanted to it. She very clearly said that was a composite number that includes the auctioning of government spectrum and broadcast spectrum. And she refused to give the component from the broadcast ponent and she would not deny that if it wasn't essential it is zero net gain. So you can't use apples and oranges --

MR. HAZLETT: Jim, it's just absolutely preposterous. Our coalition hired Coleman Baslon who is one of the leading experts on the auction issue came up with comparable numbers and conservative numbers and the government spectrum if you're talking about white spaces spectrum, is let's face it, it's the Swiss cheese that broadcasters sensibly are located in the holes where all the people are. So the likelihood that a significant portion of that $24 billion would go for spectrum where there's plenty of spectrum already is de minimus.

MR. GUTTMAN-MCCABE: And the $24 billion figure is wrong it's an estimate. But here's the --

MR. WEST: Okay. We have some other people who have questions. Over there in the back. Yep.

MR. MOLLY: How you doing? Ceton Molly with Less Government. Thank you. You mentioned --

SPEAKER: I'm for it.

MR. MOLLY: Thank you. You mentioned the secondary market --

MR. HAZLETT: Occupy spectrum.

MR. MOLLY: Yes. I'd refer to the slide. You mentioned the secondary market being not nearly as vigorous as it should be. I would argue or I'm asking isn't the hyper regulatory nature of this particular FCC especially, where they are slapping illegal conditions on every merger, every deal. They're -- you've got the April 2011 Order on the data roaming. You've got and this doesn't happen in a vacuum. They see net neutrality. They see data roaming. They see all of these illegal conditions placed on -- I'm selling -- I'm taking a side -- all these conditions placed on these mergers without a rule making process, without legislation from Congress. Doesn't that make people who may want to go into a secondary market and spell -- sell spectrum a lot more reluctant and not even enter the -- try to enter the field because they're going to get hammered by the FCC with all these conditions and regulations?

MR. PITSCH: Sure. So first part conditions have been parts of transactions forever and I think most people would, you know, depending upon which side of the equation you're on would say they make absolutely no sense, or they make complete and total sense. I tend to fall on the side of, you know, if it's something that's extremely important that isn't company specific it should be done as part of a rule making. That's what Congress sort of envisioned with the APA.

But to sort of your broader question take it up to the macro level.

Secondary market transactions are absolutely inevitable going forward. And so they need to be facilitated and they should have a robust and rigorous review. You know, we do -- we have anti-trust rules in place for a purpose, but they also -- the transaction itself and the idea of moving an asset that is an asset of the people from a less efficient use to a more efficient use is something that should be fully and completely embraced. I wouldn't say that there's, you know, any significant impediments to it now. It just should be looked at and reviewed, maybe not in the context of an existing, you know, transaction but more holistically as to how do we make sure that we get these and people are starting to look at it.

The white spaces is an example where there's, you know, the Commission is looking at and independent parties are now looking at creating databases to take advantage of areas that are unoccupied. We're looking at it in the context of sharing and can you have a temporal or geographic sharing, or the sharing of compatible uses. But I guess our point is all of the above is going to be absolutely necessary.

And you heard me say it a number of times and people in Congress are getting tired of me saying it in testimony, but everything has to be considered because, you know, Canada -- I just saw an article on Canada saying, there's no looming spectrum crisis in Canada because they're going about that 540 megahertz in the market. They've got 30 million citizens. We've got 330. So we don't have 540 megahertz in our market. So, you know, if you do a simple arithmetic equation, sure if we had, you know, 4,000 megahertz in our market there wouldn't be a looming spectrum crisis in the United States either. So I would say all of the above.

Less Government is generally good. So I applaud the entity as a whole, but there are times where it's needed and this reverse auction is one of them.

MR. WEST: Let's get a couple more questions, just because we're

running out of time. Other questions that people have.

MR. FRATRIK: Could I just add something to what -- it's unfortunate that the trademark won't be profitable in Canada. The other thing that I think is important in part of the forward auction and I've heard some talk about this. I know we're emphasizing reverse auction, is limiting the types of companies that participate in the forward auction. I think you may get an agreement among all of us here that that's just the wrong idea. That you need to have everybody in to get it to the most efficient and best use.

MR. WEST: Other questions? For panel, what is your sense of the timetable on this? I know auctions take years to design and implement, what are we talking about here?

MR. FRATRIK: You're closest to it.

MR. PITSCH: Not it. After the summer beginning of the process at the FCC, in terms of an NPRN, probably.

MR. WEST: 2022?

MR. PITSCH: Statutorily, some of the auctions for the government spectrum are going to happen in the first quarter of 20 -- not auctions, the licenses have to be assigned and finalized by the first quarter of 2015. If the Commission wants to honor its goal of getting 300 megahertz into the market by March of 2015, they're going to have to move somewhat quickly. And that means launching this proceeding late summer, early fall at the latest. And that means launching it. And so then we've got, you know, a significant process.

MR. FRATRIK: By statute they have to have 300 megahertz?

MR. PITSCH: No. That's what I'm saying. So there are two things that are sort of helping to put some pressure on. One is by statute there has to be an auction

of about 70 megahertz of spectrum, and that assignment of the licenses by March of 2015. By their own goals and the National Broadband Plan they were going to have 300 megahertz by February of 2015. So in order to -- in order to get there you need more than the 70 megahertz that's been identified in the legislation. You need the spectrum that's been identified and is part of the broadcast reallocation.

MR. GUTTMAN-MCCABE: I would say this, there are few things that the FCC is doing that have the potential to generate as much for society as this and if they can get it done sooner by adding more people, they ought to do it. And they ought to be taking them away from other areas probably if they need to do it. The delay here could be enormous and what -- just to put this in perspective, as some of us have noted, this spectrum is a non-depletable resource. It's like the wind. If you put up a windmill three years from now, it's not like you can get any -- capture any value of the wind from the prior three years, right? That's exactly what we're talking about here. And there's a net gain to society from this occurring. And if the loss to society is like five percent per year, then you've lost probably 14 percent of the net present value of the spectrum.

So delay is enormously costly here. Yes, let's get it right, but I put emphasis on moving quickly.

MR. HAZLETT: I would also -- with the discussion we had a little bit ago on the estimates of the actual net revenues for the U.S. Government, to be honest I didn't listen to most of that because it's totally uninteresting to me. The numbers are on the side of consumer surplus. And they are at least in order of magnitude above whatever the take is. I mean, look at today's market. There's at least $200 billion in consumer surplus in mobile services. I mean, in the most conservative way you can actually measure it. And it is constrained. You get more service at lower cost, more business models, more competition, even with the same number of actual networks. You got lower

marginal costs for the existing networks -- you get more of everything.

For consumers, when you get more spectrum from that and the consumer gains are extremely large. And when we talk about taking TV stations off the air, we're not talking, with all due respect Peter I think said, the low valued stations. It's not the low valued stations. We're not taking stations out. The stations can stay. Their programming can stay. Okay. We're taking the broadcast facilities out. And there's a huge difference. Okay. There's a massive shift that's already taken place in this country. That much more than 90 percent of TV viewing is on cable and satellite. And the next generation is already here. It's broadband.

And so we have something that has a very low value to society, which is terrestrial broadcast, where stations on a digital multiplex have six program feeds that they're putting out there. And in essence the only one people watch is the one that goes on cable and satellite, the primary feed. And we're reorganizing that. We're losing almost nothing. Okay.

Now, I say that having had an unbelievably upsetting incident last night with four minutes and ten seconds left in the NBA Playoff Championship series. Did I say NBA Playoff Championship series? Did you get this? On DirecTV they cut off all local television. I'm surprised I'm here today. I'm surprised I'm here. I was apoplectic.

MR. FRATRIK: You should have had an outdoor antenna and you could have picked up the station right away and you wouldn't of had a problem.

MR. HAZLETT: Not where I live in Maryland. So that's not even a solution.

MR. WEST: Okay. We have one question --actually, can you hold on until you get to microphone so we can hear you. Give us your name.

MR. WHARTON: Dennis Wharton with NAB.

MR. WEST: Okay.

MR. WHARTON: Dennis Wharton. Mark had a good solution, put up an antenna. And your comment that less than 10 percent of the people --

MR. HAZLETT: For four minutes a year?

MR. WHARTON: -- are -- less than 10 percent of Americans are over the air, that's actually 17 percent, 56 million people. There are new studies that will be coming out very soon that will demonstrate that. So my question to you though is if cell phone companies had every broadcast station out of business in a time of crisis, in a hurricane, in an earthquake, would you be able to communicate, because we know that from history has shown that the cell phone networks crash? If you had every piece of spectrum that broadcasters had -- if you had every piece of spectrum that the Defense Department had, would you be able to communicate in a time of crisis?

MR. HAZLETT: So I was going to make a joke about these are the new tornado warnings. The NBA Playoffs and you don't want to be without the playoffs because you need over the air. And you've made it. You've made -- you've gotten to my punch line before I could.

No, that's not the efficient way to have warnings. And in fact, in my -- where I live we don't have good over the air broadcasting. It's in major parts of the country. So and the 17 percent, look you can jack these numbers up. It's just not, look in our house we have five televisions; one of them just sits there. It's counted as an over the air receiver. I understand how you can jack those numbers up. Of course we don't watch the one that doesn't have satellite and cable programming. I mean, that's the way it goes. 91 percent of households have cable and satellite and that's what they tend to watch. And the people who don't have it tend not to watch television. A lot of my students don't have cable or satellite. They don't watch television. They're law students.

At least they won't admit to watching television.

MR. FRATRIK: They're working so hard for your class, right?

MR. HAZLETT: It must be something else.

MR. WEST: But the part of his question in terms of --

MR. WHARTON: -- crisis situation.

MR. PITSCH: Yes, but I think what another response. I'll be more moderate, A-typically here today. The -- another response is the vast majority of stations even though Tom's point is very telling, are still going to be available over the air after this process. After the dust settles, the smog of day clears the vast majority of over the air broadcasters are still going to be in business, either because they're sharing or they haven't sold out at all.

MR. GUTTMAN-MCCABE: And let's be honest, you know, the idea of we should not pursue this -- I don't know if this is what you're suggesting, Dennis, but it seems that way -- that we should not pursue this because we want to continue to make sure that we can send alerts over the air television seems, I don't know, little strange or misplaced. When the idea of the federal government and the Warn Act and others is to send alerts over a multitude of transmission vehicles just in case you're not in front of your over the air broadcast television, which whatever in front of, whatever percentage that is 9 or 17, or 42.

We just launched, wire stations just launched a voluntary program. Prior to us launching that I was crossing over the GW Bridge and there was a microblast in Arlington that was moving right down Glebe Road. And I didn't hear about this microblast from my broadcast television because I was in my car. I also didn't hear about it from my FM radio, in spite of the fact that I had MIX 107.3 on. I heard about it and my wife did simultaneously from our mobile devices, which we both had on ourselves. And we got an

interesting cadence from a voluntary service from Arlington Alert and that's what told us what was about hit us. And we pulled over and trees dropped, telephone poles were severed in half. I mean, it looked like a war zone. And the only way we heard about it was from our mobile phone. I'm glad we had it. I'm also glad that if we had been at home it would have told us get in your basement on the television or on the radio. It's all of the above.

So the notion that we insert the fact that broadcasters give us, you know, information about it that's fantastic, but I don't think it's part of this discussion or this equation, in spite of the fact that Dennis talks about it and spite of the fact that I've testified in front of Congress a half dozen times over the last six years about it. This has nothing to do with reverse auctions. They are voluntary. The broadcasters that want to participate will participate. Those that don't are going to be protected in some form. So I think it's a little misplaced that five minutes before the end of the program to have a discussion about maintaining over the air broadcast television. So that all broadcasters so that we can get emergency alerts.

MR. WEST: Okay. We have time for one more question right here in the front row. If you can get the microphone over here. And if you could give us your name and organization please?

MR. KOSS: Hi, my name is John Koss. I'm with Mintz Levin, and ML Strategies. I promise I'm not going to throw any rocks at you guys. I'm up here in the front.

MR. HAZLETT: Yeah, your seat is great.

MR. KOSS: Yeah, I love those socks.

MR. FRATRIK: You guys don't see this. Watch this. Look at his shirt.

MR. HAZLETT: I can't help myself. It's got to be a clown question.

MR. KOSS: You mentioned that you're wearing a medical device --

MR. GUTTMAN-MCCABE: I am.

MR. KOSS: -- that operates, you know, on wireless technology. I cover a lot of healthcare stuff for Mintz. So my question is more focused on amends, which are medical area body networks and things like that. What do you think the future or spectrum allocation to those sort of things is going to be, because it seems like based on everything that I've watched the FCC recently that everyone wants to move in that direction and everyone kind of agrees that there should be spectrum available for these sort of things, especially the more advanced monitoring systems that will be able to tell you your heart rate things like that from home so doctors can stay on top of that without having to be wired in the hospital? But it seems like everything is a super slow process here. And this seems like one of the things that really should move quickly and I know the FCC is of the same opinion, but you know, what's going to happen?

MR. GUTTMAN-MCCABE: So this is the device. It monitors my heart rhythms, my heart rate. It is connected. It is branded to a certain carrier who has a couple of people in this audience right now who I won't mention. They're members of CTIA.

MR. HAZLETT: Okay. Good. Good.

MR. GUTTMAN-MCCABE: This is an off the shelf device that has been loaded with the capability to manage -- to monitor a number of leads. And this is done over commercial spectrum. You know, a lot of times we get asked the question about should there be spectrum set aside for mobile health? Should there be spectrum set aside for smart grids? I would argue that in most cases there are a lot of companies in the United States that actually manage networks for a living and do a pretty good job of it. And this is a good example.

If there are instances where there's a need to have, you know, for telemetry, for medical uses to have dedicated spectrum, I can see people wanting that, but then you've got to build a network to actually manage that. And so I think more often than not in order to get products to market you're going to see them launch. We have them -- we call them verticals. The verticals at our tradeshow have exploded compared to sort of the traditional carrier consumer relationship. And almost all of those verticals operate on carrier networks, because the networks are built. They exist. And the reality is these devices are a hell of lot more sophisticated than say our public safety entities have on their built networks.

And so the idea of sharing in the public safety space is moving to using commercial networks so that they can take advantage of scale scope, economies that go with it. So I would say you'll probably see both of the above, you know, standalone issue specific networks, but I think you're going to see a lot more being launched over the commercial networks because of the, you know, you just got to tinker with a little device like this and all of sudden you've got, you know, a product that does just that. It lowers healthcare costs and it allows me to be out here and not tied to a device which I have to then plug into a phone or bring back to the hospital.

MR. KOSS: Right. It's funny you mentioned public safety things because I actually covered the Commission on a meeting yesterday where they talked about the lack of development with public safety with the mesh wide area networks and stuff like that. And they were going to open up spectrum to secondary commercial use because of that.

MR. GUTTMAN-MCCABE: Right. And you see a lot of that. Spectrum is dedicated to a specific use that it doesn't work or it lies foul low and then you've got to go in and reclaim it. Mobile satellite service is a perfect example. You know, it was a

great deal of spectrum was allocated for it. Very, very few companies got off the ground, even those that managed to launch satellites weren't able to make a business model of it. And so were reclaiming it, either through an FCC process or a Dish Network is trying a secondary market approach to try to repackage that spectrum so.

MR. KOSS: Thank you.

MR. WEST: Okay. I want to thank Thomas, Peter, Mark and Chris for sharing your thoughts with us and thank you very much for coming out.

MR. FRATRIK: We didn't disagree on anything.

MR. HAZLETT: Hey, I'm not going to disagree. I've been around too long.

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