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NEW DIRECTIONS FOR PUBLIC SECTOR SPECTRUM POLICY

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P R O C E E D I N G S

MS. MORRISON: Well, good afternoon, everyone. Welcome to Brookings. We are delighted that you could join us here today. My name is Adele Morrison. I am a fellow in the Economic Studies Program here at Brookings.

A couple things before I introduce our speakers. First, I would like to start on a note of gratitude. As a nonpartisan and nonprofit institution. Brookings independent research and analysis publications and events are made possible by the generous support of a video variety of philanthropic individuals and organizations, including Verizon, who we have guests here from today.

Second, I want to just mention that the FCC's anti-collusion rules for the upcoming AWS-3 auction are in effect, so out of respect for the FCC's rules and processes about communications before the auction, we will not be taking public questions on that auction. Not that it particularly pertains to our event today but I just wanted to let you know. If you have any questions, bring questions on that topic, you're welcome to ask the panelists afterwards at the close of the public session.

So you have bios for our distinguished keynote speakers in your handouts, so I'll keep the introductions brief. We're going to hear from two important administration perspectives on spectrum policy today. First, we'll have Jason Furman, the chairman of the President's Council of Economic Advisors (CEA), and he'll share his thoughts on the economic dimensions of the issue. A couple of years ago CEA put out a compelling report on the economic benefits of greater spectrum availability for wireless broadband, and it's great to see the president's economic team continuing its engagement in this issue. Jason has been with the White House in various capacities since 2008. More importantly, he's an alumnus of Brookings, and before he joined the Obama Administration, he was a scholar in our Economic Studies program and the

director of our Hamilton Project.

So Jason is going to make some remarks and take a question or two. And then we'll move directly to our second distinguished speaker, Tom Power. He is the deputy chief technology officer for telecommunications with the White House Office of Science and Technology policy, where he has served since August 2011. Tom spearheads the efforts to coordinate and develop administration policies on telecom and technology issues, and he's had a tremendous role in leading the spectrum and related technology issues at the White House, including commissioning what I think is an extremely useful report that reviews the approaches to sharing or relinquishing agency assigned spectrum that was done by the Science and Technology Policy Institute.

So please join me in welcoming Jason Furman and Tom Power. And Jason, come on up.

(Applause)

MR. FURMAN: Thank you, Adele, for organizing this discussion. I think it's really one of the very important issues that we face in economic policy, because ultimately what we're trying to do in economic policy, the most important thing we can try to do is enhance a concept that economists call total factor productivity, which is the total amount of output you can get from a given amount of capital and labor inputs. And if you look at variations in the growth rate that we've seen in the last 60 years in this country, they hasn't been very much because of changes in labor, they haven't been very much because of changes in the quantity of investment. They've really been because of changes in the quality of investment as manifested in total factor productivity (TFP). In the '50s and '60s, you saw TFP growing at more than 2 percent annually. From 1973 to 1987, it fell to 0.5 percent annually, and in the 30 years since then, it's doubled to a 1 percent growth rate, which still wasn't as good as what came before.

To give some perspective on what this means for people, if we had seen total factor productivity grow at the same rate it grew in the decades leading up to 1973 in the decades following 1973, incomes across the board, all else being equal, would have been 69 percent higher. I think if everyone's incomes were just shifted up 69 percent from where they are now, we'd be maybe a little bit less worried about the whole discussion and debate about inequality.

A key driver of total factor productivity is the level of innovation -- new technologies and opening up new markets, inventing new products. One of the really important ones is what we've seen in terms of wired and wireless broadband, the combination of those with cloud computing, mobile devices, all of which serves as what economists call a general purpose technology or platform technology. That's something that isn't just an innovation in its own right but it's something that can actually -- other innovations build on and have the potential to help speed the pace of innovation.

There was a German study that found that companies that have access to broadband, for example, were 40 percent more likely to increase the amount of new innovation that they do. You see this in health and education, and we're pursuing it there. Maybe Secretary Burwell is talking about health in the room right next to us. ConnectED is a topic we've spent a lot of time on. You see it in public sectors in businesses. You see it in the way we work and manufacture and the way we play and use our leisure time.

All of this is leading to a virtuous cycle in which there's increased demand for bandwidth, which itself leads to increased innovation. But that virtuous cycle also creates a challenge for us, and in particular, it creates a real need for sound spectrum policies. We lead the world in 4G. Half of the global subscriber base is here in the United States, but we want to keep our hold on that lead because that puts us at the

center of an ecosystem involving developing devices, deploying networks, developing the apps to operate on those devices.

And to do all of that, I think we need to pursue a four-part strategy when it comes to spectrum. The first part of that involves reallocating some portions of public health spectrum to its most socially valuable use. We, of course, do not want to disrupt critical defense and public safety operations. However, we must take notice of underutilized ranges of spectrum that were set aside for government use at a time when there was no need to be disciplined in our allocation of spectrum or to use spectrum-efficient technologies.

In the language of resource economics, spectrum has gone from being a nonrivalrous, nonexcludable, nonpriced good, to one that is very much rivalrous. And as a result, we need to find at least some degree of excludability, regulation, or shared stewardship so that it can remain in its most efficient uses. That's why last year the president directed agencies to augment their spectrum reports by including an assessment of their actual use of bands assigned to them, thereby assisting in the process of identifying those bands that would be good for commercial use.

When looked at in a certain way, this idea is simply the latest iteration of a successful and deeply American approach to technological innovation that's been around for a long time. So-called dual-use technologies, like GPS, duct tape, microwave ovens, and even the Internet itself, drew out of what Dorothy Robyn at lunch was telling us, in her argument at least, was the most innovative force in the world, DOD, and the commercialization of those investments was part of what drove the productivity growth we saw, especially in the Post-World War II years.

Spectrum follows in the footsteps of these models, but there's a large disconnect between the practical benefits that as economists we know are there, and

how exactly you implement it. And I think a lot of the papers in discussion today will hopefully help us figure out how to better understand that divide.

The second policy area, in addition to reallocating public spectrum, is one that was in the broadband plan, part of the president's plan, and that Congress passed two years ago, which is voluntary incentive auctions. And that's a very good example of where you have a win-win, where as long as you align the incentives, which if spectrum is more valuable in mobile broadband than it is for a broadcaster, the broadcaster can sell it, the mobile broadband provider can provide it. Both of them, as well as the taxpayer, can be made better off.

A third notion is spectrum sharing, which provides yet another way to squeeze as many growth-inducing benefits out of the spectrum as we can. Under this concept, we can still efficiently allocate even those ranges of spectrum over which a public or private entity does not wish to cede full control but which would otherwise remain vastly underutilized.

While spectrum has long been shared among different kinds of users over frequency, over space, and over time, recent advances in communications technology promise dramatic increases in the intensity and dynamism of sharing. Indeed, it's now possible to envision a future, and it's possible with the help of PCAS, in which all of our communications devices will be able to autonomously negotiate shared use of common spectrum based on pre-agreed rules-based priority ordering. Such an achievement would be a real boom to innovation across all sectors, again in the spirit of communications being a general purpose technology.

I think we have to though have some humility about our present tools for sharing spectrum, be it via manual or autonomous technologies do not yet eliminate the possibility of rivalry or the value of market mechanisms for allocating the scarce resource.

In the context of shared spectrum where new technology may enable multiple tiers of users to co-exist in a band, we should certainly consider innovations in the design of property rights and market mechanisms that could help arbitrate those rights under conditions of local scarcity. For example, we could consider auctioning spectrum usage priority or spectrum time, rather than fully exclusive licenses. On the other hand, as technological innovation relaxes the constraints imposed by congestion scarcity, we should keep in mind that there is no economic rationale for auctioning off exclusive rights to a resource that can be freely shared without degrading its quality.

And that brings us to the fourth and final policy issue, which is the possibilities for unlicensed spectrum, so that we can enable more devices to be used in fixed locations within small radii, such as those we use for Wi-Fi and garage door openers.

One criticism of this policy that is worth acknowledging and addressing is the notion that unlicensed spectrum would amount to a lost opportunity for potential government revenue. I think this perspective by itself is overly narrow and that it doesn't take into account the contributions that unlicensed spectrum would make to our economy overall and thus to our tax revenue, not to mention the social surplus associated with us. And to reiterate an important point from the discussion of spectrum sharing, basic economics suggests that the price for any truly nonrivalrous resource is zero.

I want to emphasize that these four approaches -- clearing federal spectrum for exclusive use, clearing private spectrum -- reallocating private spectrum for exclusive use, shared spectrum, and unlicensed all can and should be undertaken simultaneously, something that I like to borrow the language we use in another context and talk of as an "all of the above" approach to spectrum. They are all compatible with each other, and they'll all be necessary to achieve the president's ambitious goal of

adding 500 MHz of spectrum for mobile broadband over the next decade, nearly doubling its current allocation.

I'd like to conclude by underscoring how much the president personally cares about the management of spectrum. It's an issue that he has personally engaged with us on several times, and that's because he understands that it's a key element of job creation, wage growth, and improvement in living standards. One measure of this interest is that last year the president established a spectrum policy team within the Executive Office of the President, and the next person you'll hear from is the leading force on that spectrum policy team, Tom Power.

But first, I'd be happy to take one or two questions. Thank you.

I think there's a microphone making it your way.

MS. YOUNG: My name is Ni Young.

I think the current, and maybe for decades, equality or social-political sense, so I just wonder if you can really provide some spectrum or any telecommunication pools that would allow people to speak, to complain, and make some public comments on a website. Currently, everything is covered up and a conspiracy. I just wonder how can we have a democracy and economic growth in this sense? So maybe you can have a more precise comment on this.

MR. FURMAN: I think that's a broad question, but I do think, you know, I've mostly spoken to the economics of spectrum, but I think there is a broader political argument for the Internet and the way in which it enables communication and democracy and the fact that a very large fraction of Americans have a smartphone and have access to information from things like Wikipedia that the richest American wouldn't have had access or the ability to do 20 years ago. So I think thinking of this in the broader way in which it fits into our democracy is important beyond just the economics.

If there's one other question; otherwise, Tom will answer everything you would have asked.

Well, thank you very much.

(Applause)

MR. POWER: As he walks out, I'll note how humbling it can be to follow Jason. He's got such a great ability to take the complex economic issues and the complex technical issues and synthesize them down. And an honor to be preceding the panel that's coming after me who have put a lot of thought into this important issue of providing incentives to agencies.

We've seen a lot of success as a country in the wireless space over the last few years, and as Jason said, you know, the president is personally invested in this and it really does make it a lot more interesting and a lot more exciting for folks like me. I was going to take up basketball, but I'm not so good at that, so I decided to go the spectrum route instead because I just try to follow along.

Jason reminds us why this is so important, and as wireless technology serves as a platform for productivity throughout the economy and playing into this virtuous cycle of creating increasing demand which then creates incentives for folks on the edge to be developing new applications and new services, which increase demand, which means there will be more investment in the network and certainly we've seen huge investment over the last few years from the major carriers, as well as on the unlicensed side. And that's the thing we want to keep supporting and keep building. And even in the worst days of the recession, wireless was one area where we actually did see continued growth, including job growth. And as Jason said, we are -- it's sort of every tool that we can. We're trying to pull all the levers to make this continue to be an evolving success story.

So how do we prime that pump, and particularly with respect to agencies? How do we get them to minimize their footprint so that we can continue this virtuous cycle on the commercial side while still allowing the agencies to execute their vital missions? And everyone in this room is, of course, just familiar with sort of the starting point for this discussion, which is the fact that agencies don't incur costs for acquiring spectrum, they don't really incur opportunity costs for sitting on spectrum. And so there's no real incentive for them to shrink their footprint or otherwise free it up to relinquish or share with the commercial side.

Now, we should sort of step back and ask the preliminary question, because some people say why do we need incentives at all? If this is an important public policy goal, isn't this just part of the agency's responsibilities? We do not need to create market incentives for government actors. And interesting, some of the folks who take that position are within the agencies themselves who don't see themselves as market actors and they feel they have a mission to do and they will acquire and use spectrum to execute the mission and they will not acquire or otherwise sit on spectrum if it's not essential to their mission.

To give them some credit, we can look back at the last few years under the sort of existing scheme where the president in 2010 issued a presidential memorandum directing NTIA and the federal agencies and requesting that the FCC as an independent agency work with all of us to free up 500 MHz of spectrum for wireless broadband. And you can sort of see what happened there. NTIA and the agencies got together and they said, well, here's the 3.5 band of spectrum and we're coming up to an order I think later this year. The FCC plans to put in an order on that band. NTIA and the agencies took a look at the 1755 band and kind of teed that one up, and we've got an auction coming up in November on that band. And so we're seeing progress on that

front. We, of course, had the Middle-Class Tax Relief and Job Creation Act of 2012, known to all of us as the Spectrum Act, and the important spectrum provisions there with the incentive auctions coming up next year on the broadcast side, preserving a role for the FCC on unlicensed. We had the H block auction earlier this year, the establishment of First Net, and of course, they just issued their Request for Information to set the framework for the design of that network. And then in 2013, another presidential memorandum, which among other things created the spectrum policy team that Jason made mention of, and did a number of other things a little more tactically, a little more in the weeds than the earlier presidential memorandum.

Jason mentioned one part of it, which is directing the agencies to report on how they actually use spectrum. We often hear folks talking about the need for a spectrum inventory, but an inventory, you know, is sort of a two-dimensional representation of bands and who's in them. It doesn't really tell you how they're using them, and it's really important to understand how they're using them because the agencies use spectrum much differently than most on the commercial side. Agencies get authorized for systems, which use spectrum intermittently during the day, at different times of the week. It's not a 24/7, let's see how much we can actually use it all the time. That's not what those systems need to be doing, so it's really important to understand how they're actually used as opposed to just where the assignment sits. So we're working on that. And NTIA actually has put out a spectrum compendium that starts to dig into this. And if you go to the NTIA website you can dig into this in some more detail.

That 2013 memorandum also directed agencies to be more detailed when they're seeking funding for new systems or new spectrum assignments, that they need to outline with more specificity how they went about determining that this was the most spectrum-efficient way to proceed. And it directed greater collaboration between

government and commercial stakeholders, and that's where we've seen a lot of the progress. And some of the folks in this room I think have the scars perhaps I'll say from the run-up to the AWS-3 auction that's coming up in November, but there has been just a lot of work and a lot of great progress that the credit goes to folks at the agencies at NTIA and all the carriers. A lot of the stakeholders who really worked together, a lot under the aegis of the Commerce Spectrum Management Advisory Committee, to really get in the room and work through the issues.

And so I should pause to thank those folks on all sides, all the stakeholders, but particularly my old colleagues at NTIA, and Larry Strickling at the Defense Department. The CIO's office over there was really leading the charge, both under Teri Takai for most of the last few years, and now her successor Terry Halvorsen. Apparently, you need to be named Terry, I guess, to take over that job. Or maybe people named Terry are better at spectrum management. I don't know. But anyway, they've been doing a great job. And General Wheeler and Fred Moreland -- or Fred Moorefield, my good friend. And John Lehman from the FCC is here today with us and it's really been a remarkable effort those last few years to see it all come together. And so I say all that because there are people who say, look, you can overthink this incentive issue. What we went through the last three years with AWS-3 had a lot of fits and starts but we're getting there. I think we're going to have a successful auction in a few weeks. And so we shouldn't lose sight of the fact that when we do bring folks together and we do commit to an end, we can get there even if it's hard work and not always pretty.

But turning to the sort of various approaches that have been put out there on the issue of incentives, just to sort of set the framework, the existing law creates the Spectrum Relocation Fund, and that's where the proceeds from spectrum auctions go. And before the FCC can proceed with an auction, the FCC has to certify that the

expected auction proceeds will be 110 percent of the expected costs that the agency will incur in relocating. So, in some ways that locks us in, obviously, and we've been going through that hard work over the last year on the AWS-3 auction to make sure that we can contain those agency costs and get to a point where we know that what's going to be freed up will pay for them.

I think ideally you'd like to give the agencies a little more flexibility than that. They sort of have to back into this and really put themselves into a straightjacket when it comes to trying to think about future auction planning. And, you know, the PCAST had a constructive proposal here, which is take existing funds in the spectrum relocation fund and use it to fund R&D going forward, but without quite putting the agencies in that straightjacket of being able to prove to almost a certainty what's going to come out on the other side. You want to have a little faith that they'll be able to work creatively, solve their own mission, free up spectrum, but we get caught in this little catch-22 under the current law where you can have planning money if you can show that there's going to be a return, but you need to do the work in order to get in a position to know which bands to start looking at. And so you need the funding up front but you can't get that funding until you've already got a plan that shows there's going to be the return.

So that's a little bit of a shorthand. It would be good to provide the agencies with a little bit more flexibility there, but you can see it from the other perspective, too, whether it's appropriators on the Hill or OMB who wants some assurance that any kind of investment, any kind of disbursement is going to have a return. We don't want to create large pools of untethered R&D money. I mean, there could be and probably would be great advantage to doing that, but from a budget perspective, that's a hard sell. The point is that shrinking the federal footprint is not an end in itself; it's a means to free up spectrum for innovative commercial use that will

eventually bring great return, boost creativity, and create jobs, while still preserving the federal mission.

So if an investment in that kind of R&D isn't going to have that result, then we don't want to do it. But I'm just trying to articulate the sort of hard place we find ourselves in in wanting to fund innovative R&D, wanting to kind of set loose the innovative folks in the agencies and elsewhere, but without it being a fund without any discipline in terms of how it's been or the return we expect to guess.

I guess another way to look at this same issue is the fact that agencies are almost forced to be reactive rather than proactive in their strategic thinking. And the 1755 to 1780 band, the AWS-3 auction that's coming up, shows this. When the president first came out and said, "Let's find 500 MHz of spectrum," one of the first things that NTIA and the agencies did was identify all 95 MHz spectrum from 1755 up to 1850, and they said this will take us, I think it was 10 years, to get mostly out of at a cost of $18 billion. And a lot on the industry side said, "Well, you know, you're kind of shooting too high here. We don't actually need all that. On the other hand, we need it sooner. On the other hand, we don't want to have to cover $18 billion worth of costs. So why don't we shrink that down to that lower 25 MHz." Which made total sense from that perspective. But from the Agency's perspective it means sort of amputating the systems that you have running in the whole 95 MHz, pushing some of them -- squeezing some of them up just to the upper 70, taking others and moving them up to the 20-25 band. Doable, and we're going to do it. But it's not like long-term strategic planning from the Agency's perspective; it's backing into an answer that best serves the commercial needs. And those are real needs. But it's not a great way, if you're a spectrum manager at an agency, to go about your job. And now, you know, before they've even started this relocation up to the upper 70, folks are starting to say, well, when does that come available for commercial use?

And so we're going to go through this process again. So giving the agencies a little more flexibility to be more strategic, giving them the resources to do that I think would be very helpful.

One place we can look, obviously, is to the incentive broadcast auctions where Congress authorized the FCC to conduct this two-sided auction where we first sort of have the broadcasters bid for the right to relinquish their spectrum and then turn around and after repacking, offer that spectrum to the wireless broadband providers. I guess it was last year or early this year when Congresswoman Matsui and Congressman Guthrie proposed a similar approach on the federal side where the agencies could share in the auction proceeds from spectrum that they free up. So currently, in the current law, there is a form of this where the agencies are paid their relocation costs out of spectrum proceeds. The main feature of the bill from Congresswoman Matsui and Congressman Guthrie was that the auction proceeds that the agencies got wouldn't be so strictly tethered to relocation costs. They could spend it on other items, specifically anything that had been sequestered, anything that had been subject to the sequester a few years ago. So it would have to be spent on things that had been authorized by Congress, so there is some limitation on it, but it wouldn't have to naturally just go back to relocation costs. So it's a nice way of sort of elevating the decision frankly, because rather than simply the spectrum manager essentially being given the incentive or not to move and to take the money to move and maybe you end up better off, maybe you don't, you're elevating it up so that somebody higher up, maybe at the secretary level, can take a look at this and look at spectrum as more of an asset and decide whether there are opportunities to give up spectrum to take funding to spend on potentially completely unrelated projects and initiatives that have been approved by Congress.

So, if there's an approach here that works for the private sector, there's

certainly some merit to taking the same approach among government users. If you talk to the agencies, the one thing they will start by pointing out is that the amount of revenues in the bill that would be reallocated to the agencies after an auction is one percent of the auction revenues, and it will shock you to learn that they think that number could be a little higher. And it's interesting, if you compare it to the existing law where the way the law is phrased, 110 percent of the auction proceeds -- I'm sorry, the auction proceeds have to be 110 percent of agency costs, what that really means is 90 percent of auction revenues could go to agencies if it was exactly 110 percent, versus one percent. And the agencies aren't really going to point out that disparity. Now, they do get more freedom under the Guthrie-Matsui bill as to how they spend that money but, of course, they would love to see that number a little higher.

Another interesting theory that's been put forward, and I think the Commission has looked at this, and I know Commissioner Rosenworcel, has talked about this, which is essentially you would have an auction for the right to negotiate with a federal agency. So you wouldn't know exactly what you're getting. You would know what band you're in. You would know that it's encumbered by the federal agencies, but the hard work of really working with the agencies to find out what they can free up and how much they can free up and what sharing would look like would come after the fact, but the bidder would be bidding for the right not only to have the negotiation, but to then actually compensate and pay for system improvements by the agency to assist them in freeing up the spectrum.

I'm told the law doesn't permit -- today there's something called the Miscellaneous Receipts Act, which actually prohibits you from doing deals with federal agencies, and there's a lot of good reason to not allow people to go do one-off deals with federal agencies. But if you think about it, it makes a lot of sense. If you put it in the

context of the upcoming AWS-3 auction, the Air Force has a big Air Force base down in Florida, and whoever gets the spectrum down there is going to have to go down and work around the Air Force base and all the operations that are going on down there. And DoD has been great at trying to explain the parameters of usage down there and they're trying to shrink their footprint so that sharing can happen as freely as possible, but the real progress will be made after the auction. Somebody is going to bid for that and then they're going to sit down with DoD and they can really get down to brass tacks and talk about where towers go and which way you point transmitters and what power levels you're going to operate at. And I'm pretty confident that the exclusion zone or the coordination zone where these negotiations have to take place, those zones will shrink, but we won't know that until after the auction, until after somebody can sit down and get into this nitty-gritty.

So what if you just bid for that right to negotiate in the first place? What you would have to do is amend this Miscellaneous Receipts Act so that then the winning bidder could actually help pay for system improvements to shrink the federal footprint. It would mean a much lower bid at the auction to begin with, but presumably made up at the backend, and perhaps more than made up because you could really negotiate down the size of the coordination and exclusion zone. So that's another option.

One of the challenges you run into with any of these approaches though is the fact that in any particular band you're liable to have multiple agencies and multiple systems. The 1755 to 1780 band, I believe there were 800 assignments in that band when we started looking at that, and you have to solve for all of them, basically. So you know, you might create some fool-proof incentive plan, at least that works for one agency. Agency A says, "I'll get out of the band," but Agency B, you haven't quite solved for it yet, and maybe getting Agency A out doesn't really unencumber the band enough to

make it worthwhile.

So you've got to get all the agencies rowing in the right direction. And we do that today with NTIA and with a number of the interagency groups, and working with the FCC and working with the broader community. We try to do that, but it's tough because there are just so many different bands in there and the importance of a band and the importance of a system to one agency is going to vary as between agencies.

So one the approaches, of course, that's then proposed when this issue comes up is the BRAC approach, which the BRAC, as some of you probably know, is the Base Closure and Realignment Commission. It's actually, BCRC, but BRAC sounds tougher, so we call it BRAC. And somebody says we just need to BRAC the spectrum. And you've got to do this when you say it.

And this is something that NTIA has never been given the funding or the authority to do. It wouldn't have to be NTIA. It could be OMB who is used to trying to put their foot down with the agencies at some point. So you then get into the real weeds though which is it's not just a question of how spectrum is assigned but how it's used, and you have to get into real operational details. Like at the Air Force base down in Florida, you get into more than questions of spectrum. How many training missions should they run a day or a week? Should law enforcement be doing as much surveillance as they do? Is NOAA's soil moisture studies from the satellites, how are they -- you know, you get into much more than spectrum issues. You get into these real operational issues that would take I think a huge investment to really have somebody looking over the shoulders of the agencies and considering their agency missions and how spectrum plays into it.

But I'll just say, it's extremely heartening that we're having this dialogue. I've laid out a bunch of challenges. I'm sure we're going to get a bunch of answers in a

minute and we'll have this all solved. But the most important thing, thank you to Brookings for organizing this, maintaining this dialogue. I would love to hear from any of you, especially if you're named Terry, because I know you'll have the right answers. But I would love to take a question or two if we've got time.

SPEAKER: So, Tom, you mentioned AWS. Adele said not to ask questions, but the collusion rules involve the individual bidders and communication between them. You mentioned the coordination. Are you confident that there will be adequate coordination just before and after the auction, that it will be successful in terms of the bidders being able to get the spectrum in the timeframe that the agency said they'll be able to get the spectrum?

MR. POWER: Everything seems go. Yeah. I think we're down to five and a half years through the whole transition. So yeah, it's looking very positive.

SPEAKER: So you haven't worked hard enough already on the AWS auction. So I'm already thinking past that. So you mentioned some intriguing legislative ideas. You've got some administratively implementable ideas. What do you see as the policy process going forward, you know, starting maybe December?

MR. POWER: You know, it's just an ongoing dialogue. Obviously, we'll want to see how things go with the AWS-3 auction, although signs are looking good. I think a lot of us are going to be very consumed with the 3.5 rules as well as they come out. But it's just considering the dialogue with folks at the FCC, NTIA, and the Hill to figure out the best way forward. I don't know that there's any silver bullet. We just need to keep pushing on all these levers.

MS. MORRIS: Well, please join me in thanking Tom Power for his excellent remarks.

(Applause)

MS. MORRIS: So now we're set up for our panel discussion. And so we've got presentations by the authors of the three papers that we're releasing today, and if you didn't see them, there are copies of the papers sitting outside at the Welcome Desk.

Our first speaker is going to be Joel Brockner, and then we'll have Dorothy Robyn. And then I'll present the highlights of my paper, and then we'll hear thoughts by our discussant, Scott Wallsten. After that we're going to have a discussion amongst the panelists and then we'll open up to questions from the audience.

You have bios of our panelists in your handouts, so again, I'll keep the introductions brief.

Joe Brockner is the Phillip Hettleman Professor of Business at Columbia University. He is a leading authority on psychological issues in the workplace, and certainly, that could apply to the Federal government. Having worked there I can say that. His expertise involves change management, leadership, and decision-making, and he consults to organizations worldwide about the planning and implementation of significant organizational change. So we thought we'd invite him to contribute his expertise to the design of spectrum management policies, perhaps a little free consulting for the White House on how to manage organizational change.

Dorothy Robyn, our second speaker, is a public policy expert who writes and consults on policy issues related to energy, infrastructure, and telecommunications. She is fresh from her experience as commissioner of the Public Building Service at the General Services Administration, the real-estate arm of the Federal government, and she served as deputy undersecretary of defense for Installations and Environment in the Department of Defense, and she provided the department with oversight of the military bases around the world. And so with all this terrific hands-on management of federal

capital assets, as well as a background in telecom, we thought she'd have uniquely informed insights on how to manage spectrum assets.

And our discussion and moderator, Scott Wallsten, is a vice president for research and a senior fellow at the Technology Policy Institute. His research focuses on telecommunications, regulation, competition, and technology policy, and he's a senior fellow at the Georgetown Center for Business and Public Policy. He has government experience as well at the FCC and the President's Council of Economic Advisors.

Again, I'm Adele Morris. As I said, I'm a fellow here in the Economic Studies Program, and I'm also the policy director for the Climate and Energy Economics Project. And you may rightly wonder what does Climate and Energy have to do with radio spectrum? Well, certainly, as a natural resource economist, I can see some parallels between energy issues and spectrum allocation issues, but the real answer is that about a decade ago, as the natural resource economist for the Treasury Department during the Bush Administration, climate policy was a little slow at the time and so I needed other things to work on. So I became the Treasury's representative to the Interagency Federal Spectrum Policy Taskforce. And this was one of those interagency processes where we got together and we tried to scratch our heads and figure out better ways to do things. And one of our tasks was to look for ways to encourage federal agencies to use spectrum efficiently. And so having been through the process of looking for federal incentives, I know how hard it is, and it doesn't surprise me to see that many of the same problems still occur 10 years later. It is an intractable issue.

So it is good to see new leadership in the Obama Administration, and we're looking forward to the comments of Joel and Dorothy and Scott to help showcase the ideas we're releasing today.

So Joel, come take it away.

MR. BROCKNER: Thanks. Thanks to all of you, and thanks especially to Adele for organizing this.

When I was contacted by Adele I said, you know, I don't know a lot about spectrum, but I do know about the process of planning and implementing and change, and I told a little bit about my thoughts, and she thought that it might have some relevance to what we're talking about here today.

So you see the title of the presentation, "Towards gaining support for federal spectrum reform." The subtitle might appropriately be called, "It's not only what you do; it's how you do it." And to kind of set the context for you, what I've been doing in my work at Columbia in executive education, consulting, research, and so forth, is trying to figure out what makes people in an organizational change situation more likely to get onboard rather than to be resistant? So I put a list of types of changes that we've studied, consulted to, and so forth, downsizing growth, merger, and so on and so forth, and I've left at the bottom your organization because undoubtedly, your organization is going through some type of change as well. And again, what we try to understand are what are the factors that make people get onboard rather than resist, but in particular, what are the factors that people who are in the role of change agents, who are trying to make change happen, that they can actually exert influence over so it's not a grand theoretical exercise but more practical and kind of hard-nosed.

And what we found is two broad categories, neither of which will come as I think as much of a surprise to people in this room. One is the outcome of the change. I think people oftentimes when a change is introduced, they will quickly size up what is this going to mean for me? Am I going to be better off or worse off as a result of the change? Am I going to make more money rather than less? Am I going to have more interesting work to do rather than less interesting work? If it's a relocation, for example, has my

commute to work just gotten longer or shorter? So a variety of changes have implications for whether people see themselves as being better off or worse off. And as you might expect, people are more likely to embrace a change if they think they're going to be better off rather than worse off. And I think that was kind of at the heart of the spectrum policy team's work on trying to come up with incentives. How can we make agencies better off, or at least not worse off, and the more we can make them better off, the more willing they would be to engage in reform -- either sharing or relinquishing their hold on spectrum. So the outcomes matter.

The other broad category of factors that matter over and above outcome, controlling for outcome, is the process. How well was the change process planned and implemented? And I'll say more about that in a moment. But to give you kind of a foreshadowing, were the reasons for the change well-articulated? Is there a sense of vision in how these changes will help organizations move forward? Does it make sense to do this change in light of the vision? Are people going to have to do new behaviors? Have they been trained in order to be able to do those new behaviors? Was there a reasonable amount of advance notice provided or was the change just kind of dumped unceremoniously on people overnight? These and other things go into what I call a "high quality process." And what we're finding is that, again, holding outcomes constant, people are more embracing of change if they feel the process was handled well.

And so let me show you a summary of results across many different studies. This is not one study but rather what I call an artist's rendition of the results of many studies, looking at how people react to change. Will they be embracing or resisting? The higher the score, the more they're onboard with the change. And the numbers show you what I've already said. People react better if the outcome are more favorable rather than less. People react better if the quality of the process is high rather

than low. But there are some other kind of interesting wrinkles that I wanted to call to your attention.

We've all heard the expression "the ends justify the means" or "all is well that ends well." And the numbers are basically illustrating that. They're basically saying that if you look at the outcome favorability of the high column, if people feel they're going to be better off as a result of the change, then they don't really care as much about the quality of the process used to get there. I mean, eight is better than seven, but not a heck of a lot better. All is well that ends well.

It's when the outcome is going to be unfavorable -- so look at the low outcome favorability column, if you will. That's where the process makes much more of a difference. So the difference between five and one, a four point difference, is much greater than the difference you would see if people were on the receiving end of favorable outcomes.

Or look at the numbers horizontally, not simply vertically. What the numbers are also saying is that if you handle the process well, then people's reactions don't depend as much on the favorability of the outcomes. So the incentives that are built in are less consequential as long as the process was handled well. Or put differently, if you don't handle the process well, that's when people are very much taking a "what's in it for me" attitude, in which case the outcomes are much more consequential.

So what the numbers are saying is that if you do one of these well, you don't have to worry about the other one. Give people good outcomes; don't worry about the process. Do the process well; don't worry as much about the favorability of the outcomes. But there's a way in which outcome and process are not interchangeable and that is typically you can't give everybody good outcomes. You are usually financially constrained for making everybody better off. I mean, it would be great if that were the

case, but let's be real. In change situations, some people are made better off and some people are made worse off. So you're more constrained from an outcome point of view.

You're less constrained, however, from a process point of view. In other words, even when you have to make the so-called tough decisions, where some people are going to feel worse off, you can, and should, do the process in a high-quality way. You can explain. You can communicate. You can give advance notice and so forth. These are hard things to do but there is usually not a financially prohibitive price tag associated with doing the process in a high-quality way.

So let me take the last few minutes that I have to articulate what do I mean by doing the process in a high-quality way? I've already kind of alluded to it with a few of my points, but the father of social psychology, Kurt Lewin, maybe 40 -- closer to 60 years ago, talked about change management and it's a series of driving forces and restraining forces. And what he meant by that -- and I'll translate that into the figure that you have in front of you -- if people feel that the driving forces outweigh the restraining forces, they're more likely to get onboard with change.

What do I mean by driving forces? Well, you have to make people dissatisfied with the current state. If people feel that the current situation is just fine, and we see a lot of that in some of the agencies, they feel like "ain't broke, don't fix it. I'm very happy with the way things are." But you have to motivate people to be dissatisfied. You have to make them a little bit uncomfortable, either by showing them that where you're at is about to head south or where your at is okay but you could be doing so much better.

So on the one hand, make people uncomfortable. But if you only do that, you're not going to be a very inspirational change agent. You're going to be seen as too negative, a wet blanket, so you have to show people a better alternative, and that better

alternative is captured by the V word, "vision."

And the third thing that needs to be in place is a process to transition from the dissatisfying current state to the better future state. So it means things like respecting the past ways of doing things. If people feel like the old world order was being disrespected, then they feel disrespected and they're not likely to get on board. You have to work with opinion leaders who have a lot of influence. If they're onboard, they'll help spread the message, and if they're not onboard, they can make life miserable for you. You have to involve people, communicate, train people. Again, provide advance notice and develop a plan. Kind of the who, what, where, why, when details. You don't just give people incentives and then it kind of runs itself. Things have to be put into place in order to make the transition.

So those are the driving forces. And the restraining forces are C. In other words, what Lewin argued is you have to reduce the cost of change. Another way of putting that is you have to lower people's resistance to change. People resist for a variety of change. Those are the costs of change. So what astute change agents do is they figure out what are those basis of resistance, what are the costs, and they find ways to lower the costs.

So unfortunately for any change agent in the room, you know that it's an exhausting process. A lot of stuff has to be in place, and that's essentially what the model is suggesting as well. If D and V and P and C are all there, change will happen. It's quite intentional that I put a multiplication sign between D and V and between V and P. It's my way of communicating that all of the above need to be in place. 100 X 100 X 0 is still 0. So if those three driving forces in the change process -- D, V, and P -- can outweigh the restraining force -- C, basis of resistance -- change will happen.

Thanks very much.

(Applause)

MS. ROBYN: Thank you. Great to be here.

Spectrum is property. It's a form of property. And in the last couple of years, among the many proposals that are out there to improve the process of managing federal spectrum, our proposals that are inspired by approaches or institutions in the area of property, real property management, creating a GSA, General Services Administration, to spectrum, applying the BRAC process, Base Realignment and Closure Process, to spectrum. Tom mentioned that.

So I think it was with that in mind that Adele asked me to take my last five years of experience in managing federal real property and apply it to spectrum. And I do it wearing, in the paper -- it's a weird paper because I'm wearing two hats. Part of the time I've got my public policy hat on and analyzing some of the proposals from that perspective, and other times I'm wearing my GSA/DOD hat.

Let me talk this morning -- let me hit a couple of highlights from the part of the paper where I wear my GSA/DOD hat and try to draw some lessons from federal real property.

First of all, how many of you are familiar with the GSA for spectrum proposal? Okay, most of you are familiar with that. I think most of the people who have proposed that are actually in this room. I see Blair Levin and Tom Lenard. I think that proposal is motivated principally by the notion that GSA charges agencies rent, and it should really be the Public Building Service for Spectrum. I headed PBS, the Public Building Service, one of two business lines at GSA. And that's what we're talking about, but I'll refer to it as GSA. So we charged agencies rents, commercial equivalent rents, and presumably that created incentives for efficient use of space. In addition, I think GSA is seen as an agency that can impose more discipline on unruly federal users, federal

hoarders of spectrum than NTIA can.

So my bottom line is I think the GSA, the Public Building Service, is a good model for NTIA to emulate, but not necessarily for the reasons that people say. I think the -- and I struggled a lot with the notion of spectrum fees. Part of me wants to embrace the concept. I think it's enormously appealing. My GSA-DOD experience tells me that the transactions cost of charging agencies spectrum fees equivalent to GSA rents would be prohibitive.

GSA spends a lot of resources calculating what commercial equivalent rents are. The auditors come in every five years. It's very detailed and it's very contentious. That's the key. Even though we're talking about federal agencies, it is very contentious. An enormous amount of effort devoted to one particular issue -- and there are many -- how do you measure vertical space in a building? That's a big deal in a courthouse or a new federal building. You have a lot of atrium space. How do you count that? I kid you not, there have been GAO reports, congressional hearings devoted to that. It gets down in the weeds, and agencies are poised to be very contentious around what their rent charge is.

With spectrum, you've got many more assignments than you do federal buildings. You have lots of agencies sharing certain types of spectrum, geographic timesharing. It's much more complex, and economists disagree about how easy it would be to calculate what the commercial equivalent value of spectrum would be. Even if you can do that, there are a lot more opportunities for agencies to dispute that charge. So I think the transactions costs would be very, very high to that approach.

GSA is -- also the Public Building Service -- not a model of sort of "kick butt" kind of, you know, what I think some people have in mind. They actually only control a fairly small amount of the federal real estate footprint because most of it is

under DOD control. Does that sound familiar from the spectrum world? Specialized space, not individual agencies control that. So it isn't an instrument of enormous central control.

All of that said, I think it is a good model for a couple of reasons. One, they do approach -- it is a mini business -- the Public Building Service. They approach -- they have valuable assets and they approach them the way a business would, and charging rents is one of many ways they do that.

Second, property disposal. Getting rid of excess federal property, underutilized property is a passion. It's a mindset. GSA was created after World War II. A lot of surplus war assets, so that culture is still very deep. They are the property disposal agent for the Federal government with some exceptions. That's a very useful culture, I think, when you think about spectrum.

Third, they play a dual role of being cop and trusted partner. On the one hand, a quasi-regulatory role. No, you can't be in that nice building. You have to be in this less nice federal building. You can't have that much space. So you're a cop. On the other hand, we want to work with you like a partner. And that's a very hard balancing act, but I think it is one -- it's a similar sort of dual role that NTIA has to play. So I'm thumbs down on fees, but I think GSA is a good model for NTIA to emulate.

Let me come back to property disposal because that is a big deal in the real property world and I think there may be some lessons that are applicable. And I identify three lessons in the paper.

The third one, and the big one, and it took me a while to figure out that anybody -- that not everybody just automatically agreed with this -- but in the federal property area, federal agencies are very, very responsive to an opportunity to make money. They are allowed to retain -- most agencies can retain 100 percent of the

proceeds from the sale of their property. This is a fairly recent development, and some of it came with BRAC. It is a very, very strong motivator. This is how the Office of the Secretary of Defense in the late '80s got the military services interested in undertaking another BRAC round, holding out the prospect that they could keep the proceeds, and DoD got legislation. That entailed delegating GSA's disposal authority -- property disposal authority directly to DoD. That was the way they could get the proceeds. They'd go into a BRAC fund and the services can spend that money.

The details matter. And I have lots of anecdotes. I'll mention enhanced use leases. This is a form of property disposal. A military base or GSA can lease out underutilized property to a developer in exchange for cash or in-kind services. It's a long-term transaction. GSA just did the old post office, a six-year lease to the Trump organization. In the early days of enhanced use leases in DoD, 100 percent of the money the statute said went to the department. All of the work goes on at a military base level. The bases weren't doing anything. The law got changed to say half of the money could go to the base and the projects really started to flow.

So if the incentive is structured correctly, it can make a big difference. Who has the disposal authority makes a big difference. It was important for DoD to get the disposal authority directly for BRAC property. Not only because they wanted the proceeds but also because that determined the environmental cleanup standard and the environmental remediation cost associated with individual pieces of property. The stakes were very high. They didn't want to entrust that to GSA. They did that directly. So it mattered who had that authority.

Finally, I think the third lesson I would say is there are a variety of tools that are available in the real property area and that facilitate property disposal. Long-term leasing, like the enhanced use lease or the outlease of the old post office is a very,

very important one. If you do an outlease, you don't have to go through the very, very complicated federal property disposal process and you can retain the property for long-term use.

Exchange. Property exchange is an important approach. It's basically barter. GSA is currently doing something that is very, very analogous to dealing with a problem of federal hoarding of real property. Volpe Center, it's a Department of Transportation R&D facility and it sits on 14 acres in Kendall Square in Cambridge, Massachusetts, some of the most valuable real estate in the country. It's an old NASA facility right in the heart of Kendall Square, right next to MIT. And they are exploring an exchange whereby they would convey to a developer a large portion of that property in exchange for construction services to renovate and create a state-of-the-art facility for the Department of Transportation. I think there are a lot of opportunities like that in the spectrum area.

Okay, I just got the stop sign. Did I say don't use BRAC, it's a bad process? Not for that, but it doesn't work for spectrum.

Thank you.

(Applause)

MR. MORRIS: So, in my paper, I first reflect on why this is such a hard problem. And just to go through some of the reasons why we're still talking about incentives for agencies 10 years after -- I mean, we're having a lot of the same conversations. And just to run through some of the reasons.

Number one, federal agencies have a lot of legitimate, high-value uses for spectrum. So, you know, it's not that we need to relocate them. They're doing a very important mission and many of those missions are not accomplishable in other ways. And it's also very hard for any kind of authority to know exactly how agencies could do

things better. It's extremely technically difficult. Often there are security issues involved. There's a big information asymmetry.

There's also extreme coordination problems. You may have many agencies with safety of life issues sharing a particular band. It's not so easy to just go in there and clear it out and figure out what else to do. And each time you go into a band and try to analyze it and find a way to clear it, each of those projects is different because the uses are different, the existing systems are different, there's no economics of scale really in doing these kinds of transactions. And as Dorothy mentioned, agencies don't have clear property rights over their spectrum, and they don't have the disposal authority to engage in those kinds of conversations and transactions directly with the private sector potential users of that spectrum.

And there are some genuine rigidities. There are a number of things like international agreements or laws of physics that govern why a particular band needs to be used a certain way by the Federal government. And it's very difficult if there are policies that White House or Congress is trying to get agencies to change, if the agencies don't really buy into that, it's easy enough to just wait out the next administration. I mean, energetic and spectrum savvy political appointees come and go, and if you're someone in the trenches who is opposed to whatever the initiative du jour is, it's generally a feasible strategy to just kind of drag your feet and eventually it will go away.

So I guess all of this makes me conclude that fundamentally, if we're going to have reforms, they have to be in the interest of the federal agencies. You've got to set up a system where the system leads them to generate the outcomes that we're trying to obtain.

So I have five specific recommendations in my paper. The first, as you've already heard alluded to today is to establish clear, technologically neutral rights to

spectrum and give those rights to the agencies. That means that contracts -- contracts are always easier to construct if there's a clear exchange of rights. So it starts with having the potential supplier of those rights having clear rights themselves and giving the agencies more control over those outcomes. Giving them the disposal authority that Dorothy was talking about. That doesn't mean that you give them the right to any and all possible transactions. I mean, there might be guidance you need to give in certain bands or around certain technology. And it doesn't mean they get to keep 100 percent of the revenue and do whatever they want with it. I mean, there are standard rules within government about how these things work. But the more clear and the more complete the rights are to the agencies, I think that's an enabling condition for all the other possible incentives to work.

My second recommendation is to have agencies or NTIA keep updated asset balance sheets showing the commercial value of the spectrum resource that the Federal government occupies. Now, why would you do that if you're not going to sell it all? Why would you even go through the trouble of monetizing it? The idea is to -- I mean, we do this for all sorts of capital assets within Federal government. If we have a dam or a power plant or a hospital, we record those capital assets in our financial sheets. I'm not saying we should do something as formal as federal accounting for spectrum, but having a clear idea what that opportunity value of spectrum and private sector hands might be would capture the attention of high-level officials within an agency. And given that they then have the disposal authority, that might generate some attention for those possibilities. Of course, you know, that's easier said than done but OMB has issued new guidance under circular A11 to do the same kind of calculation in procurement processes. I don't see why you couldn’t do something similar for existing spectrum inventories.

My third recommendation, again, is to allow agencies to benefit from these transactions. So that means allowing them to keep as much revenue as possible and giving them as much flexibility as possible on how to use those revenues. As Dorothy said, this will be motivating, and it creates -- these transactions are potentially so beneficial to society that we shouldn't worry so much about how the agency spends the money. I would just say that yes, normally in good government you want all that discipline over spending, but in this case, the gains from the incentive effects of allowing agencies to use those revenues flexibility, even if they suboptimally spend that revenue, the consumer and producer surplus that can be gained from these transactions are going to dominate any loss of efficiency from agency spending. And to be clear, the agency spending might well have social benefits as well in these tight budget environments. So it's not like they're necessarily going to just squander all the money.

And so the Guthrie-Matsui bill I think goes in the right direction but not far enough. So those kinds of authorities but where agencies keep more of the revenue and can use it more flexibly I think would be very useful. And I give a couple of examples in my paper about -- Dorothy mentioned enhanced use leasing. There are other federal agencies that have sort of preauthorized spending authorities. The Forest Service can do it with certain kinds of forest land. They sell some forest land. They can keep the revenue and buy some other forest land. I don't see why those kinds of creative arrangements couldn't work.

My fourth recommendation is to engage trusted intermediaries. I think one of the fallacies is assuming that federal agencies know how to construct these spectrum transactions and they're simply not doing it. That's a lot of work to go through all the varied systems and how they use spectrum. And think of all the different ways it can be done and construct commercially attractive deals of one kind or another. And

think of what all the parameters of those contracts might look like. That I would argue is not a core competence of Federal government agencies. So it suggests to me a role for a trusted intermediary, perhaps a federally funded research and development center, maybe private contractors who could bring to bear some expertise, both in radio engineering and economics and finance. But bring parties together who can be a trusted agent for the federal agencies and provide some of those heavy lifting analytical services. And I think it's possible to construct some incentive contracts that reward these intermediaries if they manage to identify a successful transaction.

My final recommendation is around thinking carefully about what these transactions might look like. Typically, we've been thinking about clearing exclusive use spectrum with a very broad geographic area, ideal for commercial users no doubt, but probably not feasible for a lot of the federal spectrum and use. But other kinds of arrangements might be feasible. Maybe we could do some more leasing. Now, to do leasing, I think the key is to ensure that federal agencies are confident that at the end of the lease period they will get their spectrum back. And it stands to reason why they want to keep some spectrum for future system needs, but maybe they don't need it for 10 years or 20 years, and they can allow others to use it temporarily. But how do they ensure that they're going to get it back? And so I have some ideas in the paper about how to do that.

Dorothy mentioned barter arrangements. I think this has tremendous potential where agencies trade their spectrum resources for other goods and services. And I think the technology necessary to do more creative sharing is also an important role for the government, and allow agencies to adopt technologies. Maybe it's flexible frequency technologies or technologies that sense the location and prevent unauthorized transmissions in geographically excluded zones; the main point being to allow financial

innovation and technical innovation to go towards helping these creative transactions work.

So I'll close there and then Scott, we'll have your thoughts on these topics.

(Applause)

MR. WALLSTEN: So thanks, Adele, for inviting me, and for convening this discussion.

So I have the easiest task. I didn't actually have to write a paper; I just get to talk, which is always a good position to be in.

And so I want to back up just a bit to remind everybody why we care about this issue and just to discuss kind of its magnitude. People in this room probably generally know this but it's just worth reiterating.

From a GAO report in 2012, it tries to estimate how much spectrum the Federal government holds, which is a very difficult exercise. And they estimate about 18 percent of what is considered to be valuable spectrum from 250 MHz to 3.7 GHz is exclusive federal use, and if you take into account where the Federal government has effectively exclusive use, it's somewhere between they say 39 to 57 percent.

If you sort of take the same numbers that others use to estimate spectrum value, which is a big no-no in lots of way, but at a dollar a MHz a pop, basically we're talking between $200 billion to $600 billion in assets that the Federal government gets to use without having to consider its opportunity cost. That's a big deal. And so we care about it not just because of increasing demand of wireless services, but because it is inherently a valuable asset. I mean, it's an input into these wireless services but the price of spectrum goes up and down with different transactions and depends on demand for wireless services and also changes in technology. But any way you look at it within a

huge range of spectrum values, this is a very large, very valuable resource that the government doesn't have to think about when it uses. We wouldn't even consider allowing it to have $200 billion worth of oil, for example, without having to pay for it.

So now to focus on the papers themselves, they're very complementary, so I'll go in backwards order. Adele's paper focuses on the conditions necessary for large-scale reforms to happen, which starts with defining the agencies' rights over the spectrums that they're assigned. Increasing transparency by simply accounting for the spectrum. That shouldn't be such a bit deal at all. Publicly traded companies will value spectrum on their balance sheets as something that they own. So they're clearly necessary. And she and Dorothy also both note the need for properly compensating the agencies for anything they give up. The Matsui bill, which would give them one percent, obviously isn't anywhere close to creating the right incentive. Maybe 100 percent is too much, but that's 100 times the one percent. We know it's got to be closer to the 100 percent than the one percent.

Now, Dorothy focuses on the institutional reforms. So Adele focuses on the conditions to set it up and Dorothy focuses on the institutional reforms, looking at different proposals and where they may and may not be useful. One thing that is important right away is that she says it's easier to find the problems than it is to find the solutions. And it is. It's a huge problem. And she goes very well through the different proposals, also finding the advantages in them.

And, oh, by the way, my favorite quote so far is that GSA has a disposal -- "disposal is a passion." I don't know if that's on the letterhead, but I can't imagine many for whom disposal is a passion.

She reminds us that Cos had another paper on spectrum -- not the one that most people talk about -- where he advocated property rights for federal spectrum

also but was opposed to sort of increasing centralization of spectrum. And she draws on her experience with GSA to show where it would be useful and what are the potential problems. But one of the things that struck me when reading about this was that a lot of the incentives for agencies with respect to GSA are exactly the same or similar to agencies with respect to spectrum. Agencies want to have control over their own buildings, building processes, their own property, just like agencies want to have control over their own spectrum.

So how did GSA happen? What were the conditions that led them to overcome those obstacles? I think that might be really informative for this process. We know some of the details in how this all works would be different, but I think it would be useful to know how in one case this overcame it.

Now, Joel points out that the process of reforms matter, and especially that the more undesirable reforms themselves to relevant actors, the more important the process is because it has to take into account everyone's incentives, which is not just the agency's but also the people who work at the agencies who maybe were responsible for spectrum and might not be so interested in this because it means if they give away spectrum, it might also mean giving away their jobs.

Now, I think it's also worth pointing out that agencies can use process to delay as well as to move forward. And they have done that. And I think, Adele, you were just saying that, well, they can just sort of draw out the argument until this administration is done and then we have to start over with the next administration. And this administration had to start over from the previous administration. So that's also something to think about.

But also I think probably, and this isn't a fair question for Joel because he hasn't done spectrum in particular, and I'm speaking more generally, but in some ways

we've seen nothing but process for the last 20 years. And so the question is what's wrong with the current process? Maybe we've seen very little progress for 20 years because the process is wrong. I'm not sure. Maybe that's part of it and so we should be rethinking the process. I don't know.

Now, and then a final point on this. All the papers allude to it but don't say it explicitly, Congress is another important actor in this, and what is Congress's objective? Is it to get revenue from the spectrum? If it's to get revenue from the spectrum, that conflicts with trying to incentivize agencies to give up spectrum.

Now, finally, all of the papers -- Dorothy and Adele's papers note that government has already given up a fair amount of spectrum over the last few years, and so government agencies are worried about that. Well, that also indicates some progress. Right? These small steps. And it's worth, first of all, looking to see whether we can learn anything from those steps that have actually allowed us to make some progress, or if that in itself is the answer; that it will always be just small, incremental steps. And while we should be looking for the big solution, maybe really the way forward, despite all of its problems and difficulties, is identifying these incremental places where there are opportunities, because you can identify the problems, you can identify the solutions, you can identify who exactly is involved, and so it's worth not overlooking the progress in that way that it's been made, and probably, you know, in some ways is related to this constant push for a big change. Even though the big change hasn't happened, it's kept people interested in this.

Now, finally, one final point. The government also has increased wireless services -- increased use of wireless services, and the papers note that. And so they have their own need for spectrum. And some agencies also have certain mission critical, public safety, security concerns, secret confidential security concerns. And that's

certainly true, but it's also the case that agencies can use that as an excuse to not even enter into a debate. We always have -- security and public safety is often used as a reason to claim the need for more resources without engaging in a rational discussion of those resources. And so recognizing that those are real needs, that's not an excuse to not debate the issue.

So I guess I'm supposed to start a discussion among you. And I'm going to start off with sort of a very broad question.

How far do you think we've come in the last 20 years?

MS. ROBYN: I don't know that you have the best group of people here to answer that question. My sense is that we've come quite a ways. I don't know how much of the spectrum that was auctioned off in the '90s was federal spectrum, but certainly, a lot of it was. I think, I mean, I know from having been in DoD for three years, they are feeling the pinch. There is a lot of concern about this. Now, that doesn't necessarily translate into the kind of action you want to see, but I think agencies -- I think certainly at high levels recognize this is not a free good any longer.

MS. MORRIS: I think one way in which we're unambiguously making progress is in the technology and the social benefits that come from wireless applications. I mean, there's just no question, and Jason said this very well, that the new technologies and that broader system of the technologies -- the apps, the spectrum, et cetera -- has done enormous things to society and allowed us to do so many things so much better. And that's true, I think, within the Federal government, although that's kind of a pate to American households. I mean, the technology within the Federal government community has moved forward very well. I think the challenge within the Federal government is to create the same kinds of accelerated demand for new technologies and more spectrum efficient technologies that appear in the commercial sector. So finding a

way to make sure that the Federal government is taking advantage of all the potential technological leaps is part of this effort.

MR. WALLSTEN: So if we bring technology into it, spectrum sharing is the current hot topic in this area, and there are lots of ways to define spectrum sharing. Has this changed anyone's underlying -- not underlying incentives, but underlying calculus of what are the costs and benefits of entering into this? Or is it just, as I guess Coleman was saying earlier, it's just another technology among the lots that we use and hasn't really affected the incentives at all?

MS. ROBYN: I think it probably creates more room for negotiation. I mean, sharing -- the history of spectrum -- I'm not an engineer, and when I hear sharing I think, well, gee, that's sort of the history of spectrum. CDMA is one of the -- one of the many wireless technologies that came out of the military. The military is -- they may be -- they are using very antiquated equipment in a lot of places. They are, nevertheless, the greatest engine of technological innovation ever devised. And the reason for that is because it's supply and demand under one roof. They are providing the technology that the warfighters use, and so they make sure that it's very good, and a lot of that is test and evaluation. But sharing has been -- sharing in the CDMA sense and other sense has been perceived as being in the military's interest, and I think there is an openness to embracing some of these new technologies because it's good for the military because they have to operate under very difficult circumstances. And so learning to do that is a positive thing.

I think -- I'm not convinced how far we are in terms of the dynamic spectrum access and some of the technologies needed to do the spectrum superhighway, but I think that it certainly creates more opportunities for deals than if you have to -- if agencies have to entirely clear out of a band. I think that's a different

proposition than one where they can still be there. The private sector can help them figure out where there is opportunity for sharing of the band.

MR. WALLSTEN: Is there a chance that sharing could work in the other direction, too? That government users want to use civilian spectrum and use sharing as a way to move in that direction and get some spectrum back?

MS. ROBYN: Yeah, I mean, this is an old -- this is a long, long time debate and fight within -- that I've been involved in for a long time. Jason used the term "dual use." I think of it as commercial military integration, changing the acquisition process so that DoD is using business practices and using commercial technology, not necessarily off-the-shelf, but taking advantage of commercial technology. It is no longer out ahead in a lot of areas; the commercial sector is. And so being able to tap into that. And that's a long, long fight and debate. But yes, there is a lot more room for that. I mean, satellite systems are one. Being able to use commercial satellite systems as opposed to military-unique. But I think that the big use of spectrum by the Defense Department is for the remaining big bands that they're in are for some military unique systems like radar. And I think -- let me just -- this a little bit going beyond your question but I want to make sure that I mention it.

I think a big problem here -- and it's very parallel to the problem in real property -- is you have DoD sitting on bands with these very old systems that are very spectrum -- they're spectrum hogs. They don't have the upfront funding to invest in upgrading the system. The Federal government doesn't have a capital budget. That's a capital investment. You have to have the money upfront. You can't borrow it. That's a problem. The scoring rules, the budget rules are a serious problem here. But I think that is part of what explains the government's inefficiency is the FAA. The second biggest user, same thing. Some of these approaches, like barter, like the one Tom mentioned

where you're bidding on the right to negotiate with federal agencies, those create an opportunity for the private sector to do deals. I think there are a lot of deals to be done here, and it is a way for the Federal government to get that upfront funding to upgrade systems that it can't get directly.

MS. MORRIS: So I would just point out there are a number of federal employees in this room that have BlackBerrys. So to answer your question, the Federal government is already using commercial wireless services in ways that people don't think of, but yes, there's plenty of private sector spectrum at use in the furtherance of the federal mission. And I think as commercial providers, the applications expand, the technology expands. There might be more ways to outsource wireless needs from the Federal government and procure that from the private sector and thereby, unlease underutilized federal spectrum or availability to the private sector.

I was wondering if I could ask Dorothy a question. So in all my interagency dealings, there was one conversation I kept having that I just want to relate. It's a conversation with a federal agency where there's a conflation between the value of the input of the spectrum. Like, I was talking about balance sheets and the monetary value of that asset. And the monetization of the output of the federal mission. And it just seemed that we were kind of at loggerheads that because I wanted to monetize the input, the implication was that I was trying to monetize the output. And I don't want to be in a position of trying to monetize a secure national defense or any of the other important federal missions.

And I just point out that we price all manner of other inputs. You know, federal employees have wages. That's a pretty open market. We buy pencils. We buy tanks. What's your impression? Have you had similar conversations with regard to any of the other kind of federal property managed? What would be your response in that kind

of conversation?

MS. ROBYN: I've had that same conversation.

First of all, let me point out, it isn't the only big, unpriced input. Federal land is not a priced input. The Department of Defense occupies 28 million acres of land, about half of that is withdrawn from the Bureau of Land Management. That is not a priced input. A lot of it, low opportunity cost; a lot of it, high opportunity cost. I mean, think about the Navy yard and Fort McNair and Fort Myer just in this area. So not all inputs are priced.

I think it's just a foreign concept. It's a foreign concept. And I think people aren't used to thinking about it that way. It isn't a commodity. It isn't approached as a commodity, and more spectrum may be more reliability. This is a point Larry Strickling emphasized to me the other day when I talked to him. If you're a procurement officer in the Department of Defense and you're buying a system, you want low risk. You want something that is not going to screw up because the life of somebody in another country behind the lines depends on it. And so you want certainty, and that may well be something that uses more spectrum rather than less.

Now, you and I would say, okay, fine. It's not inconsistent with that to take the price into account, but that isn't done. I think it should be. I think that is an area for reform, is getting the price -- it's an alternative to fees. It's a backdoor way of getting at the same thing of spectrum fees to make that part of the acquisition process. Whether it's DoD or FAA, the price of spectrum. And you can make it a competitive discriminator for contractors in a new weapons system. There are 30 spectrum-using features of the Joint Strike Fighter. I don't know how many of those are under the control of Lockheed-Martin or not. I suspect Lockheed-Martin and other contractors would like to see spectrum made a competitive disseminator so that it becomes part of the price

performance tradeoff. But something like that takes a while. That is not a simple change.

MR. WALLSTEN: We should take questions in just a second. Also, Adele, I thought you were going to make a different point when you pointed out that the Federal government users are carrying BlackBerrys.

Other people get it.

MS. MORRIS: The case is technological.

MR. WALLSTEN: Exactly.

But I wanted to ask Joel. So you've been thinking about spectrum for a while now and putting it into the context of your world. If this were, you know, if the Federal government or somebody came to you and said, "Help us solve this problem." And based on your insights, where would you start? Not what changes would you make, but where would you start looking for the problems, why it's been at such an impasse for 20 years?

MR. BROCKNER: Yeah, well, that DVP model that I showed on the screen, it's one of these easier said than done. I mean, everybody would look at it and say, "Yeah, that makes sense. You can't argue with that one."

I think it's because it just requires a tremendous amount of human energy. Usually it's not so much a financially costly thing as it is to be a high-quality change agent requires making yourself available to people, being willing to tell them the tough news. I was once doing a workshop in a downsizing organization and I was talking about survivor syndrome and how they needed to get tough and they needed to take the organization forward. And they didn't want to hear that message, and it was a painful audience to work with. And I said, "Gee, now I know what the managers in this place are going through." Because I could kind of go in and out that day. I had to incur their wrath,

but at least I was going home, and the checked cleared. So it worked out okay.

But I learned a lot that day about what it would be like to work in that kind of environment where you have to be the bearer of bad news. And the tendency is to kind of want to run away. And when you're running away, it's kind of the antithesis of doing the good things that I showed you earlier.

So then it becomes a matter of how do we build in resilience among change agents? One of my recommendations is that they form support groups with one another. It's lonely at the top. That they go home, or even at work, do something self-affirming, because so much of what it means to be a bearer of bad news is that you feel lousy about yourself. So you have to kind of take care of yourself psychologically as you're trying to take care of your people at the same time. And that's hard work. Again, it's not a financially hard thing, but it's a psychologically hard thing.

MR. WALLSTEN: Questions?

Yeah, the gentleman here

MR. BRODSKY: Mark Brodsky, retired CEO. Has dealt lots of changes.

I have a question about leasing. You all refer to leasing and all the incentives associated with it. And to me a large part of it is the uncertainty you brought out of the future. You don't know how valuable or how useful this property would be in the future.

My question is not just the public sector spectrum, but in general, spectrum, has the government been moving to rather than selling assets to disposing of assets? And that would apply to land as well. Just the leasing of the assets, I think it's probably counter to the public interests, financially as well as future use, to sell these things. They're so valuable, with unknown value in the future. Leasing should seem to be more general policy than it has been.

MS. ROBYN: I'm really glad you asked that, and I've struggled with this because when I was at -- GSA has moved heavily over the last 25 years in the direction of leasing space for federal agencies as opposed to ownership. That is not the right answer in the building world if you are the federal government. That has been driven by these crazy budget scoring rules. In the old days, GSA would enter -- like a homeowner, they would enter into a 30-year lease, structured so that at the end of the 30 years they owned the building. If you're the Federal government, you have a very long-term perspective. You want to own rather than lease under most circumstances. GSA has been driven to leasing space by crazy budget rules, by the absence of a capital budget. The Department of Transportation headquarters, which you may know down along the Anacostia River, that's a $450 million building built for DOT, world famous architect. They lease it. That's a leased building. It's the Department of Transportation headquarters. It is a leased building. At the end of 15 years, having spent half again what it cost to build it, they will have to renegotiate, recompete. Anyway, you've struck a chord.

So why is it different on the spectrum side? I think it's the opportunity cost of it. I mean, because I do come to a different answer in the spectrum world. It's better to have the Federal government be using what's commercially available.

MR. BRODSKY: (off mic)

MS. ROBYN: Well, through outleasing. Yeah, I mean, there again, so why does the Federal government do outleasing? In some cases, with enhanced use leases, frankly, it's often because you don't want to go through the ordeal of the federal property disposal process where you have to make property available to the homeless, to state and local -- you know, you're trying to serve a lot of masters. Or you can't actually get the money because the money goes to Treasury and you lease it. Or a property like

the old post office, it's a historically, you know, it's got historic value. And even there, the big fight with OMB and GSA. OMB wanted to sell it. Why don't you just auction this off? And we said no. We want to retain this. And then there's also conservation value to a lot of the land that DoD owns, these 28 million acres. A lot of that serves good conservation purposes. I don't think you have that in the spectrum area, and the opportunity cost is just completely different.

MR. WALLSTEN: Another question? Yeah.

MS. YOUNG: My name is Ni Young.

First, I appreciate your presentation, but for almost every terminology you mentioned, I have relative question and doubt because I'm sure the government can do a lot better. Every public budget or plan or goods and services, whether it's a lease or BRAC or leasing, outleasing or inleasing, always in unfair terms or conditions. So every time (inaudible) they say there is nothing else for consumers or school children. So I want the government to be sure to save all the spectrum, all the capability of telecommunication for consumers, for taxpayers, for school children first before you're leasing out or sell out or leasing out.

MS. MORRIS: Well, I'd say one of the things we're really trying to focus here on is trying to strike the right balance of the value of the spectrum resource for federal government operations and the extreme value of the spectrum for the benefit of Americans as consumers of wireless of services and all the related technologies. So it's really a governance question. You've got a resource. You can use it different ways. How do you construct the right portfolio of ownership by the federal government, ownership by the private sector, unlicensed uses, et cetera? And so we're just grappling with how do you benefit society the most across all these potential uses.

Do we have any other questions? There's one in the back.

COLEMAN: Thanks for your papers.

An underlying premise here is that the Federal government's use of spectrum is inefficient and that it's obvious that there should be transitions from federal to private sector uses. And I won't ask you to justify that. But I will ask you how do we know we've won? What's the end state that we're looking for and how do we evaluate whether we've been successful in changing the balance?

MS. MORRIS: You know, I'm really glad you asked that, Coleman, because I've thought about that question, and it is really hard. There's certainly no -- I don't know of any good way to prove the social welfare value of spectrum as it exists now and alternative allocations, but I do think it's interesting. If you create the right incentives for agencies and nothing changes, you probably know we're about at the right point. So I guess what I keep thinking is, look, if you set up a bill, for example, that lets agencies keep all the revenue and they still don't do any spectrum transactions, then you've learned something. You haven't resulted in any new federal agency spending and the agencies have revealed their preference to keep the spectrums that they have. I think the trick is to create a preference revelation mechanism and see what happens, and then we'll know.

MR. WALLSTEN: Blair?

MR. LEVIN: I'd like to challenge that assumption. What you've learned is what I think England learned, if I recall correctly, when they tried a similar, and what they learned is that the heads of the agencies basically concluded that that which Congress giveth, Congress can taketh away, or I guess Parliament. In other words, okay, an agency gets a $10 million windfall because they sold spectrum, and then the next year the Congressional Budget Committee cuts their budget by $10 million. That would be the likely outcome and they know that.

The second, I think Dorothy absolutely is correct in referring to it, my experience with agencies is the downside risk is much more significant than the upside opportunity. I'm sure there is someone with the Secret Service right now who is just haunted by the fact that they saved the government a few thousand dollars by having a few fewer people on the shift so that when the president was going off on the helicopter, you know, the front gate was basically unguarded or something like that. No one will ever get credit for that budget, right, but they certainly get the blame for when something bad happens. So, while I'm not philosophically opposed to agencies getting the money, I just think as an empirical matter, at least my experience in government, and we talked about this when we were doing the plan, suggests it may actually not reveal what we might think of from an economic sense is real preferences.

MS. ROBYN: I want to disagree. I totally agree with your last point. I fundamentally disagree with the first one. As I said, it took me a while to realize there are actually people who think that money doesn't motivate federal agencies. Believe me, it does. And I don't think it would be --

MR. LEVIN: (off mic)

MS. ROBYN: This is a parlor game of theoreticians who say that the appropriators are going to come in and make up the difference. The budget process is very, very sticky.

So GSA got $5.5 billion to renovate buildings under our stimulus funding, and it probably is not a coincidence that the three following years Congress diverted out of the Federal Building Fund about $5 billion. But the services wouldn't fight so hard to sell off their property at the highest value if they thought that that money was going to be taken out the next year. It just don't work. The budget process is very sticky. So I think you really -- I think we're missing an important tool if we take that attitude that it won't

matter. It does matter.

MS. MORRIS: But I want to add that your point is right. To the extent the federal agencies don't have the incentives net of these budget and appropriations process, then you're not going to see much activity. So that tells me, you know, you can't have the White House on the one hand telling agencies they need to make their spectrum use more efficient and then have OMB kind of in their dismantling the incentives you so carefully created; right? And likewise, Congress can't be pressuring federal agencies and then the appropriators in the committees messing it all up. So think you've kind of got to speak with one voice from the Executive Branch and the Legislative Branch to keep those incentives intact. And my point to the appropriators and to OMB is it is absolutely a false economy to not keep those incentives intact and to use kind of, you know, appeals to federal budgeting norms to undermine those incentives. We've got to find ways to keep the incentives intact as much as possible through all those processes.

MR. WALLSTEN: Dorothy, are you as confident of this within an agency? You pointed out that OMB doesn't have a lot of control over DoD. If a unit of DoD sells spectrum, will then DoD move money around? Is their budget process as sticky?

MS. ROBYN: I don't know. I mean, I think -- in the paper I use -- well, I think I mentioned the enhanced use lease example where it didn't -- the bases didn't respond at the point where the money was going to the department. It wasn't until the law was changed to say that the individual installation could keep 50 percent of the money that you got a response. I mean, that was all it took.

Another example I use, it's a little bit different but it's the same principal. When the Office of the Secretary of Defense enticed the services in the late '80s with the prospect of being able to keep the proceeds from the sale of their property, they worked

out an internal arrangement with the services that you will get -- each service will get 50 percent of the money from your property. The other 50 percent, I, OSD, will allocate to the services on an as-needed -- on the basis of need. You know, for related stuff, but it will be on the basis of need.

Now, the Navy had what was seen as the most valuable properties that were likely to be closed. Things along the California Coast. Mare Island, Treasure Island, Long Beach Naval Shipyard. The Navy agreed to that 50/50 arrangement, but they didn't like it. They Navy didn't play in the first two BRAC rounds. And insiders say that was the reason that they didn't play, because they felt it was unfair and they weren't getting their fair share. So I think the details make a difference. And who knows? Maybe the agencies, maybe these people are all wrong, but they think that this is a big deal and they act as if it's a big deal.

MR. WALLSTEN: Adele, this is your show. Do you want to wrap up?

MS. MORRIS: Well, I hope you will join me in thanking the panelists for this discussion. I'd like to thank the audience for coming and for all your good questions, and we look forward, I hope, to continuing this conversation and helping Tom and Jason in their difficult challenges ahead. So thank you all very much.

(Applause)

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