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BENCHMARKS

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1 P R O C E E D I N G S

2 MR. STOCKDALE: The purpose of this
3 workshop is to explore various metrics or
4 benchmarks, as required by Congress, and for
5 evaluating the various dimensions of broadband
6 across geographic areas and across time.

7 These benchmarks may include such
8 metrics as measures of broadband deployment and
9 adoption, measures of speed and quality of
10 service, and measures of competition.

11 These benchmarks can be used to chart
12 our progress over time, as well as to identify
13 areas where additional efforts are required.

14 We have a distinguished panel here today
15 to offer their important thoughts -- their
16 thoughts on this important issue.

17 They are Gregory Rosston, Richard
18 Clarke, Scott Berendt, Harold Feld, Catherine
19 Sandoval, and Jon Eisenberg.

20 In addition, joining me on the panel as
21 questioners are Jon Peha, Chief Technologist at
22 the FCC; Nicholas Maynard, Economic Research

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1 Manager of FCC's National Broadband Task Force;
2 and Kenneth Lynch, Industry Economist in the
3 Wireline Competition Bureau's Industry and
4 Technology Division.

5 I will provide a brief bio for each
6 speaker just prior to his presentation.

7 But I referred the audience to the
8 agenda on the broadband.gov web site for a more
9 detailed, but still abbreviated bio of each of the
10 speakers.

11 I ask the panelists to limit their
12 initial comments to 10 minutes, please, so that
13 there will be sufficient time for discussion and
14 questions.

15 After the presentations, FCC staff may
16 ask him questions, and then we will take questions
17 from the audience, both those physically present
18 in this room and those watching on the Internet.

19 And I have been asked to note that it is
20 also possible to submit questions via Twitter.

21 Okay. So our first speaker today is
22 Gregory Rosston.

1 Professor Rosston is the Deputy Director
2 of the Stanford Institute for Economic Policy
3 Research and the Deputy Director for the Public
4 Policy Program at Stanford University.

5 He is also a lecturer in Economics and
6 Public Policy there.

7 Greg, earlier in his career, served as
8 Deputy Chief Economist at the FCC, during the
9 implementation of the Telecommunications Act of
10 1996, where I had the pleasure of working with
11 him.

12 Greg earned his Ph.D. In Economics from
13 Stanford. And, Greg, please go ahead.

14 MR. ROSSTON: Thank you for having me,
15 and I especially want to thank Don Stockdale for
16 the years of hard work that he's done at the FCC
17 as an exemplary public servant. I don't need that
18 because I'm from Silicon Valley, and I don't have
19 PowerPoint slides.

20 The FCC has an important task here of
21 providing this broadband plan to Congress. In my
22 short presentation, I want to talk about three

1 issues regarding the overall topic of benchmarks,
2 which is sort of an amorphous title that we were
3 given.

4 International comparisons can be useful,
5 but they can also be misleading. It's important
6 to understand the benefits of broadband, and third
7 is that costs are also an important factor to
8 consider.

9 And benchmarks, as someone told me
10 earlier today, could benchmarks are good. They're
11 -- benchmarks are useful if it's done in an
12 appropriate way, and what I wanted to do is sort
13 of put together a framework for what can and
14 should be measured compared, and more importantly
15 what we can learn from different benchmarks.

16 So just in context, we're talking now in
17 this country about healthcare, and everybody
18 thinks more healthcare is better, more broadband
19 is better.

20 We're talking about this unfortunately
21 in -- we don't focus -- we don't have an attempt,
22 so far as I can see in this broadband debate,

1 about how to quantify the benefits and costs of
2 broadband. People say broadband is good. More
3 broadband is better, and that's great.

4 But we also need to know how much does
5 it cost. I think more broadband is better, and it
6 would be good to have more of it, but I want to
7 make sure we understand what does it cost and how
8 to do it.

9 One of the hot button issues in this
10 debate has been international comparisons and
11 ranking of the U.S. in terms of how do we rate
12 internationally in terms of broadband adoption.

13 What -- thinking about these
14 comparisons, we have laboratory in the United
15 States. We have 50 different states and the
16 District of Columbia, and we have a lot of
17 learning and benchmarks that we can do from this
18 laboratory of the states.

19 As an academic, I, you know, have to
20 resort to citing my own work. Recently, I've
21 completed a SIEPR discussion paper with Dan
22 Ackerberg, Mike Riordan, and Brad Wimmer where we

1 looked at low- income and lifeline telephone
2 programs, and we have data on 7,000 different wire
3 centers. And we look at what are the important
4 aspects. We note that there are differences in
5 the adoption of telephone by low-income people in
6 different things, but we don't just stop there and
7 say, "Well, there are differences. Let's provide
8 a table."

9 It's what are the different programs
10 that exist in different states and what are the
11 things that drive adoption?

12 Using this -- so one important factor
13 that we found was transactions costs. States that
14 have automatic enrollment in lifeline and linkup
15 plans tend to have higher penetration rates among
16 low-income households, even though as they don't
17 necessarily take it -- take the lifeline and link
18 up programs, but these adoption programs and
19 transactions costs are an important factor.

20 If we can use benchmarks to figure out
21 what is driving the different adoption rates,
22 that's a good way of using these, not just

1 providing a list.

2 So while our study is detailed and
3 sophisticated econometrically, simple headlines
4 comparisons still can be very powerful, like in
5 the space race when we were behind the -- behind
6 Russia, it caused something to happen.

7 The question is should you cause
8 something to happen just because of headlines, and
9 I don't think that we necessarily should try to do
10 something more because we're "behind," but we
11 should find out what we can learn about why we're
12 behind and what factors will affect it.

13 So adoption is one measure that you can
14 -- something you can measure, and it's been
15 focused on because it's easily measured, it's
16 easily understood, but does it tell us anything?

17 So, first, what you'd want to do is try
18 and figure out what policy answer you'd want to
19 come up with.

20 The way to think about this requires a
21 number of steps. First of all, assessing where do
22 we stand in this, and not necessarily comparing us

1 to other countries, but maybe absolutely is it
2 right for our country.

3 Second, what benefits would come from
4 program to accelerate our position more than it
5 would change from normal government (inaudible)
6 and market changes.

7 Third, what are the costs of those
8 changes? And fourth, can we justify those costs
9 from a societal perspective? Who would pay? What
10 are the different changes that would occur because
11 of that?

12 So, we have right now -- the United
13 States ranks differently depending upon what
14 measure you use internationally. And I want to
15 focus -- just a minute to talk about the
16 international comparisons I've seen.

17 The OECD, which a lot of people cite,
18 has the Internet penetration per capita of 26
19 percent in the United States.

20 Well, if you're -- if every household
21 were like mine, and we have four people, that
22 would be great because then we'd be at 100 percent

1 penetration.

2 But because four people share one
3 broadband line in my house.

4 So the OECD has been criticized for this
5 fact that they don't take into account households.

6 PointCast provides some data that looks
7 at household penetration, and they have a huge
8 number of countries where they provide penetration
9 rates per household. Unfortunately, they don't
10 have household broadband; they just take broadband
11 lines and divide by households.

12 Scott Walston has taken some other data
13 -- point topic as to closer to 75 percent. Scott
14 Walston has done some work on a series of trying
15 to figure out what about residential penetration
16 per household incomes -- he uses for the United
17 States John Horrigan's Pew and Internet American
18 Life Survey, so I assume that the Commission has
19 access to this data that shows it's basically
20 about 63 percent of households.

21 You know, as a side note, when you look
22 at these international comparisons, we need to

1 make sure that there are margins of error in all
2 of these surveys, and I've never seen anybody
3 mention or stress that these things need to be
4 taken with a grain of salt on that.

5 But the rankings are not an end of
6 themselves. It's -- you need to think about --
7 well, what does it cost -- what would happen --
8 what could happen -- first of all, how far behind
9 other countries are we? If we are six months
10 behind, is that making a difference in our
11 competitiveness?

12 How does -- if we're thinking about
13 comparing with other countries, does our
14 comparison with other countries think of -- do we
15 need to compete with them on a household level or
16 is it on a business level -- for consumer goods or
17 on business side.

18 So we need to think about how do these
19 things affect it and what are we trying to do.
20 The -- then once you have these measures, you need
21 to think about both benefits and costs.

22 So starting with benefits, there are two

1 kinds of benefits that you can think of -- private
2 benefits and public benefits or externalities.

3 In addition, some people might argue
4 that there is a societal right to access. So, for
5 the moment, I'm going to assume a fixed notion of
6 something called broadband, and even with that,
7 things are complicated to measure. It gets harder
8 with different gradations of broadband, and I'll
9 come back to that at the end.

10 Private benefits are relatively
11 straightforward. What are people willing to pay
12 for broadband? And then, if you think that
13 there's some people who can't afford it, you want
14 to deal with those with income transfer programs.

15 Most economists would want to have a --
16 you know, trying to get these private benefits to
17 try to reduce the price and increase the quantity.
18 And that way, you'd have higher consumer surplus.

19 There are two particularly good analyses
20 of broadband benefits. Savage and Waldman have a
21 study from 2002 to show the increased value of
22 broadband, and then Greenstein and McDevitt have

1 also looked at the incremental value of broadband.

2 These numbers are much smaller than most
3 people have come up as a value of broadband, in
4 part, because they don't look at the externalities
5 of broadband. Unfortunately, no one has really
6 come up with a good way to analyze the value of
7 the externalities from broadband.

8 I think that's an important area of
9 research, especially if people are going to try to
10 justify the expenditures based on externalities,
11 we should have some idea of whether these
12 externalities are big or small or real or
13 imagined.

14 So finally one other thing is that -- I
15 think we have a feedback over there -- thinking
16 about general purpose technologies as an
17 externality, that Tim Bresnahan at Stanford has
18 come up with this idea called general purpose
19 technology, like electricity drives a lot of other
20 innovation.

21 The Internet and broadband may be a
22 general purpose technology, and it's difficult to

1 figure out the value of that.

2 But it's important to think about that
3 when you're trying to measure costs and benefits.
4 The cost side is what are we trying to measure
5 here? What are the costs of broadband? What are
6 the costs of extending broadband to different
7 areas? It's going to be a different cost in
8 different areas.

9 I got a group together of 71 -- or a
10 bunch of us got a group together of 71 economists
11 who submitted comments to the NTIA and Rural
12 Utility Service as part of the broadband stimulus
13 package, trying to get them to use reverse
14 auctions -- Dennis Weller's in the audience who
15 should -- who was part of reverse auctions
16 initially for universal service -- to minimize the
17 cost of per new subscriber added, to try to figure
18 out how can you make benchmarks between a system
19 in rural Texas versus one in rural South Carolina?

20 Well, the best way to get a benchmark in
21 my mind is to have a competitive benchmark, and
22 you had these different areas compete against each

1 other to get subsidy funds by agreeing to accept
2 the least amount of subsidy.

3 Finally, I want to I guess is that we
4 need to think about how do we pay -- if we want to
5 increase -- if we find that the benefits of
6 benefits of broadband do outweigh the costs, how
7 do we then determine a reasonable and efficient
8 way to pay for it?

9 Benefits -- benchmarks should be --
10 basically, in the end, benchmarks should be used
11 to understand what factors in the market are not
12 working and how policy can be more effective.

13 It's not from simple adoption horse
14 races, but from ways like our paper where you can
15 look at what factors will increase broadband at
16 the least possible cost.

17 So I haven't been able to have time to
18 address other important issues like businesses
19 versus residence in terms of measuring prices,
20 speed, latency, and other things and how different
21 pricing plans can be compared, but I think those
22 are important issues, and maybe we'll get to those

1 in the Question and Answer period.

2 Thank you very much for having me.

3 MR. STOCKDALE: Thank you, Greg. Our
4 next speaker is Richard Clarke. Dr. Clarke is
5 the Assistant Vice President, Public Policy at
6 AT&T, where he is responsible for AT&T's economic
7 and competitive public policies for
8 telecommunications.

9 Since joining Bell Labs in 1986 -- you
10 did yourself there, Rich -- Dr. Clarke has worked
11 on almost every area of telecommunications
12 regulation.

13 Dr. Clarke earned his Ph.D. In
14 Economics from Harvard. Rich?

15 MR. CLARKE: Okay. Thanks, Nick and Don
16 for inviting me to speak on how to benchmark
17 broadband.

18 Benchmarking and indexing are the art of
19 taking a lot of data and condensing it into a
20 small set of parameters that are easy to follow
21 over time or over different geographical regions.

22 But for broadband benchmarking to be

1 useful, it's essential that these benchmarks
2 reflect accurately the clear policy goals of the
3 Commission, not just to ensure their relevance in
4 the whole process that's being undertaken to
5 develop a national broadband policy, but also
6 because you can expect providers to teach to the
7 Commission's test.

8 So if you set out a wrong benchmark, you
9 may get wrong performance as a result. But
10 second, it's also important that the policy goals
11 selected be related directly to U.S. customer
12 welfare.

13 As Greg has noted, attempting to align
14 U.S. Benchmarks with benchmarks adopted in
15 foreign environments should be approached with
16 great caution. As the example pointed out, the
17 OECD's benchmark for measuring fixed broadband
18 penetration is lines per capita. But fixed
19 broadband lines typically serve a complete
20 household, and households in the U.S. are
21 generally larger than those in other OECD
22 countries.

1 But also household sizes vary greatly
2 across the different United States, with household
3 sizes in Utah exceeding those in the District of
4 Columbia by roughly 54 percent.

5 So if you want to accurately measure or
6 benchmark the U.S. against worldwide performance
7 and penetration or benchmark the performance of
8 individual states against each other, it's
9 essential that you probably not use per capita
10 penetration because it probably could be rather
11 misleading.

12 Similarly, the ITU's benchmark for a
13 country's network capacity is its quantity of
14 international bandwidth per domestic user. Not
15 surprisingly, Luxembourg is the champion of this
16 measure, as few content providers cited economic
17 to locate servers within Luxembourg to service its
18 relatively small domestic market.

19 In contrast, the U.S. is a laggard in
20 the ITU's ranking because the immensity of its
21 market makes efficient pretty much for every
22 content provider to serve U.S. demand from

1 domestic caches rather through expensive
2 international bandwidth.

3 Finally, it's important that goals be
4 brought in stable. This is essential to ensure
5 the relevance of the benchmark overtime, and to
6 avoid the inaccuracies that may result from
7 excessive granularity.

8 After setting goals, the next step is to
9 choose specific benchmarks. These appear to fall
10 into three general categories. Is broadband
11 available? How does it perform? And what is its
12 price?

13 While availability may be the simplest
14 of these to measure -- is it just a yes or no
15 answer -- but availability over what geography?
16 We're all familiar that availability at the
17 five-digit ZIP code level has been criticized for
18 as being too vague, while data at the individual
19 street address has been criticized as being more
20 inaccurate and perhaps too burdensome to handle.

21 But the most complicated aspects of
22 broadband benchmarking are likely to be in the

1 indexing of the performance and price of available
2 broadband services.

3 The reason why broadband performance is
4 an important but difficult characteristic to
5 benchmark is because different broadband uses they
6 have very different network performance
7 requirements. This chart illustrates the mix of
8 network capabilities needed by a few of the more
9 popular web applications and how they can vary
10 greatly across different of these web
11 applications.

12 So how should we measure broadband
13 performance? Well, it often seems that speed is
14 the only characteristic mentioned when describing
15 broadband capability, more particularly the speed
16 is used as a shorthand for what I would call
17 advertised maximum potential download speed in the
18 last mile access link, there are many other
19 important performance components for broadband.

20 Not only do these include the multiple
21 flavors of speed -- are you talking about upload
22 speed, download speed, the maximum, the minimum,

1 an average, how sensitive is it to time of day
2 variations and the like, but also how much monthly
3 bandwidth do people need to use. Is this
4 bandwidth required to be used in the peak period
5 or off- peak period? Is it upstream or
6 downstream? What's the latency required in
7 performance of the network? What's its packet
8 loss and jitter?

9 All of these things can make very big
10 differences in the effectiveness or the capability
11 of your broadband line to support particular
12 applications that you may wish to use.

13 But there's a limit to how many
14 different things you can benchmark. These
15 characteristics are broadband can be very numerous
16 and their performance is often sensitive to
17 particular customer usage patterns and particular
18 neighborhoods at different times of day. It may
19 vary a great deal. Collecting average figures
20 over a day may hide important details that it
21 becomes very complicated just to say well, I just
22 want to make the longest was possible of

1 performance characteristics, and I'm going to
2 benchmark them, each one of them, individually.

3 So often what people think of is that
4 instead let's create an index of these performance
5 characteristics, but this is challenging in itself
6 because different users may have different
7 relative values or weights for different of the
8 performance components.

9 You need to determine these weights, and
10 that these weights need to remain stable over time
11 in order to have an effective index. Another
12 possibility, or solution to this problem, is to
13 let consumers determine for themselves the
14 relative importance of different broadband
15 performance components and measure their implicit
16 scoring of how well Broadbent performs for them by
17 conducting a poll of their satisfaction as opposed
18 to asking how they feel about each component.

19 Finally, we come to price, which has to
20 be a record, given an economist takes almost to
21 his last slide to deal with this issue.

22 Price itself has many different

1 attributes. How you should measure price depends
2 on the policy goal for the benchmark. Is it to
3 measure the affordability of a minimum defined
4 broadband service? Or the price paid for a
5 particular state-of-the-art technological
6 capability?

7 Are we looking to find out what the
8 price is of the best by service in a market? The
9 average by service in the market? Or maybe the
10 worst deal in the market?

11 The list is fairly long as to how many
12 different price measures one can develop and each
13 one can have a very different purpose and
14 usefulness to the Commission.

15 Okay. Another thorny issue occurs
16 because broadband service is most commonly
17 produced in conjunction with other services such
18 as PSTN, voice or cable television. So what's the
19 most relevant price? Is it what I'll call the
20 standalone price if you buy, you know, what people
21 commonly -- naked broadband service? Or is it an
22 incremental price where you consider bad than to

1 be part of a double play, where perhaps DSL is
2 bought in conjunction with PSTN voice or cable
3 modem service is bought as an add- on to cable
4 television service?

5 Or is it part -- the incremental price
6 is part of a triple play, where all three of these
7 services are combined together?

8 When you look at this total bundle price
9 perhaps that's the most accurately measured item
10 because commonly -- or it's rather common in the
11 U.S. for people to consume all three of these
12 services and given the cost complementarities
13 between them, you know, that that might be the
14 most useful or most accurately measured parameter.

15 I'll note that a number of the ways in
16 which price has been measured have some very
17 significant difficulties with them. For example,
18 the OECD's current practice for indexing broadband
19 prices is to report an unweighted average price
20 for a rather idiosyncratic or eclectic collection
21 of plans that the OECD decided to sample off of
22 company websites, and not to adjust the different

1 prices for each one of these plans, but the actual
2 sales popularity of the plan or of the provider's
3 market share within the country.

4 Furthermore, their current practices
5 they don't adjust for performance differences
6 between plans, such as differences in speed or
7 bandwidth usage limits, overage fees, or other
8 features. They are proposing to reform this in
9 some upcoming price index reports they put out,
10 but they have not done that so far.

11 Finally, price comparisons that are
12 reduced to U.S. dollars at purchasing power parity
13 per advertised megabit of speed. This latter
14 practice tends to lionize the highest advertised
15 speed services over lower advertised speed
16 services, as well as services that were bought in
17 western and northern European markets over those
18 purchasing the Americas because of their
19 idiosyncratic exchange rate that they use.

20 Finally, any benchmarking process must
21 -- finally, any benchmarking process must
22 recognize that customer preferences change over

1 time, often rapidly, and you need to -- it's a
2 continual trade-off between maintaining a
3 benchmark for a consistent historical record
4 versus the measure a cheap and of current customer
5 demands.

6 The key to making broadband benchmarking
7 effective is to keep the index broader scope so
8 that it remains relevant for a reasonably long
9 period of time. Thanks very much for your
10 attention. I look forward to the
11 question-and-answer period.

12 MR. STOCKDALE: Thank you, Rich. Our
13 next speaker is Scott Berendt. He is the Director
14 of Research, Evaluation, and Documentation of One
15 Economy Corporation, a global non-profit
16 organization focused on maximizing the potential
17 of technology to help low-income people improve
18 their lives and to enter the economic mainstream.

19 Prior to his time with One Economy,
20 Scott worked for the U.S. Geological Survey, and
21 served as a Peace Corps volunteer in Mali,
22 focusing on agricultural and community development

1 issues. Please go ahead, Scott.

2 MR. BERENDT: Thank you. And I
3 appreciate the opportunity that the FCC's
4 presented to be here today.

5 For starters, what we at One Economy
6 believe should be a part of the benchmark process
7 as a result of the National Broadband Plan is to
8 create what we're calling a broadband progress
9 board. This board would be chaired by the FCC,
10 FCC personnel, and would consist or would be
11 advised by Perry's government agencies, which can
12 include Commerce, Department of Education,
13 Department of Energy, HHS, HUD, various other
14 agencies that are involved -- oh, thank you --
15 that are involved with broadband issues.

16 In addition to that, it would include
17 key nonprofit organizations, possibly
18 private-sector entities or their various
19 associations. The intention of the Broadband
20 Progress Board would be to implement and monitor
21 the National Broadband Plan and to focus on the
22 establish benchmarks and performance measures that

1 have been handed down.

2 Furthermore, it would be their true
3 form, shape policy directives, increase supply and
4 demand, promote public-private partnerships, drive
5 innovation, and ensure that broadband is
6 affordable, available, and adopted.

7 All right. Some of the key goals that
8 we feel should be met by 2013 or sooner -- now
9 you'll see some dates that are at the end of some
10 of these suggestions. These we don't feel are
11 necessarily written in stone, but we feel that if
12 there's no set date initially, then it just gets
13 pushed farther and farther to the side. Some of
14 these include affordable broadband that's
15 available to 100 percent of the country, a
16 national digital literacy initiative, fully
17 funded; ubiquity of online public purpose content
18 and applications.

19 Today, we focus on putting broadband in
20 the home. In 2013, we feel that it should be on
21 the person, where wireless would play a
22 significant role.

1 All government services online and used
2 as an adoption lever, pushing people towards using
3 broadband versus standing in line. They'd be
4 online.

5 Fully digitized national emergency
6 network. All public and affordable housing wired
7 or enabled for broadband. We say here 100 Mb per
8 second or greater in all educational institutions,
9 health and public safety facilities. Now the
10 speed -- others may have it at a lower rate, which
11 if we would certainly would defer to people who
12 have greater expertise in this area then we at One
13 Economy do, but certainly the intention is that
14 these facilities need to have high-speed and very
15 robust broadband capabilities.

16 Mobile computing devices available to K
17 through students, and as it's been discussed here
18 a little bit about availability and adoption and
19 what we feel is key to these components is that
20 there's a -- along with the ubiquity in usage,
21 that there's also utility, that public purpose
22 content that we provide at One Economy and that

1 other entities could contribute to is information
2 and resources that drive people to action.

3 So it's not just a passive experience,
4 but something that broadband can help motivate
5 individuals to engage and improve their lives.
6 And at One Economy, with our focus on low income
7 and underserved populations, these are areas that
8 certainly could benefit from the capabilities and
9 capacity of broadband that has not yet been
10 realized.

11 Some of the tools and methods that could
12 be implemented to achieve these. Certainly is the
13 FCC Form 477 could be leveraged, the information
14 there. Asset mapping and consumer assessment
15 service, civic participation, town halls, on-lone
16 crowd sourcing. These areas would fit into the
17 design of the Broadband Progress Board as well,
18 where it determines within the communities
19 themselves what is not just available double what
20 their needs are, what their wants, their
21 capabilities, how they want to engage. So it
22 creates a feedback loop that would enable not just

1 a fixed approach, but a continually evolving
2 situational analysis of what's going on within
3 these communities and how to adjust and
4 incorporate the needs of these communities that
5 could benefit from broadband adoption.

6 With that, I'll cede the rest of my time
7 --

8 MR. STOCKDALE: Sure.

9 MR. BERENDT: -- and open it up. Open
10 it up for questions in the question and answer
11 period.

12 MR. FELD: I get to do an extra five
13 minutes. As I'm the lawyer on the Panel, so I'm
14 going to take more time. But --

15 MR. ROSSTON: And not get introduced.

16 MR. FELD: -- yes.

17 MR. ROSSTON: You mean it be a lot to be
18 introduced or not?

19 MR. FELD: (Inaudible) it's done.

20 MR. STOCKDALE: Okay. Our next speaker
21 is Harold Feld, who is the Legal Director for
22 Public Knowledge. Before joining Public

1 Knowledge, Mr. Feld, worked as Senior Vice
2 President of Media Access Project, and prior to
3 that he was an Associate at Covington Burling,
4 where he worked on Freedom of Information Act,
5 Privacy Act, and accountability issues.

6 Mr. Feld also writes Tales of the
7 Sausage Factory, a progressive blog on media and
8 telecom policy. Mr. Feld.

9 MR. FELD: Just let me start by saying a
10 few things. One is you will pick up some common
11 themes in what I'm going to say from each of the
12 preceding speakers, in that these are hard
13 problems. And the information gathering is hard.
14 Figuring out how to measure is hard.

15 Let me start with a difference, though,
16 between benchmarks and goals which is critical
17 here.

18 Goals are what we ultimately want to
19 come out of the National Broadband Plan, and, you
20 know, being a lawyer, I go back to the statute
21 and, you know, the statute says, well, you know,
22 you're going to create a National Broadband Plan,

1 which will have metrics, okay, and benchmarks,
2 okay; and to do a whole bunch of things. So the
3 statute has given us a whole bunch of very broad
4 goals.

5 Benchmarks, as I understand in the
6 context of this statute, and, you know, there's a
7 lot of different ways to interpret it, but at
8 least as I understand here is the stuff we have to
9 measure the progress of the National Broadband
10 Plan so that we can know that we're on track. We
11 know we're moving in the right direction, that
12 we're not going to wake up five years from now and
13 be surprised that we have achieved our goals or
14 that our goals are wildly off course or that our
15 methods are wildly off course from where we want
16 to end up.

17 So in looking at this problem of
18 benchmarks that we are required to create under
19 the statute, they are, as some others have already
20 said, have to be informed by the goals of the
21 statute.

22 And the goals it here are amazingly

1 broad and complicated. It's universal, affordable
2 broadband use to its maximum utility, whatever
3 that means, that has impact in advancing consumer
4 welfare, civic participation, public safety --
5 essentially every sector of our lives.

6 So in order to benchmark this properly,
7 we need to understand not just a broadband market,
8 but a broadband ecology. This is not just a
9 simple producers-consumers price analysis. To do
10 what the statute is telling us to do, we need to
11 know how it is impacting an extraordinarily
12 complex system, us, with a whole bunch of
13 different community stakeholders and providers in
14 every critical aspect.

15 That's a tall order, and it's very
16 intimidating. And the problem is the temptation
17 when confronted by something that large and
18 intimidating is to draw back into go to what we
19 know, which is to look at very narrow kind of
20 metrics about the broadband market, except that
21 that may technically comply with the narrow
22 reading of the statute, but it will fail.

1 It will fail miserably. It will -- we
2 will end up where we are after the last broadband
3 plan, which was in 2004, when we had a plan --
4 we'll have universal broadband in 2007, and in
5 2007, we declared, hey, we have it.

6 So that didn't work out for us here well
7 because we are still here trying to figure this
8 out.

9 So as we move forward, we need to be
10 willing to grapple with the hard problems.

11 Now the problem is I could recommend a
12 couple of specific benchmarks based on what I
13 think the goal should be, but I don't think that's
14 useful to do at this point. And I want to cover a
15 -- in a very short time here just a very limited
16 -- what are some of the aspects of this ecology we
17 need to focus on, how do we get all the
18 information we're going to need, because it's a
19 hell of a lot of information that we have to bring
20 in and process, and how should we set this in
21 terms of dynamic versus non- dynamic benchmarks,
22 and I'll explain what I mean by that in a minute.

1 I identify in this paper here three
2 particular areas to focus on -- traditional last
3 mile, the criterion we've mentioned, direct price
4 to consumers and small business, speed, capacity,
5 congestion, and then there's middle mile, because
6 if you don't have an idea of what the middle mile
7 capacity is, and you don't have as part of the
8 National Broadband Plan how you're going to have a
9 middle mile that supports your last mile, then
10 it's not out of work, because I can have great
11 "broadband" within a community, and if there's no
12 one to do backhaul for it, then it's a intranet.
13 It's not part of the global network system.

14 Finally, there are what I call
15 qualitative metrics, which is not what we might
16 think of as kind of are you happy with your
17 broadband service sort of thing. I mean covering
18 this vast spectrum of quality of life issues that
19 we've been talking about -- education, consumer
20 welfare, job training, energy efficiency -- all of
21 these things and get into the how does broadband
22 affect our overall quality of life.

1 So, okay. How do we do this? Well, we
2 actually have a lot of sources for this, and I
3 should point out we actually in another context
4 measure equally complex systems. We do things
5 like the Consumer Confidence Survey. We do things
6 like the Energy -- the Energy Information
7 Administration does, you know, the National Energy
8 Reports or a monthly or sometimes weekly basis
9 depending on sectors. So this is not impossible.
10 It's just hard.

11 One of the places that we need to go is
12 to move away from the traditional FCC approach of
13 relying on notices of inquiry and explicit
14 solicited comments because those can generate very
15 useful things, but they're really not good for
16 what we need, which is a lot of accumulated,
17 real-time data that can be brought in, processed,
18 cut in different ways and to the extent possible
19 shared with the public, because the more people
20 who are working on this, the better off we will
21 be.

22 One source is consumers themselves, the

1 people who are actually using this. Crowd
2 sourcing was mentioned. I will also add we could
3 generate applications that track this stuff. Now
4 I'm not saying the FCC should put spyware in
5 everybody's i-Phone to know what they're looking
6 at, but I am saying that you could develop
7 applications that did things like test how fast
8 your speed is by having volunteers download an app
9 to their laptop or i-Phone that -- or whatever
10 that randomly pings an FCC server and random times
11 and collects real-time data on how is the network
12 responding.

13 And we could use that data, collect it
14 on a regular basis to inform how well we are
15 doing. That's, you know, one quick example.
16 Automated reporting with regard to the carriers
17 themselves is another possibility. Again, there
18 are a lot of privacy concerns. There are concerns
19 about proprietary information, but the fact is
20 that we are capable of using the information
21 mining technology that is used every day in the
22 private sector and use that to inform the

1 development of policy and to make sure that we are
2 actually on our way to using this meaningfully.

3 There are federal agencies out there who
4 are also looking at this in the context of their
5 own work. There needs to be coordination among
6 federal agencies. There is no reason, for
7 example, the statute says find out about economic
8 growth. That obviously means whatever Commerce is
9 doing to look at economic growth there should be
10 questions about broadband and broadband utility in
11 there and how they're gathering it. Or the FCC
12 should be working with Commerce to determine what
13 factors they look at for these sorts of criteria
14 to look at themselves.

15 Because there are very serious problems
16 at the FCC, it's obvious that we're going to have
17 to make cuts on these things. The FCC is going to
18 have to decide what's feasible, but my big advice
19 to the FCC is don't try to do this alone. This is
20 a national broadband plan. There is a requirement
21 for government agency coordination. I think
22 you'll find that a lot of state and local

1 governments are very interested in coordinating
2 and working on this with you.

3 I think that you will find that there
4 are a lot of individuals or consumer organizations
5 and other organizations that are very interested
6 in measuring this, and I daresay that even the
7 providers themselves, while they hate, you know,
8 those mandatory reporting forms, you suddenly want
9 to make sure that if the FCC is collecting data,
10 that they're collecting the right data and that
11 it's accurate and that they minimize the reporting
12 burden on themselves to the extent that's
13 necessary.

14 The final thing I will say about trying
15 to devise these benchmarks is there are two cuts
16 the FCC needs to make overtime. One is a question
17 of how do you deal with regional variation or
18 benchmarks that are defined in terms that are
19 really relative to specific individuals. The
20 statute says affordable. While affordable, if you
21 look at the HUD's definition for affordable
22 housing is 30 percent of income.

1 So, you know, how do you do that for
2 broadband? You could say, well, we'll take income
3 level by census block or something like that and
4 look at the price within a census block. That
5 would be one way.

6 The other is to say what percentage of
7 people's income should they be required to spend
8 on broadband as opposed to, you know, housing or
9 food or any of those things.

10 Again, lots of different cuts, and there
11 will be questions about tractability and how you
12 can gather the information, but these are
13 benchmarks that are made with reference to these
14 kinds of externalities that Dr. Rosston was
15 talking about earlier and try to find ways to
16 standardize these, because standardization is
17 critical if we're going to use benchmarks to
18 ascertain if we're on the right path or not.

19 But that does lead me to a last point,
20 which is how dynamic do we want these benchmarks
21 to be, because we're going to reevaluate them. We
22 will discover, as we collect more data, that we

1 get better at this. We get more experience at
2 this, and we can figure out the tree on the harder
3 questions of how this is impacting our lives, what
4 are the right things we really should be looking
5 at that Corley would broadband. How will we know
6 the right speed is to achieve the positive social
7 benefits? That's something that we will only
8 learn by experience.

9 And, therefore, while we must have
10 stability are benchmarks so that we can actually
11 be making proper progress and while there is a
12 risk that if we revisit these things, the
13 temptation will be to write them to conform to
14 what's going on the ground so that politically we
15 can declare success.

16 Nevertheless, we also have to recognize
17 that in a complex system, such as this one, where
18 we're really at the beginning of our learning
19 curve, we must inevitably go back periodically and
20 reevaluate where we are in light of the goal,
21 which we set for the National Broadband Plan,
22 which should not be altered, but we should

1 reevaluate from time to time are benchmarks to
2 make sure that they are actually the ones that are
3 properly informing our journey to those goals.
4 Thank you.

5 MR. STOCKDALE: Thank you, Mr. Feld.
6 Our next speaker is Catherine Sandoval, who is
7 Assistant Professor of Law at Santa Clara
8 University. At the University, she teaches mass
9 communications regulation, anti-trust law, and
10 contracts, and performs research, among other
11 topics, on telecommunications and anti-trust.

12 Before joining academia, Professor
13 Sandoval held a number of positions, including
14 Director of FCC's Office of Communications
15 Business Opportunities and Under Secretary of the
16 State of California's Business, Transportation,
17 and Housing Agency.

18 Professor Sandoval received her juris
19 doctor from Stanford Law School. She also was the
20 first Latina to win a Rhodes Scholarship, and she
21 earned a Master's of Letters Degree from Oxford
22 University. Please go ahead, Ms. Sandoval.

1 MS. SANDOVAL: Thank you very much.
2 Thank you very much for the invitation to be here,
3 and thank you all for your interest in this
4 important topic.

5 So when we're talking about how do we
6 measure broadband, one of the things that we also
7 have to look at in terms of achieving the goals of
8 the Act is that what the FCC has really done to
9 date in terms of measuring broadband -- can I have
10 -- is to lump all of broadband into one single
11 bucket.

12 So in order to define broadband for the
13 purposes of the American Recovery and Reinvestment
14 Act and also report on broadband deployment and to
15 identify competition issues and other issues,
16 including gaps in service, we need to actually
17 better distinguish between what I call as actually
18 the different types of broadband access.

19 And one way of looking at that is
20 emphasizing and examining restrictions on access
21 that Internet service providers are increasingly
22 imposing instead of just focusing on speed,

1 because the FCC to date has really had a one-
2 dimensional measurement that is focused on speed.

3 And second, I also want to discuss today
4 the need to report on gaps and Internet access,
5 including the continuing digital divide. And as
6 we do these various measurements of where we are
7 with broadband, one of the things that were going
8 to have to do is make sure that we are doing what
9 is necessary to measure those gaps, including
10 doing surveys and languages other than English, to
11 capture some very important gaps in populations
12 that are experiencing these gaps.

13 So the FCC has recognized the need to
14 start with a clean slate to measure broadband.
15 They've recognized that the (inaudible) of code
16 methodology was deeply flawed, but we still need
17 to move on to distinguish between really what are
18 different types of Internet access.

19 So, as several of us have discussed, the
20 FCC has really focused to date on speed, and speed
21 does not accurately measure whether broadband
22 services by different Internet service providers,

1 or ISPs, are substitutes.

2 And, of course, the concept of
3 substitutes is something that's just borrowed from
4 antitrust law, that we define the relevant product
5 by looking at whether or not one product is
6 actually a substitute for another.

7 You know, if we had more time, one thing
8 I would do -- I've done in my classes and at other
9 events is ask people how many of you are willing
10 to give up access to a personal computer or a
11 desktop computer and the Internet which is
12 attendant to that, the Internet access that you
13 get through that, and rely solely on Internet
14 access through a cell phone or personal digital
15 assistant.

16 So usually when I asked this question,
17 how many of you are willing to give up one for the
18 other and rely solely on the cell phone, no one
19 raises their hand. And the reason no one raises
20 their hand is not just because of issues about the
21 size of the screen and the size of the keyboard
22 and worry about purple thumb, but also the nature

1 of the level of the Internet access which is
2 provided.

3 And I think that the different -- these
4 restrictions create such big distinctions that, in
5 fact, they suggest that they compete in different
6 relevant markets, different product markets, if
7 not at least different sub-markets, because
8 consumers are not willing to substitute, and, in
9 fact, these differences are also growing.

10 So in measuring broadband, we also have
11 to focus on significant restrictions that ISPs
12 impose, such as restrictions on downloading
13 applications, application use, computer tethering,
14 device attachment, as well as congestion policies
15 and practices, which also affects speed.

16 So it's worth just taking a step back
17 and also putting this within the regulatory
18 framework.

19 So we are member that the Internet was
20 developed and became available initially to
21 universities and then to the public under the
22 FCC's Common Carrier rules that prohibited

1 discrimination against Internet traffic.

2 And subsequent to the Supreme Court's
3 2005 decision in Brand X versus FCC, the FCC has
4 now reclassified Internet service providers under
5 the regulatory category of information service
6 providers rather than common carriers, removing
7 non-discrimination obligations.

8 So while some may argue that the number
9 and, indeed, type of Internet service has
10 proliferated since then, so too have restrictions
11 that would have been prohibited under common
12 carrier regulations.

13 So these restrictive practices have
14 become commonplace, particularly for wireless.

15 So in my analysis, I wrote a paper
16 called "Disclosure, Deception, and Deep Packet
17 Inspection," looking at the role of the Federal
18 Trade Commission Act in the net neutrality debate
19 and contrasting the FTC's role with the FCC's role
20 and also the role of antitrust.

21 So in this analysis, I also looked at a
22 number of contracts and terms of services from a

1 number of different service providers and found a
2 plethora of restrictions. So, for example, some
3 wireless services allow customers to download only
4 the applications that the wireless service
5 provider has approved. You know, it is a
6 fundamentally different model of the Internet than
7 the open Internet, where no one needs permission
8 to post an application and no one needed
9 permission to download an application, because you
10 can only download the applications that your
11 carrier has approved.

12 So this is a very different model of
13 Internet access. Other providers, through their
14 contracts or terms of service, sometimes
15 explicitly limit the use of certain applications,
16 including peer-to-peer.

17 And peer-to-peer has been demonized as a
18 marginal technology, and often characterized as
19 people who are doing file sharing, perhaps
20 illegally, but increasingly peer-to-peer is being
21 used by organizations such as the National
22 Geographic, the National Football League, the

1 National Basketball Association to also make some
2 of their video available.

3 So it is not a marginal technology, and,
4 in fact, what is now -- it is second to other
5 video technologies.

6 Nonetheless, many carriers, particularly
7 wireless providers prohibit use of peer-to-peer.
8 So consumers who wish to use those technologies
9 have to find an alternative, and even when they're
10 looking for an alternative, some terrestrial ISPs
11 also impose restrictions.

12 Additionally, many wireless providers
13 prohibit tethering the phone to a computer to
14 provide Internet access. So part of the reason
15 that you don't want to substitute or some people
16 may not want to substitute is the device
17 attachment prohibitions, specific prohibitions on
18 computer tethering.

19 Now some wireless providers do offer
20 separate tethering plans for computers for
21 additional fees, but they are subject to bandwidth
22 limits and are often higher than bandwidth limits

1 that you might be able to get through
2 terrestrial-based Internet service providers.

3 And then there's also general device
4 attachment prohibitions. So we see this also in
5 satellite service providers. So satellite service
6 providers many of them are imposing monthly
7 bandwidth limits, and I'll talk about how this is
8 becoming common elsewhere as well.

9 But some satellite companies warn that
10 if the user has exceeded her undefined fair share
11 of bandwidth, then it will slow down the user's
12 speed for a 24-hour recovery period.

13 But this slowdown will last for each 24
14 hours or thereafter until usage is reduced. So
15 when you look at some of the sites where consumers
16 are talking about their experience with this they
17 say they wake up to find that their kid looked at
18 a couple of YouTube videos and suddenly their
19 speed is slowed to Fred Flintstone levels, and
20 they get -- they feel trapped. They can't get out
21 of it unless they stop using Internet access for a
22 couple of days.

1 So these bandwidth limits are also, as
2 well as slowdown policies, what I call slowdown
3 policies, are proliferating in terrestrial
4 networks, particularly cable- based ISPs where
5 bandwidth is shared.

6 And these ISPs may supplement monthly
7 bandwidth caps with undefined time period-based
8 caps. So basically, a user can have access load
9 for an undefined time period from downloading one
10 high-definition video or even some undetermined
11 amount of bandwidth, even if you don't exceed
12 monthly bandwidth caps.

13 So monthly caps are not an absolute
14 guide. So in summary, we need to look at issues
15 like application, device attachment, usage and
16 slowdown policies, peak average and slowdown
17 speeds to distinguish between different types of
18 Internet access, and, in fact, these practices
19 indicate that they generate something which is so
20 different that they are not actually substitutable
21 products.

22 So just putting all of these things

1 together and saying it's broadband really does not
2 capture the ability of somebody who lives in a
3 rural area, for example, to use telemedicine type
4 of applications.

5 So speaking of rural areas, I just want
6 to transition into the second half of my comments,
7 which is that we need to also measure and monitor
8 access gaps in a proper way, recognizing
9 significant gaps for rural people, low income
10 people -- gaps by level of education for non-
11 English speaking people, continuing racial and
12 ethnic gaps in Internet access, age and
13 disability.

14 So just one quick word about rural
15 access, so one of the things that we need to be
16 mindful of is that many of the Federal rules
17 exclude from the definition of rural certain areas
18 that contain a major metropolitan city.

19 So, in California, where I live, the
20 sense of excluding places that are very rural farm
21 working communities, the breadbasket really of our
22 nation that are outside of Fresno, California.

1 So in a study by the California Public
2 Policy Institute, for example, they found 285
3 communities in the San Joaquin region, which
4 encompasses Fresno, lacked broadband access,
5 excluding mobile access.

6 And similar numbers were found in areas
7 near San Bernardino.

8 And I think the language access issue is
9 also something that deserves some time, and I'll
10 take a couple of extra seconds to discuss it, if I
11 may.

12 This same public policy institute found
13 that in California, 82 percent of California
14 English speaking Latinos subscribe to broadband,
15 in contrast to only 37 percent of California's
16 non- or limited English speaking Latinos.

17 And the Pew Internet and America Life
18 Project also had similar findings in 2008,
19 paralleling basically the same gap at a national
20 level.

21 Yet, in many of the Pew studies they
22 don't actually interview people in Spanish. Most

1 of the pew studies are done only in English, so
2 this is why I used 2000 data instead of the 2009
3 data from Pew, which was done only in English,
4 and, therefore, disguise these gaps.

5 So from the 2008 study, we find only 35
6 percent access for Americans over age 65; 59
7 percent access for African Americans; 44 percent
8 for non-high school graduates; and 53 percent for
9 households with incomes under \$30,000 in contrast
10 to other groups which have much higher level of
11 access, as is discussed in the slide, including 95
12 percent access for households with income over
13 \$75,000 or 91 percent for people with a college
14 education.

15 So this whole issue of the
16 methodological appropriateness of survey data
17 gathering is absolutely critical, because in
18 places like where I live, in San Jose, California,
19 we have a very large Spanish-speaking population,
20 but we also have the largest Vietnamese population
21 outside of Vietnam. And if we're only doing
22 surveys in English, we're going to be missing

1 critical access gaps.

2 So I will stop there, which is one last
3 thought, which is another thing affecting access
4 is a huge differences in computer ownership and
5 some of these are attendant as well to some of the
6 other issues, but we also need to talk about the
7 hardware issues and the training issues as well as
8 the network issues. So thank you very much.

9 MR. STOCKDALE: Thank you, Professor
10 Sandoval. Our last speaker is Jon Eisenberg. He
11 is the Director, Computer Science and
12 Telecommunications Board of the National
13 Academies. Mr. Eisenberg has also been Study
14 Director for a diverse body of work, including a
15 series of studies exploring Internet and broadband
16 policy and networking and communications
17 technologies.

18 Between 1995 and 1997, he was AAAS
19 Science, Engineering, and Diplomacy Fellow at the
20 U.S. Agency for International Development, where
21 he worked on technology transfer and information
22 and telecommunications policies.

1 Dr. Eisenberg received his Ph.D. In
2 Physics from the University of Washington. Please
3 go ahead, Dr. Eisenberg.

4 MR. EISENBERG: Thanks. So I wanted to
5 do today was share some results from some past
6 work by the Computer Science and
7 Telecommunications Board that relates to how to
8 think about defining broadband.

9 CSTB is the unit of the National
10 Academies that does studies on computing and
11 communications, their social and economic impacts,
12 and associated policy issues.

13 And the studies are consensus work by
14 multidisciplinary committees.

15 The National Academies is a
16 non-governmental organization that dates back to
17 the founding of the National Academy of Sciences
18 in 1863, and it's chartered to advise the nation
19 on matters of science, technology and medicine.

20 I'm going to talk about some results
21 from two CSTB reports. The first is a 2002 report
22 that provides a broad assessment of the landscape

1 and makes recommendations aimed at speeding
2 broadband deployment. For this report, I'm going
3 to focus on its discussion of broadband
4 definitions. And the second is a 2009 report that
5 looks at the information technology research and
6 development ecosystem, the university and
7 industrial researcher enterprises, emerging
8 startup and more mature technology companies, the
9 industry that finances innovative firms, and the
10 associated regulatory and legal frameworks.

11 For this report, I'm going to focus on
12 the role that broadband plays in that ecosystem.

13 So this is the first report. And this
14 is the committee that authored it. This was a
15 broad survey of broadband technology and policy,
16 and note that a whole chapter, Chapter 2, is all
17 about defining broadband. And it talks about
18 multiple dimensions of broadband, and in the end
19 offers a two-part dynamic definition.

20 So I think some of these points have
21 been made already. There are various dimensions
22 of broadband. It's not just about speed or

1 bandwidth. There are also quality of service
2 measures that are relevant, such as latency and
3 jitter.

4 There's the issue of downstream and

5 upstream bandwidth, again, something that matters
6 for certain applications. There's the always on
7 property, which makes it possible to immediately
8 access Internet resources, and enables background
9 machine to machine interaction as well as human
10 interactions.

11 There's the question of whether the
12 broadband connection is shared and available via
13 some form of home network. The technology for
14 this is, of course, widely available today, but
15 it's by no means deployed everywhere or used by
16 everybody.

17 There's the question of addressability,
18 in essence can I -- can my devices connected to
19 the network, do they have unique IP addresses that
20 can be access from the outside world. Are the IP
21 addresses issued dynamically or statically? Are
22 all the devices in the home aggregated into a

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1 single external IP address through a network
2 address translation or not?

3 Today we see lots of clever workarounds
4 that make the direct addressability issue a little
5 less important than maybe it once was, but they do
6 require whoever is implementing a particular
7 service to commit additional functionality to kind
8 of work around that. How addressability is
9 implemented reflects a number of factors, which
10 include the functionality versus security
11 tradeoffs, IP address scarcity, a desire by the
12 broadband provider to tier their services and so
13 forth.

14 Several people referenced the issue of
15 controls on applications and content, and then
16 there's also the question of whether the
17 definition includes just plain Internet or other
18 service as well; that is, what's delivered using
19 plain IP versus what's delivered using more
20 specialized protocols and architectures, such as
21 what broadband providers might use to deliver
22 video and phone service today.

1 So the committee that wrote the study
2 took as its point of departure for thinking about
3 definitions, who benefits from workable
4 definitions. So there are consumers who would
5 like to be able to evaluate service offerings to
6 see if new offerings are likely to meet their
7 needs, service providers who want to develop,
8 invest in, and deploy services that consumers will
9 need and want and pay for, application and content
10 developers need to understand, attract the
11 connectivity performance options available to
12 consumers. Policy makers or regulators seek to
13 monitor broadband service appointment, and finally
14 public interest groups seek to evaluate the
15 capabilities available to consumers and to
16 understand the implications of alternative policy
17 approaches that influences capabilities.

18 So the few interesting observations that
19 the report offers related to this. First is in
20 this view defining broadband involves identifying
21 the kinds of applications that users are likely to
22 find useful and desirable and anticipate and

1 determining the benefits that different segments
2 of the population anticipate from access to
3 broadband services.

4 I also note that too limited a
5 definition could result in a mismatch between
6 expectations and capabilities. While an
7 unrealistic definition could prompt inappropriate
8 or poorly aimed policy interventions.

9 And I think finally the absence of a
10 consensus of definitions once the risk of
11 confusing the policy debate and requiring ongoing
12 debates about what definitions to use.

13 So there report offers to dynamic
14 function definitions of broadband. The first
15 definition is that the local access performance
16 should not be the limiting factor on a user's
17 experience in running today's applications. So
18 I'm up for sample, increasing the performance
19 above the rate at which content is typically
20 streamed won't improve the user's experience,
21 although, of course, as I get to the second
22 definition, increased capabilities would be

1 expected to spur higher-quality streams in the
2 future.

3 Another way of thinking about this
4 definition is that increasing performance where
5 bottlenecks actually exist elsewhere in the
6 network won't improve the user's experience.

7 So the presumption here is that existing
8 applications and capabilities of the rest of the
9 network will be unleashed by improvements in the
10 local access segment. One might also think about
11 this in terms of trade-offs. For example, for
12 some applications one can compensate for limited
13 bandwidth through compression or local caching
14 such that bandwidth is not the limiting factor.

15 Okay, so the second definition is
16 broadband access should have enough performance
17 and wide enough penetration of that performance to
18 encourage the development of new applications. So
19 this is the cliché chicken and egg, capacity
20 improvements in application innovation are tightly
21 coupled.

22 An application isn't to be made

1 available until a critical fraction of subscribers
2 receive a high enough level of performance to
3 support it. Yet, service providers will not
4 deploy higher performance broadband until there is
5 sufficient demand for it.

6 The presumption of this definition is
7 that application innovation and ultimately future
8 demand for broadband will materialize if the
9 performance constraints are eased.

10 So that is today we run yesterday's apps
11 faster and the promise for tomorrow is that with
12 increased penetration of faster broadband, new
13 applications will follow.

14 And we've certainly seen many new
15 applications become widespread in the years since
16 broadband became widely deployed in the U.S.

17 These definitions suggest the adoption
18 of application performance indicators. So one
19 indicator would be for different applications is
20 the performance perceived by the consumer to be
21 improving or deteriorating, that this is a measure
22 of whether by my first definition services

1 available are actually broadband. This is an
2 easy, of course. The sound metrics of performance
3 and means of monitoring new trends would have to
4 be developed and agreed to.

5 Another indicator would be are new
6 applications that depend on high bandwidth
7 emerging? If they do not, that would be an
8 indication that by broadband definition two the
9 services being deployed aren't broadband.

10 Okay. So let me quickly turn to the
11 second report. And this is the committee that was
12 responsible for it.

13 This report also had a broad scope, of
14 which broadband was one element. As you can see
15 here, the report laid out a whole ecosystem for
16 information technology research and development,
17 and it identifies broadband and also mobile as key
18 infrastructure and a key player within that
19 ecosystem.

20 So -- let me skip that one. So one of
21 the four or key objective to come out of this
22 report is to ensure that the United States has the

1 infrastructure that enables U.S. IT users and
2 innovators to lead the world.

3 So the argument is the U.S. has long
4 enjoyed the position of being the largest market
5 for IT, but this will not persist as growth occurs
6 around the world. And also, in the future,
7 innovation will go where there are technologically
8 sophisticated users, leading edge product
9 requirements, and the infrastructure, including
10 broadband that supports innovation, some of which
11 is customer led, which requires access to the best
12 infrastructure, which includes broadband. The
13 report goes on to observe that the U.S. has been
14 losing ground compared with other nations, and
15 concludes that the U.S. should establish an
16 ambitious target for regaining and holding a
17 decisive lead in the broad deployment of
18 affordable broadband services.

19 So underlying this is what one might
20 think of as another dynamic definition, what it
21 means to be world- class. That is, setting and
22 reaching ambitious target would enable the U.S. to

1 keep -- to leap well ahead of other countries and
2 hold that lead for some time.

3 The report argues this would have
4 significant benefits for the U.S. IT innovation
5 ecosystem. And it notes as one example of such an
6 ambitious goal one gigabit per second available to
7 100 million homes and small businesses by 2020.

8 Let me stop there and look forward to
9 the question and answers.

10 MR. STOCKDALE: Thank you, Dr.
11 Eisenberg. And I wish to thank all of the
12 panelists for their thoughtful presentations.

13 One thing I took away from your
14 presentations is that the Commission's task in
15 establishing measuring benchmarks will not be
16 easy. There are a number of possible dimensions
17 and issues that we may wish to measure and trying
18 to determine how best to measure them and how to
19 deal with the variations, both geographically and
20 among socioeconomic groups may be difficult.

21 I take particularly from Dr. Clarke's
22 presentation that there is sort of a need the

1 Commission will -- that the Commission will have
2 to balance the sort of desire to measure and
3 reflect real-world complexity against the need for
4 relatively simple and measurable benchmarks that
5 will be relatively stable over time.

6 And so what I'd like to do now is to
7 talk about some specifics to highlight the tension
8 and to get your thoughts. And, if I could, I'd
9 like to start with the issue of price, because
10 price is relevant for determining -- or it may be
11 relevant in assessing whether broadband is
12 affordable.

13 So if any of you have any thoughts about
14 how the Commission would go about measuring the
15 price of broadband, particularly given the
16 differences in types of broadband, I think we'd be
17 interested. Mr. Feld.

18 MR. FELD: I did try to touch on that at
19 this a little bit in, you know, in the
20 presentation. It's one of these metrics that I
21 really think you're going to need to break down on
22 to regional levels with reference to personal

1 income. My preliminary thought actually at the
2 moment is well, number one, I agree with Professor
3 Sandoval, that we need to be very mindful of the
4 gaps, and we're going to have to track where the
5 gaps are and that will be a first correlation.

6 Right now most of the studies do seem to
7 have shown a strong correlation between low income
8 and low adoption, suggesting that affordability is
9 -- that price to the end-user, and, therefore,
10 and, you know, affordability is a factor in
11 adoption, and therefore, I would argue that in the
12 statutory term of accessibility and of
13 affordability.

14 I think that at the moment the likeliest
15 is to do this by census block basis, because there
16 is available census block data of average income
17 within the census block, and we can track
18 advertised price in an area within a census block.

19 So there's at least some correlation
20 there. That may just be a preliminary metric.
21 You may need to actually go down to do surveys
22 once you've identified particular blocks with

1 regard to pricing to see if people are getting,
2 you know, particular deals, the bundling questions
3 that were raised by Richard Clarke and others as
4 to how we're going to track that element of price.

5 But even when we consider whether two --
6 you know broadband versus broadband plus phone
7 plus all of these other things, I do say that at
8 the end of the day a key factor in affordability
9 has to be within the measure geographic area can
10 people in that area actually afford to buy it, and
11 it will do us no good to measure broadband is
12 separate from other elements of a triple play
13 bundle is the only service that is offered within
14 an identified geographic area is the triple play
15 bundle.

16 MR. STOCKDALE: Assuming that we adopt
17 your proposal and try to sample prices at the
18 census block level, how do we do with the fact
19 that there may be different offerings and
20 different speed offerings and that with respect to
21 a particular offering you may have an installation
22 charge or a free TV, a promotional period at a

1 lower monthly rate, and then a higher monthly rate
2 and possibly early termination charges. How do we
3 come up with a simple metric there so that we can?

4 MR. LYNCH: (off mike) -- just
5 additional characteristics. You had this very
6 long factor of, you know, product characteristics
7 of what exactly this broadband thing is, you know.
8 I mean it seems to me you have to address the or
9 somehow figure out some way of addressing all of
10 that simultaneously, and then on the other side
11 you have the, you know, I know some number in
12 dollars, you know, if you're going to go for
13 affordability, you have to know what exactly these
14 services that you're buying.

15 MS. SANDOVAL: Price does not
16 (inaudible) in a relevant market.
17 Substitutability and the characteristics of the
18 product define the relevant market, right? So you
19 have to look at our these products comparable in
20 light of very significant restrictions, very
21 significant differences in quality of service
22 which can be measured through many different

1 dimensions, including application and bandwidth
2 restrictions.

3 Then you ask given these various
4 restrictions if the price of one grows, would you
5 substitute. The price itself doesn't define the
6 relevant market, you know, aside from what you're
7 talking about tying, et cetera, bundling also
8 affects price.

9 But another dimension that I'd like to
10 suggest that we need to think about his access to
11 credit as well as access to bank accounts. And I
12 think that it's something that's been under
13 studied, especially for low income households,
14 that to the extent that broadband service
15 providers are requiring credit cards or credit
16 checks or even bank accounts that there are a lot
17 of people who don't have these things, and so I
18 know with some work that I've been doing with the
19 Social Science Research Council one of our
20 grantees has been working with garment workers in
21 Los Angeles, and they really rely on pre-paid cell
22 phones. And they do that in part because they

1 don't have credit cards, and they don't have bank
2 accounts.

3 And they don't have Blackberrys with Web
4 access. They use the calling feature the cell
5 phone and they use texting. So, again we have to
6 start with focusing on what are substitutes as
7 opposed to trying to have price to find the
8 relevant market.

9 MR. STOCKDALE: Dr. Clarke.

10 MR. CLARKE: Given the writing of
11 different uses that people may have but the need
12 to keep the task manageable when I would probably
13 suggest is that you define a few profiles of usage
14 of what is an example of what we think of as entry
15 level usage, what's mid-level usage, what's kind
16 of, you know, college state of the art or geek
17 type usage, and, you know, track what, you know,
18 you'd make a profile of what are the
19 characteristics of use of those individuals,
20 making sure that they are accurate, really
21 reflecting that really that type of use, and track
22 a few of these profiles.

1 But, you know, also pay careful
2 attention to what's the -- you know, what's the
3 relative prevalence of that particular usage
4 profile within the economy, because often there is
5 people always want to talk about well, what's the
6 fanciest, most whiz-bang type of usage, and yes,
7 maybe we hope everybody will get there, but, by
8 and large, most people do have only very basic
9 uses for Internet. And the problem with all of
10 these meetings that talk about broadband is that
11 pretty much everybody in the panel, everybody in
12 the audience is at the 98th percentile or higher
13 in the intensity of use they make of broadband.

14 And it often, you know, they forget that
15 there's many other people around who have very
16 different use profiles from themselves.

17 MR. STOCKDALE: Dr. Rosston and then
18 Mr. Feld.

19 MR. ROSSTON: So I think the question
20 about price, you had very different responses.
21 And I'm trying to tie these together. One of the
22 questions about prices how do you measure it.

1 Well, it depends on what you're trying to -- what
2 your goal is. And if your goal is for assessing
3 affordability, then I think that what Mr. Feld
4 said has a lot of good things to it, to think
5 about what is it. If we're trying to figure out
6 can people afford it, we need to look at it on a
7 census block basis, what the prices are in those
8 areas, and in that respect taking -- building on
9 what Rich said and work that I've done on the
10 low-income telephone demand stuff, we tried to
11 develop a minimum price for the service, and if
12 you want to think about whether the minimum price
13 includes a bundle. If most of the low income
14 people still do take cable television service as
15 well, then you want to include it as part of the
16 bundle.

17 If the vast majority don't, then you'd
18 want to say what's the lowest price. You'd want
19 to amortize the cost of the hook-up charge based
20 on maybe an average tenure or a slightly less than
21 average tenure in the household.

22 We've tried to do this in our low-income

1 household work as well. And so I think you want
2 and try and figure out -- at least if that's your
3 goal, what's affordability, you'd like to say
4 what's the lowest price people can get it at in
5 that area.

6 If, on the other hand, your idea is
7 well, we should have a price index to figure out
8 what's the competitive level or what -- you know,
9 what's happening to prices overall, then I think
10 what Ms. Sandoval has had some reasonable thing
11 is what is in this competitive basket in what are
12 you thinking about. Should you have different
13 price indices for different types of services and
14 see what happens to them over time. Maybe there's
15 an average price of something that you want to get
16 that may not just be the lowest price if -- or
17 maybe it's the most prevalence price that's
18 charged as opposed to the lowest that price. But
19 so, your price index has to be tied to a specific
20 goal of what you're trying to measure.

21 MR. STOCKDALE: And does it not also in
22 order to deal with sort of a dynamic stability

1 over time, does it not also have to be tied to a
2 certain speed or quality characteristics?

3 MR. ROSSTON: I think you'd want to
4 correct for that. I think that's the difficulty
5 of an index. You may just want to measure what
6 the affordability of something, for example, on
7 the lowest price if you're getting more and more
8 for this lowest price, it may show that it's
9 increasing substantially faster than the rate of
10 inflation. But quality adjusted, it may be still
11 a very good deal.

12 So I think you're absolutely right. You
13 need to take that into account.

14 MR. STOCKDALE: Mr. Feld, do you?

15 MR. FELD: Right. Let me just respond
16 quickly to a couple points. One, I am sorry.
17 There is no easy metric, and so the fact that the
18 pushback on this level of complexity of the
19 service and the service offerings is that well,
20 you know, how do we reduce that to an easy metric.
21 Some of the answer to that is you can't, because
22 these things are so use-dependent, and, therefore,

1 to a certain extent, the collection of information
2 and the information that you put out there and
3 that is available is, in fact, going to and form
4 based on what our ultimate goals are how we slice
5 and dice it where I again come back to don't try
6 to do this alone.

7 You will make a first cut on this for
8 yourselves of based on the ultimate understanding
9 of the terms in the statute what you had to link
10 these to. You should expect and encourage that
11 others will be looking at this problem over time
12 will note that depending on what we mean by price,
13 it could mean these different things, and we will
14 see a body of research that emerges that helps us
15 to understand this over time.

16 We need to recognize we're at the very
17 beginning of this and that we have to take a cut
18 now and watch our knowledge evolve, rather than
19 try to, well, put this into a nice mathematically
20 tractable package at the moment.

21 Some of the issues you raise with regard
22 to how do you differentiate this will be solved by

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1 what is your definition of broadband, because if
2 the question is is the broadband affordable, the
3 first question was, what do we mean by broadband,
4 and if we adopt a definition of broadband which
5 says, well, it has to be able to support these
6 sorts of applications or functionalities or it
7 needs to have this measure of reliability or
8 whatever it is that we decide is the appropriate
9 measure of broadband, some of the questions about
10 well, then how do you measure price go away.

11 And the last thing I do need to make a
12 point with regard to Richard Clarke's comment
13 about how everybody in this room is -- or not
14 everybody in this room but generally these
15 conversations are held by people who are techno
16 enthusiasts and, therefore, you know, don't
17 necessarily reflect population need at the moment.

18 One of the purposes of the statute, a
19 goal of the National Broadband Plan, is to drive
20 to the maximum efficiency of the network and the
21 maximum use and utility of broadband so that it
22 achieves the listed social roles.

1 So to the extent that we're saying we
2 don't need to worry too much about certain
3 capacities in our definition of broadband or in
4 our pricing because most people just uses for
5 e-mail, then that is actually a problem under the
6 statute, I would argue. And part of the question
7 of pricing then is well, okay. Is there a problem
8 in pricing so that people are not using this in a
9 more efficient manner?

10 MR. STOCKDALE: Does that not suggest,
11 however, that you would -- even given a particular
12 definition, whether it's five megs or whatever
13 that you may want to monitor and measure the price
14 of high-capacity services towards which people
15 will be transitioning over time to see how those
16 prices evolve?

17 MR. FELD: Absolutely.

18 MR. CLARKE: And I think that's what I
19 suggested. I said you should have profiles that
20 are both low use and high use and but just it's
21 important to keep account as to how many people
22 are in each group.

1 MR. STOCKDALE: I don't want a mock-up.
2 Yes, Dr. Eisenberg.

3 MR. EISENBERG: I mean profile setting
4 is a little bit tricky, and I think of, you know,
5 a few years ago, you were pushed into a business
6 class tier if you wanted VPN access. Whereas,
7 today, that something anybody needs to casually
8 check their work e-mail from home. And so the
9 definition of what was a basic tier today is not
10 what the basic tier might be tomorrow.

11 MS. SANDOVAL: My study also showed
12 there are a lot of users who, in fact, subscribe
13 to the highest price tier that is available by
14 their Internet service providers, yet still
15 confront significant and often surprising to them
16 restrictions because there -- it's not just that
17 they're inadequately disclosed. They're
18 inadequately defined.

19 So you never know when you're going to
20 cross that magic moment of I am exceeding my
21 bandwidth use, which is undefined at this moment.
22 And so once again I urge you that price is not

1 what drives the definition. We have to look at
2 the quality of the product characteristics and in
3 what is charged for that.

4 MR. STOCKDALE: Let me follow up with
5 one last one question, which your comment
6 suggested. I would imagine that it would be
7 possible today with today's computing power to do
8 a survey in which you acquired information that
9 included all the price variables of every offering
10 of every broadband provider in every census block
11 in the U.S. And you can also include the sort of
12 product characteristics at least as described on
13 the website and any restrictions in usage as
14 described in the consumer agreement.

15 And we'd have a very big database. But
16 it isn't clear to me that that would be usable.
17 And one of the things that I think that we're
18 trying to do is to be able to develop metrics that
19 do reflect the complexities that you identify but
20 that we can actually use to see whether progress
21 has been made and whether the Commission is
22 meeting the goals set forth in the Broadband Plan.

1 So.

2 MR. ROSSTON: Academic researchers would
3 love you for doing that.

4 MR. FELD: Which I do, you know, again
5 come back to is you will collect far more
6 information than you will at first be using,
7 because you cannot do this alone. That includes
8 both federal agencies, you know, certain expertise
9 can and should be offloaded to other agencies that
10 conduct surveys and would include a broadband
11 aspect to this generated behavior. But in
12 addition, as Dr. Rosston said, you know,
13 academics would love it, and that would contribute
14 to the development of better metrics as other
15 people were able to play with this and observe
16 what the correlations are to things we care about.

17 MR. STOCKDALE: Thank you. I don't want
18 to monopolize the questioning, so let me give
19 others a chance.

20 MR. MAYNARD: Yeah, I really enjoyed the
21 slide from Dr. Clarke on measuring broadband
22 performance. It was a great summary of the

1 discussions that we've had internally on how to
2 look at speed, but also other metrics. You
3 mentioned performance characteristics can be very
4 complex. Separate reporting for each
5 characteristic is problematic. Creating an index
6 is delicate. And then you mentioned some of the
7 limitations of polling end-users and so that and
8 that is pretty much where we stop our own
9 conversations.

10 And I was very saddened to see that the
11 next slide didn't have a perfect answer for us.
12 That was our hope.

13 Without pinning anybody to name a number
14 on speed or price or anything, I think what we're
15 looking for on a task force is suggestions on
16 where we go from here. I mean we've had these
17 discussions about indexes, what the limitations
18 are, the usefulness of polls, what their
19 limitations, et cetera. And I'm just interested
20 to hear from some of you to think about okay, the
21 data is limited. The process is shortened. How
22 do we do the best we can to -- so the policy comes

1 out right.

2 MR. CLARKE: Well, I think there was
3 fairly general agreement across several panelists
4 that the best way to do this is to look at, you
5 know, the idea of what uses do we want the
6 Internet and people's broadband connections to
7 support, and start off with those uses, and based
8 on those uses try to develop a, you know, a
9 profile of what network quality characteristics or
10 performance characteristics are required to
11 support those uses, and to focus on kind of
12 building it from the bottom up as opposed to the
13 top-down saying, well, I want a round number of
14 number of megabits of peak speed and instead try
15 to figure out well, what capabilities do we want
16 to support, and use that as a guide for well, what
17 is -- what are the importance of these -- relative
18 importance of the different network
19 characteristics in supporting the ability of
20 customers to use, to engage in these uses.

21 Unfortunately, I can't tell you what
22 exactly the collection of users should be. We're

1 taking that can over. Maybe do a different do a
2 different panel. But.

3 MR. ROSSTON: So there are -- I'm not
4 going to answer your question either, but for
5 quite a while people in cellular tried to come up
6 with a price index. Econ One did this survey
7 every quarter average six months -- I can't
8 remember where they said, what does it cost in 25
9 different cities for 100 minutes and 500 minutes
10 and 1,000 minutes of use.

11 I'm making up the numbers, because I
12 don't remember exactly. But they had a specific
13 number of minutes of use, and partly you might do
14 what we all sort of suggested is sort of certain
15 capabilities to get things done, but that may end
16 up saying, well, what's the price for 5 megabits a
17 second. What's the price for 20 megabits a
18 second. What's the price for 50 megabits a
19 second?

20 And there may be for some of these
21 extremely high price, because you have to get
22 special access or something like that.

1 But it gives you baseline and then you
2 can take these things over time if you have high
3 enough levels that those will evolve to -- over
4 time, where there will be prices for these, for
5 residential services, and you'll see them over
6 time and that will give you the ability to compare
7 overtime what's happening. But to try to come up
8 with, or as Rich says, different profiles of users
9 and figure out what these prices are.

10 MR. BERENDT: Well, I think one of the
11 issues to keep in mind as well is that this is an
12 involving process. And we need to, at this point,
13 figure out maybe what the bottom is and at least
14 start there because five years prior to where we
15 are -- or in 2004, the uses and applications were
16 completely different or in many ways very
17 different than today.

18 And the need for the capacity is far
19 different today than what it was. And the same
20 thing is going to continue to happen as they years
21 progress.

22 So I think one of the main -- what's

1 critical is just to at least begin where, you
2 know, the consensus is right now. And I know that
3 may be not answering your question again, how do
4 you come to that consensus.

5 But certainly compiling what the primary
6 needs are at this moment, and at least beginning
7 there to create a floor, at least, and then you
8 can -- because you're going to need to
9 continuously evolve it as the world changes and as
10 the, you know, capacities and applications change.

11 MR. FELD: I would add in light of Scott
12 Berendt's comment that in fashioning the
13 definitions, we may want to actually move towards
14 the most -- how I say this -- the best efforts
15 broadest based type connection that is supportable
16 in terms of our definition of broadband and what
17 is out there, which is how the Internet got us
18 into this in the first place of being concerned
19 not with supporting particular applications, but
20 of supporting the ability to develop and
21 communicate on these applications so that in terms
22 of, you know, trying to define both broadband,

1 and, as I say, the nature of the things that
2 people are doing.

3 With regard to the broadband connection
4 itself I would suggest that we want to evaluate it
5 in terms of its overall utility and use for the
6 ability to support the maximum number of uses
7 rather than looking at how people are using it at
8 the moment and decide that we want to maximize the
9 current uses.

10 MS. SANDOVAL: So I think also what Dr.
11 Rosston was saying about, for example, looking at
12 the cellular telephone industry and then the price
13 index where we're looking at, you know, price or
14 minutes of service, for example. You also have to
15 remember that they are subject to common carrier
16 regulation. They're not for texting, but that's
17 part of what makes them comparable.

18 Whereas, when we're talking about
19 Internet service providers that are now subject to
20 information service provider regulation, it is
21 part -- that's part of what has fostered this
22 proliferation of restrictions.

1 Now some people would argue that it's
2 okay to have different types of services with
3 different types of restrictions, but my point is
4 that they are different types of services. They
5 are not all the same, and so, you know, I think
6 that we should be focusing not just on, you know,
7 what the user wants to use, but sort of the types
8 of restrictions that create a fundamentally
9 different type of product.

10 So I think when your ISP is defining
11 what applications you can access and what
12 applications could be transmitted to its customers
13 that is a fundamentally different model of the
14 Internet itself and a fundamentally different
15 model of Internet access.

16 And so I think it's possible to get to a
17 variety of those types of things that actually so
18 fundamentally change the characteristic of the
19 product that you're looking at different relevant
20 market or at least a different sub-market.

21 One just last comment about polls. So,
22 again, we have to be careful that we are not

1 simply pulling people who are online or even
2 polling people who have cell phones because, you
3 know, while it's -- among low income people cell
4 phone use is increasing, you know, as I said, with
5 a lot of low income people, they're just getting
6 prepaid phones and they don't have Internet
7 access. So we can't just ask people with Internet
8 access about their Internet access, especially
9 when we see some of the statistics -- only 58
10 percent of African Americans have broadband
11 access; 32 percent of Spanish speaking people have
12 broadband access. Very significant differences.

13 So to the extent that we do polling, we
14 also have to spend some times with these
15 underrepresented groups. And I'm on the Board of
16 Expert Advisors for the California Emerging
17 Technology Fund, and the state legislature has
18 given some money to try to foster broadband and
19 deal with some of these access gaps, for example,
20 also for the disabled, low income, rural, and
21 underrepresented groups, including minorities and
22 non-English speaking.

1 And what they've found was -- in working
2 with several of the grantees is again gaps in
3 access to hardware, computers, you know, credit
4 issues and also training issues. So there's a lot
5 of issues that drive the usage side, but then all
6 of these issues that drive from the carrier what
7 services you're being offered.

8 MR. EISENBERG: Yeah, I was just a
9 comment. I mean if you buy the dynamic definition
10 of the two definitions that I gave you, then you
11 probably want to do something to measure the
12 uptake of new applications, new more demanding
13 applications. And I will again not answer your
14 question by telling you how that can be done, but
15 that seems something worth measuring or monitoring
16 in some way.

17 MR. BERENDT: And if I can add, building
18 off of what Harold Feld was saying, is certainly
19 in areas where they're underserved or unserved. I
20 think it's critical not to put in the minimum at
21 this point because in the coming years that
22 minimum will be then be obsolete, but to try and

1 implement in those areas where they currently are
2 maximizing broadband what is the more advanced.
3 So they're in a few years they don't need to be
4 retrofitted again and then it's more money, you
5 know, good money after bad so to speak.

6 MR. STOCKDALE: Dr. Lynch or Professor
7 Peha, do you have any questions?

8 DR. PEHA: All right. I'd just like to
9 follow up a little bit on Nick's comments or
10 Nick's question on understanding the quality of
11 this service.

12 I heard a few interesting ideas here.
13 I'm not sure how many I'll have time to push on,
14 but to -- I guess one of them Harold Feld said a
15 couple of times that we should be making use of
16 other entities. I can't remember how you said
17 that -- to collect this data. I'm -- part of me
18 -- is dying to ask you about the technical aspects
19 of that, but let me ask about a couple of others.

20 One is financial sustainability. Can we
21 believe that there will be entities out there who
22 will undertake this thankless task for the

1 long-term, and the other is sort of credibility.
2 How do we make sure that either accidentally or
3 deliberately one of these entities doesn't slant
4 from -- towards one provider or another?

5 MR. FELD: These are all very good and
6 very important questions. I touch on them briefly
7 in the written statement. But I would first start
8 with an observation that you have a lot of
9 private-sector companies that make their living
10 doing these sorts of things.

11 We do the Consumer Confidence Index as a
12 survey of people. We -- Nielsen for over half a
13 century has been doing user diaries and other
14 methods that ask people to make simple records in
15 real-time, and the reason it's sustainable is
16 because you break it down into something fairly
17 simple and you shift your people around, and you
18 do represent a sampling rather than everybody.

19 And in fact, what Nielsen has discovered
20 is that people like being in homes because they
21 think they're doing something important. Now
22 there is to some of these a user effect that you

1 have to account for. If I know that Nielsen is
2 going to, you know, keep my favorite show on, I
3 will, you know, watch it constantly on my Tivo or
4 whatever so that I drive up.

5 But people are sophisticated about that,
6 and they have learned how to process these things.
7 I do come back to the possibility of developing
8 applications that volunteers would download that
9 either make it more feasible for users to do
10 real-time reporting. You know, you just have a
11 little window that comes up every now and then
12 that lets you Tweet or send a text message to the
13 FCC answering what am I doing now with my
14 broadband. Or applications that reside within
15 machines that are downloaded by volunteers. You'd
16 need certain safeguards for privacy or, in the
17 case of working with businesses for -- to protect
18 proprietary information, which simply monitor and
19 report certain functions.

20 And those are reliable because you
21 develop the apps in a way that ensures the
22 standardization of reliability.

1 MR. EISENBERG: I mean just one other
2 thought, and it's got also to problems in it, but
3 lots of applications already do their own
4 monitoring of the network; right? So streaming
5 applications negotiate an optimal band -- you
6 know, data rate. Of course, that reflects not
7 only the local link, but other things. So that's
8 an issue. You know, i-Tunes knows how long it
9 took you to download a song or a video.

10 So you might be able to use some
11 aggregation of that sort of data to give you some
12 indicators. But there are all sorts of problems
13 in that as well.

14 MR. FELD: And I will add that one of
15 the areas we haven't talked about which will be
16 more critically important is the machine to
17 machine uses of the network. And to the extent
18 that, as I say, you imbed some of these monitoring
19 functions or other ways to capture what will be an
20 increasing amount of machine to machine Internet
21 traffic so that we can observe what will be an
22 increasingly important aspect of economic and

1 social welfare aspects of this; but that's
2 something that really we can't be overlooking
3 here.

4 DR. PEHA: One other interesting
5 suggestion here on the same front that I'll push
6 on. I guess Richard Clarke pointed out that lots
7 o people have pointed out that there are lots of
8 characteristics you might want to use. As you
9 said, separate reporting of everything is complex,
10 and an index is delicate and you have to define
11 weights. And I just wonder if anybody knows of
12 any credible attempt to create an index that might
13 actually be useful.

14 MR. FELD: The closest thing -- I mean
15 there are pieces of this floating around, and
16 actually I will mention that one of the things
17 that kind of -- a meta project in this and why I
18 think we need to bring in more people who actually
19 study informatics as a field of its own rather
20 than all of us who are coming from particular
21 fields, which, you know, come to what is the
22 important information with a particular bias.

1 The -- as Eser Hargittai has been trying
2 to collect -- created database of surveys so that
3 we could actually have some standardization along
4 this very subject and find out, you know, what
5 questions people have been asking and what indices
6 people have been creating, because everybody does
7 this from scratch when they do this.

8 That said, I do suggest that the USDA's
9 recent release on the importance of broadband to
10 rural America, which contained at least some
11 effort to measure the economic benefits of
12 broadband introduction was one approach that
13 struck me as of the more useful that I've seen so
14 far in terms of how you get to these impact
15 questions, which are critically important to
16 whether we are actually achieving what the statute
17 wants us to achieve with broadband.

18 DR. PEHA: I guess I meant even --
19 helpful in more narrowly. If you can do that,
20 that's phenomenal. Even the more narrow question
21 of whether you can get the quality of a particular
22 link as an index is a challenging issue.

1 MR. CLARKE: Well, I think a way that
2 this might be done is again, using a certain
3 amount of social science techniques of giving
4 people services of particular qualities and asking
5 them how did this work, just overall, how is --
6 did this workout for your type of uses. And then
7 if you have, you know, have enough of these
8 laboratory rats and different qualities of service
9 that you can infer back an implicit set of
10 relative weights that people are putting on these
11 things and I think this was -- you know, when Bell
12 Labs was a very huge organization, they had all
13 sorts of human factors research on well, how long
14 does latency have to be -- this is the talk about
15 PSTN to before it gets bothersome and what type of
16 frequency response do you need and so I think
17 there is a history of doing things like this.

18 But again, it's an elaborate research
19 project.

20 MR. ROSSTON: One thing that you might
21 want to think about is updating the database that
22 Savage and Waldman used in their paper, the 2002

1 data that they got on the value of broadband, and
2 the papers that they've written. You may -- it
3 may be very useful to try to update the data and
4 do more surve -- it was a survey-based paper, and
5 I think updating that would be useful.

6 MS. SANDOVAL: Yeah. So I think we also
7 have to think about when you get information from
8 the carriers, when you get information from the
9 user, when you get information from third parties.

10 So, you know, if we talk about user
11 perceptions, one of the issues is, for example,
12 sometimes the users don't actually appreciate
13 what's going on, because it's disguised. And so
14 now sometimes the latency which may be created by
15 congestion management policies may be so small
16 that people really don't notice.

17 Now in certain other services, people
18 are noticing, and I can tell you where to go on
19 the blogosphere to hear what they're saying and
20 especially where when you use too much, and you
21 end up in this penalty box that lasts for, you
22 know, at least 24 hours if not several days.

1 So user perception is one thing, but it
2 doesn't really capture often what's going on. So,
3 for example, with the whole peer-to-peer
4 interference issue, one way of finding out what

5 was going on was using some of these applications
6 and actually the Max Planck Institute in Germany
7 made available some very interesting applications
8 that became downloaded all over the world. Again,
9 part of the question about that becomes
10 methodologically is it really representative, but
11 those applications can be useful.

12 So but as much as deep packet inspection
13 technology is criticizing the number of fronts --
14 it has some privacy issues. There are various and
15 sundry criticisms that have been used against it,
16 the reality is that many carriers are employing
17 it, and they know exactly what's going on across
18 their network.

19 So, you know, when you look at some of
20 the best sources I've found were actually from the
21 DPI providers who've written papers, you know,
22 like Sandvine and PeerApp, and they can tell you,

1 you know, here are the types -- here's the
2 protocols or applications that are being used.

3 Now they can -- they only put out so
4 much because they have contracts with the ISPs,
5 but the carriers know what's going on in terms of
6 what people are using. The carriers also know
7 what they're doing in terms of slowdown policies
8 that are not necessarily explained full in those
9 terms of service.

10 So we have two really look at getting
11 sources for multiple dimensions, including when
12 these carriers are employing sophisticated
13 technologies that are giving a lot of data how can
14 we ask them to report on what they're doing with
15 that data. For example, it is through DPI that
16 they implement some of the slowdown policies that
17 they implement.

18 MR. BERENDT: I'd also like to bring
19 into the conversation as well is populations that
20 -- I mean right now we're talking I missed about
21 users, you know, people who are online and using
22 and what their, what the feedback might be, and

1 that's going to be certainly valuable. But I
2 think there's also a component of a digital
3 literacy and digital awareness component that
4 needs to be a part of this that I know that's hard
5 to capture, but those elements I think need to be
6 enhanced, because that's going to change or at
7 least influence what the results are.

8 People you become more familiar and more
9 acquainted with what's out there and what's
10 valuable for their lives. And, as such, that will
11 influence what results are received, and it will
12 be different, you know, and necessarily from
13 someone that is a much more nuanced user of the
14 network.

15 MR. FELD: Let me provide one example
16 that illustrates this point: We've been doing
17 e-Rate now for, you know, over 10 years. We have
18 a pretty good knowledge of how many e-Rate, you
19 know, how many folks have applied for e-Rate, how
20 many schools are -- and libraries are connected
21 with e-Rate.

22 We have no knowledge whether e-Rate has

1 actually made a difference to educational outcomes
2 by any measure, because we don't know if e-Rate is
3 resulting in schools that are training their
4 students to use this stuff or schools that have a
5 connection that they do not train their kids on,
6 because they don't have laptops or they don't have
7 people who can actually train the students to use
8 the broadband effectively.

9 And I think that one of the things that
10 we desperately need to do as we are examining
11 whether we are meeting the goals of the statute is
12 if our initial series of benchmarks triggers us to
13 look at things, then we need to start asking why
14 they're happening. So, if we're looking at low
15 adoption rates, for example, and we see adopt --
16 and we decide adoption rates are important and
17 they don't change, we need to cast a very broad
18 net to determine if they're as a result of things
19 like the lack of training, the lack of equipment
20 access, and not simply, you know, are back to
21 something else that we're already measuring like
22 price and assume it's affordability.

1 MR. MAYNARD: So I had a question about
2 one of the last slides in Dr. Eisenberg's
3 presentation where you're laying out some of the
4 long-term goals for the National Plan -- it was
5 100 Megs available to 100 million homes and small
6 businesses by 2020, which I think would bring us
7 in about eight years behind South Korea, but it's
8 still a long-term goal for the United States, an
9 important one.

10 I was just thinking through -- about how
11 should the Task Force balance these sort of big
12 idea, long-term efforts with short-term getting --
13 you know, target populations in certain areas or
14 certain demographic groups onto the net as quickly
15 as possible. How do we look at the trade-offs,
16 the costs and benefits, as Professor Rosston
17 talked about in thinking about these goals and
18 prioritizing them.

19 MR. EISENBERG: Right. I mean so that
20 -- this framework really tell you about benefits
21 and not costs, and that committee's recommendation
22 is admittedly a leap of faith, okay? But it's a

1 leap-and the argument there would be that it's a
2 leap of faith within a critically important
3 component of the U.S. economy. And so that the
4 benefits and not just the individual benefits to
5 the consumers, the users of broadband, but broader
6 economic contributions; that is, that it provides
7 an essential enabler of innovation.

8 But I don't have a quantification for
9 that. It's at the end a bit of a leap of faith.

10 But it's also -- it's sort of like how
11 you decide to invest in lots of things -- how much
12 should a nation invest in R&D? There's no great
13 empirical way of determining that and one of the
14 things you do is you benchmark yourself against
15 your competitors.

16 MR. STOCKDALE: Yes. Well, before I ask
17 a couple of questions from the audience, Ken, do
18 you have anything since you will probably be
19 responsible for writing the data request and
20 cleaning the data and then presenting it?

21 MR. LYNCH: I didn't want to change the
22 subject too much, because it's -- I had -- I

1 didn't want to pick on Mr. Feld too much, either,
2 too.

3 But one thing I do want to -- I was
4 reading through your comments and I thought they
5 were really interesting, and one thing I did want
6 to ask about -- and we haven't really talked about
7 -- so we talked a little bit about what we think
8 broadband is and, you know, how much it might cost
9 and what characteristics that might have. But we
10 haven't talked about what are the other parts of
11 the ARA which talks about availability.

12 And you were critical, to some extent,
13 of the Form 477 in your comments, and I'm
14 wondering if we should give up on that effort,
15 because it would save a lot of people a lot of
16 time. You know, we just didn't collect it anymore
17 -- not just me, but, you know, the carriers.

18 And if we would go to some other
19 methodology for determining, you know, which
20 particular hen houses and, you know, every last
21 domicile -- to the extent to which every last
22 domicile has access.

1 MR. FELD: I am critical of the Form 477
2 and meaning no offense to the folks who devised
3 it. But it doesn't provide data that is
4 particularly helpful for this purpose. Now it
5 might be helpful for things like the national
6 broadband map, which are a little more static,
7 which we're not going to -- you know, kind of post
8 in real-time, you know, every new address it
9 comes online, although, again, depending on -- you
10 know, there is nothing other than, say, the Fourth
11 Amendment, which stops us from requiring every
12 carrier to report back to the FCC everybody who's
13 connected, and, God knows, when the government
14 wanted to get that information for purposes of
15 come you know, monitoring for terrorists, they
16 were able to get it.

17 But I do think that we need to
18 distinguish a couple of different things. We need
19 to distinguish mandatory reports that are good for
20 some things and not for others, the question of
21 benchmarks, the things that are going to tell us
22 in a way that is valuable whether we're on course

1 to achieve the National Broadband Plan is very
2 different from some other uses of data collection.
3 That said, I do think that getting twice annual
4 reports that are compiled that aggregate a whole
5 bunch of information in ways that are -- that the
6 aggregation process itself may lose valuable trend
7 data is just not -- is just not helpful.

8 And everybody hates doing it. And
9 while, as a good public interest guy, I don't mind
10 about imposing burdens on industry, if it gets us
11 something, there is something that offends me
12 about wasted time. And so I would actually, you
13 know, suggest that to the extent reports can be
14 automated, to the extent that these forms may be
15 easier to fill out on a weekly or monthly basis,
16 because you're not pulling together all this
17 information and trying to, you know, come up
18 after, you know, six months, sit down there, you
19 know, kind of like your income tax form input this
20 and put this together, if you just, you know, as I
21 say, if you file in real time, if every time you
22 do this, you just, you know, filled out, and it

1 went right into the FCC's database or even on a
2 weekly basis, you could minimize burden overall
3 and you'd have better, more timely, and more
4 accurate information.

5 MR. STOCKDALE: I have a question here
6 from the audience, which is, "Would it be useful
7 to include a question about broadband use or
8 access in the upcoming 2010 Census? This may --
9 there may be time to devise a question, probably
10 only one is possible, and get it in. The
11 precedent is there, and the purpose to easy to
12 justify."

13 Any thoughts or comments?

14 MR. ROSSTON: Working with Census data
15 on (inaudible) telephone things is tough. I think
16 it would be fantastic to have questions on
17 broadband included in the census so we have -- and
18 then supplement it with the ACS.

19 MR. STOCKDALE: And any suggestions
20 about the questions?

21 MR. FELD: My one suggestion is that we
22 -- you need to make the question or questions as

1 simple as possible. I mean the -- and even a do
2 you have broadband connection is not a good
3 question, because a consumer, you know, a person
4 filling this out is probably not going to, you
5 know, have a good definition of what that is. We
6 can't come up with a good definition of what that
7 is. So, you know, putting something like that,
8 which sounds like a good idea, this isn't like a
9 telephone connection, where you have it or you
10 don't have it.

11 The -- so, to the extent we're going to
12 have, you know, questions about it, I would urge
13 that they be oriented towards simple, easily
14 understood, factual things that take useful, small
15 quantifiable measurements that would make sense
16 for the kind of data that we are connecting.

17 Some of them might be, for example, more
18 oriented towards use than actual connectivity.
19 Have you bought something, you know, from, you
20 know, using, you know, and have you bought
21 something using an Internet connection or however
22 we might try to phrase it. Has, you know, if

1 there is child in your household, has your child,
2 you know, done a homework assignment using the
3 Internet.

4 Those kinds of things may be both easier
5 to collect and provide data that would otherwise
6 be more difficult to come by here.

7 MR. EISENBERG: And just a quick
8 comment. You don't have to necessarily do this in
9 the decennial Census. You can do this in the
10 Current Population Survey, and NTIA regularly
11 commissions such questions as part of that survey.
12 It also give you much more frequent information.

13 MS. SANDOVAL: I believe the Current
14 Population Survey is how we've gotten some of the
15 information on the lack of computer access, and so
16 that is useful. But like, for example, currently
17 the Census asks both about do you have a telephone
18 as well as now do you have a wireless phone at
19 home. So if we were to ask questions about
20 Internet access, again, the whole question of what
21 is Internet access, we might to want ask questions
22 about how are you accessing the Internet. What

1 are you using in order to get there.

2 MR. STOCKDALE: Any final questions or
3 comments from the panelists? If not, I want to
4 thank you for your participation. I've found this
5 panel extremely interesting and thought-provoking,
6 and I invite you, if upon further reflection you
7 have additional bright ideas or suggestions, to
8 submit them to us. We are -- we would welcome
9 them. So thank you, again. And with that I think
10 that this session is closed.

11 (Whereupon, the PROCEEDINGS were
12 adjourned.)

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