THE BROOKINGS INSTITUTION
LAZARD

THE NEXT AMERICAN ECONOMY:

TRANSFORMING ENERGY AND

INFRASTRUCTURE INVESTMENT

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ANDERSON COURT REPORTING
706 Duke Street, Suite 100
Alexandria, VA 22314
Phone (703) 519-7180 Fax (703) 519-7190

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PARTICIPANTS:

Introduction and Welcome:

GEORGE BILICIC
Chairman of Power, Utilities, and Infrastructure
Vice Chairman, U.S. Investment Banking
Lazard

How U.S. Metro Areas Lead Nationally and Compete Globally:

BRUCE KATZ
Vice President and Director
Brookings Metropolitan Policy Program

Transitioning to the New "Green" Economy:

Moderator:

REBECCA SMITH
Staff Reporter
Wall Street Journal

Panelists:

MICHAEL AHEARN
Executive Chairman
First Solar

THEODORE CRAVER, JR.
Chairman, President, and Chief Executive Officer
Edison International

LARRY SONSINI
Chairman
Wilson Sonsini Goodrich & Rosati

Keynote Presentation:

THE HONORABLE EDWARD G. RENDELL
Governor
Commonwealth of Pennsylvania

THE ROAD TO U.S. COMPETITIVENESS:

Moderator:

ROBERT PUENTES
Senior Fellow and Director
Metropolitan Infrastructure Initiative
Brookings Metropolitan Policy Program

Panelists:

GEORGE BILICIC
Chairman of Power, Utilities, and Infrastructure
Vice Chairman, U.S. Investment Banking
Lazard

TOM CASEY
Chief Executive Officer
CURRENT Group, LLC

JAMES KOWALISHIN
Partner
Highstar Capital

MARTHA WYRSCH
President
Vestas Americas

Closing Remarks:

BRUCE KATZ
Vice President and Director
Brookings Metropolitan Policy Program

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P R O C E E D I N G S

MR. BILLIC: If we could get started as people continue to arrive, including a couple of members of my team who must still be sleeping.

So on behalf of Brookings and my colleagues at Lazard, let me welcome you to the conference to discuss the next American economy. As my partner, Vernon Jordan, said last evening, we wanted to have this event to start a dialogue on issues that we come across from time to time in our work, and we are hoping that the dialogue could lead to proposed concrete solutions to address the angst, but also the dramatic opportunity that resides for America around things like our declining competitive position, the need to invest in America's subpar infrastructure, changes to the way America generates and delivers electricity, and general quality of life issues affected by those factors.

In order to do so, we have assembled a terrific group of panelists and speakers both last

evening and today who bring different perspectives to the challenges and opportunities we discussed last evening, and we'll discuss today.

We also have a great audience from an equally diverse group of disciplines intentionally selected to avoid this being a networking situation and also to generate dialogue. We hope we get some participation from you today, and as you'll hear from us later today at closing, we don't intend for this to be yet another conference but one where we take some of the ideas raised and try to develop ultra-intense follow-up, including with a couple sessions like this elsewhere in the country, and that may be coming back here in the fall for a further discussion.

Already from last evening, we might identify the following thoughts. First we probably know that it's bard to be a squirrel in California, and we must work on permitting issues. There's a question as to whether the government should be in the VC business versus focusing on long-term energy and other policy issues. We need to take a point of view on carbon

because it's affecting the way the markets are developing here.

We need market definition around renewable energy generally. It seems this is affecting scale issues and whether the U.S. is a large enough market to be competitive in these areas. And then there were expected observations about government's inability to address long-term thinking and observations about some of the other dysfunctional issues all of us observe around government today.

Then last and I thought, interestingly, given the nature of the asset mix we're talking about: a great need identified to protect IP, I guess not surprisingly, given where we are in the country.

So I'm going to turn this over to Bruce Katz, who will speak for a bit about some of the work at Brookings in this area and some of his other observations, and then we'll start the panel discussions and hear from the Governor of the Commonwealth of Pennsylvania.

MR. KATZ: Thanks, George, and again I just wanted to thank George and the Lazard team for the partnership and for their vision and leadership on the issues before us today. I'm going to try to set the table this morning. It's great, particularly given last night's conversation to be in California, be back in California with a group of individuals who really are the cutting edge of economic transformation, which is the topic for today.

So let me start with this: The Great Recession, obviously has been a wake-up call for the country. It inveigled an economy that was dangerously out of whack, frenzied with consumption, wasteful in its use of energy, really more adept at increasing equity than sharing prosperity, and much more successful at exacerbating rather than easing divisions between Wall Street and Main Street.

It's time to get back on track and lay the foundation for a radically different kind of long-term growth in the country. So and that's where I'm going to make the following proposition:

First, as Larry Summers and other respected economists have intoned, the shape of the next economy, American economy, must be export-oriented, low carbon, and innovation-fueled. This is a vision where we export more and waste less, we innovate in what matters, we produce and deploy more of what we invent. And that's the kind of productive and sustainable economy which must emerge from the rubble of the recession.

Second, the next economy will be led by metropolitan areas. They are the hubs of trade, commerce, and migration. They're the centers for talent, capital, and innovation. They have the infrastructure to move people, goods, ideas, and energy efficiently and effectively, and they have the institutions to educate and train the work force of the future. So metro areas like this one are the engines of national prosperity.

And, finally, to build the next economy we've got to connect this macro vision to metro reality. We've got to connect the macro to the metro.

But we need to leverage the market creativity and the energy found in metros like this one with smart gain-changing federal and state actions. We need a full-court press on delivering an educated and skilled work force which can drive the next economy and must benefit from it so the next economy must be operatively rich as well as being export-oriented, low- carbon. innovation-fueled.

All this, as we talked about last night will not be easy. We compete in a fiercely competitive world where established nations like Germany, rising nations like China, India, and Brazil are moving forward. And they're making seismic and ultimately transformative investments in renewable energy, in modern ports, in high-speed rail, in metropolitan and transit. And America? We seem stuck in political polarization and hyper-partisanship.

So our challenge really is to convert the dynamism in this metropolis and others like it into solutions that are pragmatic, far-reaching, and critical to the moment. We must move as quickly as

possible to change the mental map of our country from a constitutional union of 50 states to an economic network of highly connected, hyperlinked, seamlessly integrated metropolitan areas. The most important action we take in the aftermath of this recession really is to build for the future. The stakes couldn't be higher.

So let me start with this vision for the next economy: Export-oriented, low carbon, innovation-fueled. Let's first visualize an economy where more firms in more sectors trade more goods and services, seamlessly with the world particularly with those rising nations that are rapidly urbanizing and industrializing.

As President Obama said in last week's State of the Union, the more products we make and sell to other countries, the more jobs we support right here in America.

So the departure from the current order of business could not be starker. The U.S. economy has been dominated by imports rather than driven by exports.

Our trade deficit rose sharply, about $380 billion 2000 to about $700 billion in 2008.

According to the World Bank, exports make up only about 11 percent of the GDP of the U.S. compared to 40 percent in Europe, 40 percent in China, 36 percent in Canada. 22 percent in India, and 16 percent in Japan. As Howard Rosen of the Peterson Institute recently summarized, exporting is almost an unnatural act in the United States. Only four percent of U.S. companies export less than .05 percent of U.S. companies operate in more than one country.

The first question is, can we get back into the export game? The answer is decidedly yes. For the first time in recorded history, more than half of the world's population lives in urban and metro areas. By 2030 the share will surpass 60 percent. Across the globe these economies are driving demand for increased trade in commerce, only temporarily abated by the downturn.

The U.S. can play in this expansion. We still manufacture arrangement of advanced goods that

the rest of the world wants: aircraft, spacecraft, electrical machinery, precision surgical instruments, high-quality pharmaceutical products. And we're poised for a quantum leap in the export of high-value services. Educational services are already a key export with some 670,000 international students flocking to our world-leading institutions of higher learning.

Our exports to China of management, consulting, public relations increased by 36-fold from 2002 to 2008. Our exports to India in construction, architectural and engineering services increased 39-fold over the same period. Out potential for exports, including potentially in the green sector is hidden in plain sight. President Obama's challenge last week to double exports in five years is exactly the kind of ambitious far-reaching goal we need at this moment.

Low carbon is the second related hallmark of the next U.S. economy. Let's imagine a world where America not only leads the global transition to sustainable growth, but uses breakthroughs in

technology and practice to spark a production revolution at home, admittedly very difficult. We have a long way to go. The U.S. has been slow to embrace the potential of the green economy despite having twice the per capita carbon dioxide emissions of other industrialized nations.

Only one of the top 10 solar production firms is American. The same ratio holds true for the manufacture of wind turbines. China, as we talked about, is seeking to dominate the race to green dedicating $220 billion of their recent stimulus package no renewable energy, other green investments compared to $94 billion in the U.S. But make no mistake. This transition to the low carbon economy is fundamentally about markets.

The energy we use will migrate from an almost exclusive focus on carbon-based fuels to a more sustainable mix: natural gas,solar, wind, hydro, geothermal, ocean waves, nuclear, biomass. The infrastructure we build will shift from 20 of sentry models of transport and energy transmission to rapid

busts, ubiquitous broadband, congestion pricing, smart grid, distributed power generation,high-speed rail, intelligent transport.

The products we buy will move from high-carbon gas guzzlers, fluorescent lights to sustainable goods: electric vehicles, energy-efficient appliances, smart metes, LED lights, organic food. And the homes we live in and the office and retail buildings we frequent will be more sustainable in design, more efficient in their use of water and energy, and better arrayed so that people can spend less, want more, and live a higher quality of life.

So we need job creation. The low carbon economy will be delivered by millions of new workers; finances to finance, science and engineers to invent, entrepreneurs to take the market, laborers to build and install new infrastructure, facilities, and products. And if we're looking for a smart place to invest, the International Energy Association predicts that reducing greenhouse gas emissions to acceptable

levels will require additional global investment of $13 trillion by 2050, public and private.

So that leads, naturally, to a discussion of innovation, the historic catalysts and fuel for economic growth. The U.S. must strive to be the world's -- continue to be the world's -- innovation nation, a hot house of ideas and invention, and the platform for advanced production.

Now, for decades, as people in this room know better than anyone else, innovation has been the driver of American productivity and growth. Innovation in computes and telecommunication enabled the information revolution. Advancements in healthcare sparked growth in pharmaceuticals and medical devices.

But our leadership on R&D investment and key indicators of science innovation is slipping. Incredibly, the U.S. ranks just 45th out of 93 countries, and the share that science and engineering degrees make up about those degrees putting us behind

Mexico, Uganda, and Estonia. Fortunately, we're ahead of Honduras.

More generally, the next American work force is ill-equipped to drive innovation. African Americans and Hispanics lag on critical indicators of educational achievement, yet these groups will constitute nearly 40 percent of our work force by 2050, up from 25 percent today. And the U.S. lags on the conversion of innovation into homegrown production. We've gone from running a surplus in advanced technology products in the mid-'90s to running a trade deficit this decade.

Going forward, we will innovate less if we don't produce more. So it's time to rediscover our innovation mojo in our research labs, on our factory floors, in the tradable sectors that drive wealth creation and sustainable growth.

So here's the second proposition: The next economy will be rooted in and led by metropolitan America. The world may be flat, as Thomas Friedman has taught us. but modern economies concentrate

intensely in a relatively small number of places. This is the real heart of the American economy. A hundred metro areas that after decades of growth take up only 12 percent of our land mass, harbor two-thirds of our population, and generate 75 percent of our gross domestic product, this is the new economic geography enveloping city and suburb, exurb and rural town in one seamlessly integrated whole.

These metros pack a powerful punch. Greater Seattle houses only 51 percent of the residents in the state of Washington. It generates 69 percent of the economic output of that state. Chicagoland is home to 67 percent of the population of Illinois. It contributes 78 percent of that state's GDP, and all 26 metro areas in this state collectively house 98 percent of your population and contribute 99 percent of your state's GDP.

Metro areas generate the majority of GDP in 47 of the 50 states, including states that we think of as rural like Iowa, Kansas, Nebraska, and Arkansas. So metro areas like the Bay Area and Silicon Valley

matter precisely because they cluster in close proximity net worth of large companies, small and medium-size enterprises, advanced research institutions, specialized services, skills providers, business associations like the Bay Area Council of the Silicon Valley Manufacturers Group.

The transition to the next economy will be led by metros. Metros already dominate U.S. trade accounting for just over $1 trillion of value. The top 100 metros generate 68 percent of the nation's good and service exports, excluding agriculture, 80 percent of service exports. You'd look at all the nation's exports, about 356 of them, that generate 86 percent of the goods and service exports, taking out agriculture, 92 percent of service exports. Values of the exports coming from major metros like L.A., New York, Chicago are simply stunning. These performers exported more than $50 billion apiece in 2007.

Other metros -- Dallas, Houston, Boston, Seattle, Detroit, San Francisco, San Jose, Philly, Portland -- they're also global players exporting more

than $25 billion apiece in 2007. Collectively, just those 12 metros generate about a third of the nation's exports.

It's not just about the larges metros. In the metros shown here, Wichita, San Jose, and Portland again, but Youngstown, Toledo, Greensboro, Grand Rapids, Albuquerque, those metros make up more than twice the share -- exports make up more than twice the share of gross metropolitan product in those places as in New York.

Top hundred metros dominate exports for another good reason: They are the logistical hubs concentrating seaport tonnage, air cargo weight, air passenger borings. Now, the low carbon economy like the export economy will be primarily invented, financed, produced and delivered in the top 100 metros.

As you know, the investment base for the green economy is intensely concentrated, probably mostly in this room. Ninety-four percent of venture capital comes from the top 100 metros. The most

innovative aspects of the green economy will cluster around major largely metro placed/metro-based research institutions. Fifteen of the twenty-one national labs run by DOE are located within the top 100 metros.

Older metros like Akron, Grand Rapids, Dayton, Toledo, Youngstown, they've got the technical expertise, they've got the physical capacity to manufacture wind turbines. And making our old and new homes, office, retail, and commercial facilities energy-efficient is primarily a metropolitan act, given the heavy concentration of population, businesses, and buildings.

And finally on innovation, our metros are the nation's knowledge and technology centers as well as magnets for talent and creativity of all kinds. Top 100 metros dominate the production of patents, the receipt of NIH and NSF research funding, and they gather our most educated workers, particularly those with science and engineering degrees.

In short, the next economy here and board -- in Europe, in China, in Latin America -- will be

shaped, determined, delivered by the metropolitan areas. So that's my final proposition. To build the next economy, we've got to connect this macrovision of an economy to metro reality. We've got to connect the macro to the metro.

The U.S. is not China, thankfully. We're not a planned economy, we're not deciding or having some centralized bureaucracy decide which sector is growing, which place is -- and then aligning infrastructure, innovation, human capital, and other investments to make it happen. To build our next economy, we need a different kind of playbook that's uniquely aligned to our entrepreneurial nation where growth and jobs emerge from the DNA of metropolitan America: private firms, research institutions, investors, trade associations, philanthropy, labor, and, yes, government.

The federal and state governments in this playbook, fundamentally need to lead where they must, given the need for common markets, given the need for transformative investments, given the need for

standardized rules as we talked about last night. At the same time, networks of metropolitan leaders must innovate where they should, given their clusters, their distinct competitive advantages, their special responsibilities for developing quality plays educating the next work force.

So what does that look like in practice -- and we talked about some of this last evening. Let's start with exports: double exports by 2015, Obama's challenge. We need the federal government to act smart on trade, currency, the macrolevers for export growth. But those actions alone are not going to do the trick. Anyone who travels within or among our major metropolitan areas knows that we're a first-class economy with a third-class infrastructure.

Our current path is not sustainable; it's economic suicide to expect that our major ports, freight hubs, and rail cars are going to do what it takes on their own to stay one step ahead of global forces. And it's fiscally irrational and irresponsible to expect that a system of dispersed and

uncoordinated congressional earmarks, the way the system really operates now, will get the job done.

So we need a new national infrastructure bag, and this is primarily about transport now to invest for the future. Intermodal facilities at our congested ports, high-speed passenger rail as in Germany and France, congestion-pricing as London, Stockholm, Singapore. The bank would act in close concert with the private sector, both the leverage private sector financing, engage private sector firms to get projects done at market speed, on time, under budget.

The federal government alone can't deliver, however, an export economy in a global economy, the heavy lifting has to be done by metros where sectors of exports strength cluster and concentrate. Wichita, Kansas, for example, specializes in aviation manufacturing, the sector which trades extensively with countries like France, Japan, and Brazil. Minneapolis specializes in the production of high-

precision surgical instruments, the sector with buyers in Mexico, Ireland, Singapore.

San Francisco specializes in management and consulting services exported to countries like China, Germany, United Kingdom. For the nation to complete, these ad other metros need to understand their niche in a global marketplace in granular ways, and then exploit that advantage by helping networks of primarily small and medium-size firms get access to what they need, whether it's sophisticated market information, or specialized capital, or customized job training, export promotion, fast-track permitting, collective branding and marketing.

That's what we've got to do to play on exports. Related, what about the low carbon economy? We talked last night about the carbon price. We also need a step change in advance research and development. We're recommending a national network of energy discovery innovation institutes. The administration calls these "energy innovation hubs" to help trigger breakthroughs and fuel cell technologies,

biomass, geothermal, wave power, carbon sequestration, biofuels.

These institutes would not generate ideas in a vacuum, which is really the way it's been done traditionally. They would connect closely to established and start-up firms, suppliers, and producers to accelerate the cycle of invention, financing commercialization and deployment. Like infrastructure, this is a radical departure from how we do business. The federal government's nondefense energy-related R&D funding with about $5.4 billion per year is a 33 percent decrease from 1980 in real dollars. It's an 80 percent decrease when taken as a share of GDP. We suggest that the country grow our investment to at least $20 billion per year which would place energy innovation on a comparable level with healthcare and defense.

Here again, federal interventions are not enough.

While some metros play a substantial role in energy research, all metros can take steps to develop livable

places that move away from a sprawling distended landscape to communities that connect jobs, housing, transport for people and firms.

Metros are already on the case. Denver has made significant local investments in its light rail and rapid bus system. It's concentrating mixed-se facilities around the transit stations., Charlotte, Dallas, Minneapolis, Salt Lake, Seattle have also recently opened up light rail lines. So changing how these places grow will reduce greenhouse gas emissions good for the environment and could create U.S. grown industries for streetcars, light rail transit, rapid bus.

Finally, what about innovation? We desperately need a national innovation policy if our metros and our nation are going to stay one step ahead of the competitors. There is no vision today. Innovation efforts are scattered all over the government. Unlike Germany and China, we talk about innovation as if it's separate from manufacturing and export considerations, and there's little focus on

services innovation and commercialization, although those hold great promise.

We're recommending a small, lean, national innovation foundations on efforts in Korea and Finland to bring under one roof and ramp up what are fragmented efforts to boost commercial innovations in fields such as precision manufacturing, clean energy and info tech. And to compliment that sharpened national focus, metros would then strengthen their existing centers of innovation and public and private research institutions that stretch far beyond the realm of energy.

Just imagine Silicon Valley or the Bay Area without Stanford, or Berkeley, or Livermore. These institutions really are at the heart of your regional innovation clusters and are magnets for job-generating private and public sector investment.

This is not just about elite institutions. Local community colleges, postsecondary technical schools, skills providers will deliver the bulk of the next American work force. An innovative economy can

only be built if we've got the educated and skilled workers to build it. So growing an innovation-fueled economy requires strengthening those institutions which actually supply the fuel and then ensuring the qualified individuals have access to those institutions.

Let's just go back to the playbook for the next economy. What I've described is a very different vision not just for federal leadership but for metro innovation. The federal level it's a 21st century vision of investment that's delivered by smaller, leaner, more entrepreneurial entities like an infrastructure bank or an innovation foundation, or distributed in networks like the energy-innovation hubs. That's a stark departure from the way Washington works, which generally invests today -- though the President is beginning to change this -- without any broad vision or coherent strategy.

Our sense is we may have gotten away with this kind of unfocused spending in the '70s and '80s. It's not going to work for this century. At the metro

scale, this is a 21st century vision of networks that considerably leverage national or natural economic clusters, connect transport in housing, strengthen institutions that deliver innovation and education. This vision treats metros, not as collections of governments, but as collections of leaders and institutions that link across disciplines, across jurisdictions, across sectors so the whole is greater than the sum of the parts.

Our sense is that these ideas have the potential to move forward even in a polarized moment. We've worked closely with senators like Olympia Snow, Lemar Alexander, Susan Collins, who all sponsored or cosponsored legislation in support of some of the institutional reforms I presented today. And at the metro scale, Democrats and Republicans routinely work together to advance economic growth.

So let me end where I began. The Great Recession, in our view, sets the conditions for the kind of historic reset that we really witness only once or twice a century. We need to get about the

business of restructuring our economy towards exports in low carbon, in favor of innovation, so we can complete globally and place the U.S. back on the path to prosperity. And that path runs directly through our metro areas.

The people in this room and the sectors and constituencies you represent are really illustrative of the energy and potential of metro America. Because you operate in global space, you understand the challenges we face around the world. You've a clear sense of what other nations, particularly China, are doing to lead the clean energy economy. And you have concrete ideas for what the federal and state governments need to do to enable us to stay in the game, let alone succeed.

Now, as leaders who travel in metro space, you also understand the powers of clusters and concentration of livability and transport of schools and skills. So you're a unique, pragmatic, grounded voice in the debate that to now has been intensely polarized to the extent that it's even happened.

I think, as George talked about in his opening remarks, our goal, our mutual goal here with Lazard and Brookings is to come away from these day-and-a-half of panels and conversation with concrete ideas and a broader narrative that we can bring back to federal policymakers both in the administration and in Congress, and to talk about it in a sort of broad-brush way so that we can connect the clean energy conversation and the low carbon conversation, first and foremost to jobs and investment, but then also to issues around exports and to broader issues around innovation.

Thank you very much. I'm willing to take a few questions, and then we'll move to the first panel. Thanks.

(Applause)

Any initial thoughts? Comments? Particularly criticisms. George?

MR. BILICIC: I've spent a lot of time with your alternative energy companies that are emerging,

and you look at their discussion around where they're going to locate their production.

MR. KATZ: Right.

MR. BILICIC: And they all say, "Well, golly gee, I'd like to locate the plants in California, thanks to the squirrels, but it doesn't work because, the tax system because the (inaudible), I can put it in Malaysia, and Asia's gets done.

And so what's the solution to that, if there is one, and is there a solution necessary for bringing and export economy?

MR. KATZ: Yeah, I, you know, this -- and I've talked to Mike Ahearn about this and some other folks -- I think this has to operate at several different levels. The first level is at the paradigmatic level. I think there's a large number of macro-policymakers for several decades who believed that we really didn't need to produce what we invented at home; that it was okay if the U.S. stayed at the higher end of advanced research and design and

innovation. And if the production happened elsewhere, that would be fine.

I think what we lost in that equation is that innovation is also a product of what happens on the factory floor, and that if we outsource production, essentially, to other parts of the world, we may stay ahead of the game for some period of time on advanced research and design, but over time we will lose our edge. And we know who we will lose our edge to.

I don't think that's well understood, and I don't think it's well understood how many different aspects of our system -- not just federal but our whole federalist system – (inaudible) that in the end has to really happen at the local level or, when we're dealing with cross-state issues, how many barriers, how many hurdles there are to locating an maintaining facilities here. And when we talk about not just the location, when we talk about the maintenance, this work force issue is a big issue.

I've done lots of work in older industrial states like Pennsylvania and Ohio and Michigan, portions of New England where there still is advanced precision manufacturing. It still survives, it still competes globally. But the ability for our community colleges and our technical schools to have a sort of steady or liable stream of workers that can replace an aging work force is a huge issue, and it's hidden in plain sight.

So I think we first need to make a decision as a country that it is not sufficient to just be the inventor and the generator of ideas; that we have to deploy and produce at home, and then we have to do what is a brutal process of going through tax, spending, regulation, federal, state, metro, local to understand what it will take to balance, to the extent we can, this sort of cost equation.

Now, when I talk about a step-change in advanced R&D, and it was really brought up yesterday, you get what you pay for. We have a tax code that for the most part has subsidized consumption and for the

most part has subsidized debt fuel consumption in the real estate sector. And that are, you know, perhaps defensible reasons for why we did that. But that is not a productive and sustainable economy. If we really want to compete in this century as opposed to the 20th century, we need to shift large amounts of resources towards productive wealth-generating, market-shaping investments.

Very hard to do. Entrenched lobbies, obviously, benefit immensely from the current allocation of resources, but we need to fundamentally get our act together. And, you know, as we go forward, George, I think laying out, systematically, how our system basically tilts away from maintaining and extending production at home is something that we have to re-educate our policymakers about. They fundamentally don't know what kind of system they've created. It's an accretion over decades, and there was no master mind that basically said this had to happen.

So we're never going to get all production, you know. There are lots of different equations, but we can do more than we do today, and that shift in a country this large, in a sector that profound, could have very big implications for revenues in the work force.

Other thoughts? Yes?

SPEAKER: (Off mic)

MR. KATZ: Okay, I apologize.

SPEAKER: How do you know he wasn't (inaudible)

MR. KATZ: We're on a roll.

SPEAKER: I'm sure that's one of the comments or questions (inaudible) on public hearing (inaudible) --

MR. KATZ: Yeah.

SPEAKER: (Off mic) the critics (inaudible) to say that public transportation issues have "terror" (inaudible), and people are (inaudible).

MR. KATZ: Well, I'm probably sure I know who it is. There's a, you know -- I used to

participate on what we used to call the sprawl brawls around the country, and probably this individual that I would go around the country an debate, you know, the merits of public transit and also development patterns and so forth.

I think, you know, about seven or eight years ago I was in Denver, and it was at the time really when Denver began to lay out and move forward on its vision of 118 miles of light rail. And, you know, Mayor Hickenlooper, who is now running for governor of Colorado, was very clear what he was about the business of doing.

The transit he was building was not about serving the population of Denver; it was about building a sustainable metropolis for the 21st century. And the real fruit and benefit of these investments will occur 15, 25, 35 years in the future.

I live in Arlington, Virginia, and, you know, in the 1970s Washington, D.C., capital city, decided -- the region decided to lay down a modern transportation system. Arlington, Virginia, had one of

two choices: It could tunnel under its critical business corridor, which is Rosslyn-Ballston, and then basically change its land use so that there would be density along the transit corridor, a mixed-used residential, commercial, office, retail, or it could just run the transit along 66, you know, our freeway, so that people on the transit could wave at people in the cars.

And the major decision, the big bet they made is let's tunnel under it. It'll cost more in the near-term, but over the long-term, we will generate so much wealth from being an attractive quality, walkable place to be that it'll pay itself back, many, many, many times over. As an Arlington taxpayer, trust me. I know this has worked very well.

That's what the transit conversation is about. This is a country of 310 million. We will be 400 million in 40 years. We have to ask ourselves the question, what kind of metropolitan areas do we want to build? Because they will primarily be metropolitan areas. This is not to say that the kind of low-

density development that occurs at the periphery of our metropolitan areas won't continue to happen, but this is about having more choice for many more people to decide where to live, how to get to work, how to basically carry out their daily errands, and transit is really a 21st century proposition for doing that and in the end, I think, is a competitive proposition.

The places that do this right will be the magnets for innovative firms and talented workers who pretty much can go anywhere. And, you know, I understand the sort of way in which some have basically decried these investments and have attacked some of the public transit agencies, but, you know, as with many of the other investments I'm describing, if we don't go down this path, I think we begin to retard our position over time.

Other comments?

SPEAKER: (Off mic) make this a national (inaudible)....and how do you envision of working together and to identify (inaudible) along (inaudible)?

MR. KATZ: Yeah, they're actually all three very different kinds of entities. The energy discovery institutes is really a distributing network of universities and other research institutions that are working in close collaboration with the private sector. We already do this on health care, you know -- not everywhere -- but if you go to the University of Pennsylvania, the bio, you know, the PHRMA Belt on Route 202 really grows out of the University of Pennsylvania.

You go to Johns Hopkins, you know, the -- or, you know, the NIH cluster in Montgomery County, Maryland, those are the hubs of what is a very, very profound advanced medical care cluster in the Baltimore-Washington region.

So we do this on healthcare.

What we'd done on energy is basically how the bunch of 1950s energy labs, right, that are pretty much removed because they were nuclear labs, and they're pretty much removed from the private sector. We want to blow through all that. We want to

basically say, let's create this distributing network of advanced research institutes.

Now, you know, obviously, you don't want to do this in an earmarked way where Chairman of X Committee, just basically will say, "We're going have another one in West Virginia." We've been down that road before. I mean you want to basically build off of what are already emerging clusters and areas of expertise, not just in universities or research institutions but in the real economy that surrounds that.

So that's the vision of these energy innovation hubs. I mean let's do what we do very well in the United States is build economies, shape markets off being the most advanced research, having the most advanced research institutions in the world.

The infrastructure bank and the innovation foundations are intended to be lean entrepreneurial entities, sort of hot spots in the Washington firmament.

SPEAKER: (off mic)

MR. KATZ: Well, they're meant to be really public/private kind of entities. Very important what we're trying to do here. We're trying to take transportation allocation decisions for what we believe are transformative investments out of the hands of State Departments of Transportation, which when they receive federal funding just spread the money across their states like peanut butter. They never aggregate the funding in the places that are actually driving their economy.

Case in point: The Recovery Act spent about $27 billion on highway/transit spending. States had to come to the federal Department of Transportation and say, here's how we're going to spend the $27 billion you just sent us for road and transit money. States like Washington did not have one project in Seattle. States like Missouri did not have any projects in St. Louis and Kansas City.

What are we doing? You know, we're basically just using these funds to satisfy 85 House members of the state legislature. You know the drill.

We got to get out of this business of following a political logic of allocating transportation funding and basically make some bets on those intermodal facilities or high-speed rail that are really going to pay off over time. So that's a separate -- we're going to take that out and have it be a separate entity to leverage a private sector financing, and I know Lazard and many others are working on this.

The National Innovation Foundation, you know, we have lots of innovation programs in the federal government. Lots. More than anyone really wants to know, frankly. This would be a sort of a hub of thinking about the next generation of innovation.

Example: I was talking to the Finnish Innovation Foundation about six months ago, and, I don't know, I just thought what they probably were doing was working on telecommunication stuff, given what we know about Finland. part of their Innovation Foundation was basically, you know, searching the question of what would it mean to build a no-carbon city in the 21st century? Not because it was an

intriguing environmental idea, but they felt if the Fins could get ahead of that curve, that's a tradable sector, right?

That's the possibility of a small, hot house, also working in distributed was to the best universities, best thinkers, best practices -- you know, of having a national innovation foundation in the national government. I think it probably would be a separate agency of sort, like xAmer, you know, to be looking around the curve and not be captured by so many, you know, distinct bureaucracies and so forth. So very different kind of entities but all have the element of operating in a market economy as opposed to a political economy.

SPEAKER: Have you thought about how the immigration policies would integrate (inaudible 01:21:31)

MR. WARD: Yeah.

SPEAKER: Well, what do you think about these (inaudible)... from the upper end...(inaudible)

...people that are trained here and (inaudible)...very difficult to

(inaudible)...same time and (inaudible) innovation..

On the lower end of the (inaudible), you know, especially board.. the ability to access.. (inaudible). I think in both cases, you know, from a narrow perspective, it is ... But from a broader perspective, you're ejecting complications and dynamics.. (inaudible)... so I'd be curious in having..(inaudible)

MR. KATZ: So this is a question about immigration and how immigration of both the high end and the low end play. Yeah, I mean my view of immigration -- and this is fueled by the empirical research -- is that the benefits of immigration so far outweigh the drawbacks on both the high end and the low end that we fundamentally need to get a grip, you know, in terms of our national debate about this.

So what we'd need to do, I think, are several things. At the high end, we should be the magnet for the most talented individuals in the world,

whether they're coming to our advanced research institutions or whether they're coming to work in our most innovative firms. The notion we have a cap on each 1B visa is absolutely ludicrous. I mean if we don't attract these people, they will go to some of our competitors. And when we bring people in, either as students or as workers into our advanced firms, what we naturally then do is networks, social networks between our country and their country of origin.

I mean this region really is exemplary of what it means to create relationships from Silicon Valley to Bangalore or other, you know, major emerging metro centers of talent in the world. So this is a competitive proposition in the long run. The U.S. has to be globally embracing, globally fluent, and the flow of high-skilled labor is just the same as the flow of advanced capital, or the flow of advanced information. It has to run smoothly, and the barriers have to be taken down.

On low-skilled, I think what we need is -- and you can see from my presentation, and I think the

President really, to his credit, has done more to articulate this in the last year than anyone else before -- we need to make a commitment to advancing the education and skills of the African Americans and Hispanics who are going to make up the -- you know, close to a majority of our work force. If we can make that commitment, I obviously think that the kind of,you know, guest worker programs, the kind of immigration reforms that have been on the table make a lot of sense, Mike, for many of the reasons that you say.

I think, politically however, we need to couple this with a clear sign that we're going to do -- not as, you know, some kind of fairness or eco- -- as a competitive proposition, we're going to upgrade the education and skills of the next work force. I think if we do that, then we can perhaps begin to have a rational conversation of immigration policy.

Put aside xenophobia, okay. Just put that aside for a second because I think what's fueling the immigration debate, frankly, are a bunch of places in

the United States, the new gateways of immigration that began to be really flooded with new immigrants in the '90s and had like a reaction, a cultural reaction.

We went through that at the beginning of the last century, 1900s, 1910s, and we shut immigration down in 1925. And we didn't open it up until 1965. We can't make the same mistake this time around. I mean this is about global competitiveness at both the high end and the low end. I think the real issue is just how we manage the politics of this, and that's why I recommend beginning to couple it where there's a broader systemic commitment to education and skills.

A question is over here, yeah.

SPEAKER: I'm trying to figure out, you know, we used examples of (inaudible).

MR. KATZ: Right.

SPEAKER: And I'm trying to figure out what can we do to ensure the amount of.. (inaudible). What can we do to actually have.. (inaudible).. California we have ..(inaudible).

MR. KATZ: Is that your bank?

SPEAKER: ... the State of California putting together the California innovations...(inaudible) and the same with Kansas and Arkansas and Illinois where I'm from and other places, because it just seems to me like it's -- you know, I mean it -- I mean even Obama -- let's be clear, right -- I mean his last budget increases taxes on corporations.

MR. KATZ: Yeah.

SPEAKER: The most bone-headed thing I've ever seen, you know, a president do in the middle of a competitiveness --

MR. KATZ: Yeah.

SPEAKER: -- game, right. I mean, you know, just to think that the OECD countries have an average of a 22 percent tax rate, and we're trying to raise it up again.

So, you know, why don't we just do it at the state level, or regional level if it's not one state?

MR. KATZ: Listen. You know, the great thing about the United States and the maddening thing about

the United States is that we are such a distributed diffuse nation, right? So we all want to be China for a day, maybe six months would be a little more realistic, you know. I don't think we'd get enough done in a day.

But I think what we probably are moving to over the next three, five, seven, ten years is the distributing model that you describe. I mean as I talk about connecting the macro to the metro, what you see is I talk about both the feds and the states in leadership roles. And we always have a default proposition in the United States. If the fed wither away or they don't focus, or they go on a frolicking detour, you'll find five or seven states that get their act together.

The challenge is they're probably only going to be five or seven, right, and they're probably going to be the places that are already smart, that are already, you know, globally integrated, and to some extent what that will do is the smart places will

begin to move away even more from the places that are not as globally integrated.

So I worry as a cultural proposition, as a social proposition, a country which begins to move apart from itself. And, you know, we're putting out this report in about three or four months about this last decade and what happened, you know, in this last decade on many different levels; demographics and again and so forth and so on.

One of the most striking things is how the smart metros -- you know, Silicon Valley and San Francisco, obviously, two, right -- have just moved away from the rest of the country in terms of educational attainment, in terms of, you know, performance on many different levels. That will create tensions over time, and I think that's why we have to retain some kind of national leadership, vision, new kinds of institutions. You know, Jim Robinson is here. A new vision of federalism, you know, with no one ever likes to talk about federalism because it's like, you know, complicated. It sort of

smacks of 18th century people wearing wigs, all that kind of stuff.

But, frankly, if we want to compete, we need to figure out how a federal republic works in the 21st century. Germany, Canada, Australia, Brazil, other federal republics are doing this, and we don't even talk about it, let alone move in smart ways.

So, unfortunately, I think we're moving to where you are. I may, you know, be delusional enough to want to at least retain some focus around national vision, and then, if that doesn't work, you know, California, Massachusetts -- name your favorite state, they'll begin to move in this direction.

Jim?

SPEAKER: (Off mic) Well, thank you, (inaudible) I've been on the working force (inaudible), and I remember (inaudible) Ronald Reagan (inaudible) John Regan (inaudible) and its industrial policy in the United States.

MR. KATZ: Right.

SPEAKER: (Off mic) Then the testosterone (inaudible) then the private sector, too, and I maintain we answered the wrong question.

MR. KATZ: Right. Mm-hmm.

SPEAKER: The question should have been, what does the federal government do in order to make America (inaudible)? And that's what you're doing now.

MR. KATZ: Yeah.

SPEAKER: And this is the best presentation in taxing I've seen you do. The auditors have been very good. This was pretty (inaudible). Now the question is, how do we make Congress irrelevant?

MR. KATZ: Right.

SPEAKER: And if you're right, it's going to be the states that get it.

MR. KATZ: Yeah.

SPEAKER: The states that get it like Bloomberg get it that shows the leadership what can be. But in the final analysis it's got to be (inaudible).

MR. KATZ: Yeah.

SPEAKER: (Off mic) And a collective evidence. And the more we can get together, the (inaudible) which are called anecdotes, but what stands in the way of the (inaudible) of getting the damn job done. Was the (inaudible) the government and taxation, whatever. And just profile those of people in cities, and then continue to educate over and over and over, if that's what you're trying to do, and then I think it's very important (inaudible).

MR. KATZ: Well, you know, I worked for Alan Cranston for six years, when he was Chair of the Senate Housing Subcommittee, of the Banking Committee. And what I learned in that process was, you know, Congress at the end of the day is a collection of individuals and a very diverse set of individuals. And as I think about the agenda I put forward, and I think as we go forward there'll be more added to it, maybe we'll subtract some.

There are a bunch of members who are in very powerful positions in Washington, either on the

Appropriation Committee, on the Tax Committees, or on the Authorizing Committees who can move this stuff. They believe in it, they're smart enough to understand what it's about, and they already have done things that for the most part are under the radar screen and people don't really hear about it as much because they're just diligent. They do their job, they're not prima donnas.

So I'd put aside any hopes of large-scale congressional reform, you know, because I don't have enough time in my life to figure that one out. But I do think that, you know, these sort of very clear, concrete legislatable ideas, if we're lucky enough and fortunate enough to have leaders on both sides of the aisles in critical positions, we can move this. It's not the omnibus bill to solve all everything, but it's some very critical pieces of the new architecture that I think can be done.

We're going to have a surface transportation bill probably in 2011, and there are members in both the House and the Senate who I think not only want to

do an infrastructure bank but also want to make a whole series of systemic reforms to the way in which we allocate transportation spending and the way in which we swing it behind a low carbon and competitive economy.

That's not the entire Congress, which for the most part is just interested in earmarks; but for those three to five to seven members, cultivate them, nurture them, work with them. Let's get the job done. It's just a pragmatic kind of focus.

Now, I've been told to shut up, so, and now what do you want me to do, Lael? Are ready for the next panel?

MS. SMITH: Not yet.

MR. KATZ: Fantastic.

MS. SMITH: Five minutes.

MR. KATZ: Oh, we'll take a break for five minutes. Okay, break for five minutes. We come back and we'll move to the next panel. Thank you.

(Applause)

MS. SMITH: I think that the -- what we've seen so far in this conference has been fascinating for me, and I have been to more conferences than I can being to count. I have really enjoyed the candor of this one, and really, the effort to engage in some very important topics that, honestly, I don't see discussed that much.

So what I want to do is begin by asking each of the three panelists to talk for just a minute about his law practice, or the company for which he works, and tell us a little bit about what they've been working on. And then we're going to jump into questions. We'll talk for -- we've got a 90-minute segment here, which is a little intimidating. But we'll try to keep it moving. We've got a bunch of questions we want to kick around here, and then we'll throw it open to the audience.

So, Ted, would you care to begin?

MR. CRAVER: Certainly. My name is Ted Craver. I'm the Chairman and CEO for Edison International, which is a holding company. We're

based here in California. Our principal subsidiaries are Southern California Edison, which is a regulated entity that serves about 14 million people in Southern California, as the name suggests, a 50,000 square mile territory, about 5-point -- roughly five million customer accounts.

A lot of things that we're focused on in California -- a lot of things we're focused on in Southern California right now actually relate to renewables, smart grid, a lot of things associated with the introduction of electric vehicles and other electric transportation, so I look forward to talking about some of those things. Our unregulated entities are all housed under a company called Edison Mission Groups, primarily a generation company. The focus there for really the last five years or so has been on renewables generation developing different forms of renewables, a fairly heavy concentration in wind to have about 1,600 megawatts in operation or in construction. There's probably a good little overview.

MS. SMITH: Okay, great.

Larry?

MR. SONSINI: Larry Sonsini. I'm Chairman of Wilson, Sonsini. We're a law firm with our home office based here in Palo Alto. We have offices in New York, Washington, Austin, San Diego, Seattle, and Shanghai. We're somewhat unique as a law firm because we focus primarily in representing enterprises at all stages of growth. So currently we represent over 3,500 private companies and over 400 public companies, most of them in the technology and emerging growth area.

We spend a lot of time just helping build enterprises, so our practices focuses a lot on corporate finance, mergers, and acquisitions, go governance, a heavy content of technology and intellectual property.

We do a lot of public offerings, a lot of venture capital, a lot of corporate finance and new structuring, and the main mission, basically, is to

facilitate the growth of these enterprises on a global basis.

MS. SMITH: Oh, and, Larry, could you name some of the clients that you've got?

MR. SONSINI: Yes. I mean of our public companies that we do a lot work for, we do a lot in the semiconductor industry, companies like Cypress, and those. We do computer companies. We just completed the sale of some Microsystems to Oracle. We do a lot of Hewlett Packard's work. We represent Google. We do a lot of software companies and many of the life science companies. We did the Genentech-Roche merger and of those kinds.

MS. SMITH: Have you got a car company?

MR. SONSINI: We have a car company. We just --

MS. SMITH: We gotta kinda disregard (inaudible) Name the car company.

MR. SONSINI: So we -- I'm heavily involved with Tesla Motors, as you know, and we just filed for an IPO which is going to be very exciting for many

reasons, it's not only for the company. But I think it really is going to be a harbinger for what we hope will be access to capital for this whole alternative energy clean tech sector. And, of course, when you work with a company like that, you can see many of the dynamic changes that we're seeing today, and we're going to talk about today: the role of the government, the role of the markets, the role of venture, and the regulatory aspect, all of which I think is changing dramatically and has to change if we're going to deal with this low carbon society.

MS. SMITH: Now, if you were Warren Buffet, you could have sold 10 cars.

Okay, Mike?

MR. AHEARN: I'm Mike Ahearn. I'm the Chairman of First Solar, which is a company I co-founded and until recently ran as the CEO. First Solar manufactures portable tech solar modules with a thin film semiconductor process. We're the largest solar manufacturer in the world. We're also the low-cost manufacturer in the industry.

And we started the company in 1999. The technology development I actually trace it back to 1992, but we started the company in 1999 to commercialize the technology. It actually took six years. It wasn't until 2004 that we finally got into the commercial game with the product, but the ensuring five years, '05 to '09, were really a period of hyper-growth for us where we went from, for example, 25 megawatts of annual production in '05 to over 1,000 megawatts last year.

Our employee base grew from 200, I think, people full time at the end of '04 to over 5,000 today. Our geographic span moved from two countries, U.S. and Germany, when we launched to 10 countries today where at least have an operating presence. And in the course of the scale, we drove our manufacturing costs dow pretty dramatically, so we're roughly 70 percent reduction in manufacturing costs from the end of '04 benchmark.

So we've been pushing hard to expand the scope of markets and not just penetration in existing

markets, and to try to be on the forefront of this, you know, hopeful new wave of a low carbon infrastructure, and to engage not just with product been around, of course, the policies that are needed to drive it.

So it's a pleasure to be here to have this discussion, and I, like you, find it very interesting and refreshing to start to peel back some of the real issues.

MS. SMITH: So I would like to start by asking you all, President Obama, certainly, when he was running for office and now in the past year has talked a great deal about the green economy, and he's talked about his aspiration to create at least two million green jobs. It's not been always entirely clear whether these are going to be jobs assembling and installing, or whether these are going to be what many of us consider the higher- value jobs, designing/manufacturing.

So I would like to get your views on the green economy. And are we expecting too much of the

green economy? I mean can it really lift the entire U.S. economy in the next few decades?

MR. CRAVER: I'll start with a couple of thoughts, and I'm not sure exactly why, but I've just self-appointed myself to be the kind of the curmudgeon in the discussion.

One thing that I thought was maybe a little missing in the earlier discussion was the word "cost." And I think that's a fairly important element.

On thing that we've noticed as we look at our transformation from, like most electric companies, there's a fair amount of fossil generation. Almost 75 percent of the electricity in the country comes for fossil generation. And as you look at that transformation towards renewables and other low carbon forms of generation, interestingly enough, a lot of the jobs calculus is that you're losing quite a number of jobs from centralized plant.

A coal plant, for instance, fairly modest size megawatt coal plant will typically have a complement of around 250 workers. Those are really

good, middle-class jobs, union-based jobs. So it's at least worth understanding or noting that when you shut down a plant like that, you're going to lose those jobs, and then what's going to be the replacement 250 megawatts, and how many jobs are going to be associated with operating the replacement megawatts?

And at least, as we often see those things, almost by definition you're straight u on the workers, on the middle-class workers involved, you're net-reducing jobs. So I think there's an engine that's around innovation, around creating new manufacturing potential, although I'll have to see whether that's based in the U.S. or based overseas. And there's certainly a lot in the research and development area, but when you actually get to the operating level, the actual production of, many of those kind of new technology forms of generation actually have a lower job content than the old form of generation.

MR. SONSINI: Well, I think that it's a big challenge to answer that question because I think there's a lot of no. When I think about it, certainly

I think the innovation is there. And as long as we allow risk-taking and as long as we provide for more entreprenurialism, I am sure the technologies will come along.

But, quite frankly, we're at the early stages of this whole industry. What do we really mean by "the clean-tech industry" or "the low carbon industry"? And can it scale? And I think it's going to take some new systems to do it. For example, the cost of capital: Project finance in this country is not something that we really have expanded on greatly. The old metric we've had, which we still have -- venture capital, public offering, scalability -- I think may not exactly work in this type of economy. You need venture capital very strong, but you may need another level of finance, another level of access to capital whether it be project finance or whatnot, as well as I think more receptive to be in our public market.

And if you look at what's happened in this past decade, you've seen a contraction in venture

capital; you've seen a decline in public offerings. You know, we entered this decade with over 5,000 public companies on Nasdaq. I think today if we counted we're probably what?
around 2,500? I think we've got global competition and alternative global markets where foreign capital is going. So to me, the elements are there, but I think that we have to look at it broadly and differently but at a government level and in the capital markets level.

MR. AHEARN: Okay, yeah, so I think back to what would it take to create one to two million jobs? Or do we have a viable path, I guess is the question.

MS. SMITH: And they're not expecting too much.

MR. SONSINI: So I think -- yeah, if it's a business-as-usual, I think we're clearly expecting too much. That's obviously a lot of jobs, and maybe just to set the -- set the picture here a little bit. We've got an electric infrastructure now at the state level integrated, you know, around the country. It's

been here for a century, more or less. It is very asset-intensive and a massive investment involved. It's an interactive, complex set of systems and processes in regulatory framework.

And renewable energy, clean tech, is disruptive as it relates to this traditional ecosystem, which is to say it's possible to tack on small amounts of solar and wind, relatively small, and you can sell a few electric cars as well without really disrupting the existing system. When you start to get to scale en mass, you start to run into some real problems, because this stuff is intermittent, it's variable, it requires a different type of transmission, different setting.

From a regulatory point of view, it has to be scheduled differently. If it's distributed, it starts to strip load off of the -- off the utility system, which starts to strip revenue off, which is required to pay the return on capital based on the rate cases. So you start to run into a lot of issues

if you're going to do this in a big way, in a formative way.

What could you do without confronting those problems to just tack on some small programs and kind of start and stop? I think we've seen that in the last few years in the U.S. and this is what you get. I mean from a solar perspective, no meaningful manufacturing base, some manufacturing that's tied to R&D, as in our case. In wind, I don't think you see any big production here of wind turbines.

From a technology point of view, I think there are some interesting things happening here in the electronics and software side, but not any more so than are happening in other markets. So I don't see where a million, two million jobs materializes absent a really fundamental commitment to a low carbon energy infrastructure and a framework that goes with it that also addresses, to Ted's point, the net loss that transforming to this kind of an infrastructure.

We don't have that here, so in the countries that are showing traction -- I guess we'll get into

that -- what they have in common is they do industrial planning. I mean I really looked at this question, are we committed to low carbon? What's that look like? At least tentatively, what's a vision? What pieces do we have to have in place, and should it be market-driven? Should it be centrally planned? If it's market-driven, what do we need to develop? And there's a real program underway with a big bill, a big expense that goes with that. And that's where you're seeing the kind of numbers, you know, that start to look like million.

So absent something like that, which is a big commitment, I don't think you're going to just magically see green jobs. I can't. I've thought about where would they come from, and I -- I don't get that.

MS. SMITH: Okay, so I've got follow-up for each of you. So, Ted, you talked about cost and how cost is a central issue. To me all of this backs into some basic values questions, and I think that Bruce, in his presentation, was nibbling away at it. We've

got some big values questions in this country right now. Are we going to take the great recession and change what we're doing, or is it going to be business as usual?

And to me one of the central questions is, what is our value system? We've gone through a period where, in my opinion, we've had the deification of low costs. Low cost was the No. 1 value, the No. 1 attribute. It's all we cared about. If you look around the Bay Bridge Project on which we Californians are spending billions, the central piece that they were going to bring in, they sent to China to have it made. They said no U.S. company can do it. What that really meant was no U.S. company would build it at that cost. It was a cost issue.

And I would say, how do we ever get back in the game if our companies don't get the contracts? But I don't want to get us off on a tangent on transportation.

Is this a values question on cost, and are there other attributes that we should be thinking about more in this next period?

MR. CRAVER: It's a huge question and a central one. Probably the answers depend a lot on your own individual value system. I'm an economist by training, which probably makes me a minority in the audience here, but I tend to think for anything to be long-term sustainable, it has to be an efficient method of allocating scarce resource. And to me, al large part of what conservation is or efficiency, or even environmentalism is around trying to make the most efficient use of the scarce resources we have.

To me that comes back around to cost. And you have to be able to look at all the costs, not just the explicit cost of production. You have to be able to include societal costs in there as well. But I think you tend to run into some big problems if you avoid the cost consideration, or you try to keep it out of the dialogue.

Currently, I think it's more out of the dialogue than in the dialogue. And the costs associated with this massive transformation, which I personally believe needs to take place -- I want to make that really clear -- I really believe we need to make these transformations, but they are unbelievably costly. I can't remember which of the speakers here mentioned the disruptive change -- it might have been Mike. You know, those disruptive changes as much as anything else mean that you're doing something very quickly, a relatively small transition period, and those costs aren't going to go away.

So in the case of all the systems that currently exist, they are in the process of being recovered. Customers are paying the cost of all the existing assets that make up the electric system that we have today. If you introduce a disruptive change, you push that very quickly. Those breakage fees don't evaporate, they still have to be absorbed and paid for. And that's part of the cost of making the transformation.

So to me, getting to the cost, understanding the cost part of the equation, is very important in the whole discussion.

MS. SMITH: Maybe -- I think that's a wonderful point, and given that the contracts you enter into for renewable energy are all confidential, none of which are public documents, maybe you could start --

MR. CRAVER: By divulging what those are. I knew this was going to get fined.

MR. SONSINI: Mike and I'll compare notes,

MS. SMITH: That's right.

Larry, you talked about the fact that the IPO model isn't going to be the one that's going to work the best going forward. Do you have some thoughts on what the new financing model might look like for emerging companies?

MR. SONSINI: Well, I still think that we need the IPO model as the foundation piece, and I think that in order to do that we've got to get back and change the system a little bit.

For example, there are a number of elements to have a vibrant IPO market to really help commercialize technology, and access to capital is just absolutely key. We need better independent research in our market for our technology-based companies so that the market can really understand what we mean by "low carbon technology."

We lost independent research, quite frankly. The settlement that Governor Spencer cut that basically tried to separate, because of potential conflicts, research from the investment banking side really has caused the loss of research and independent analyst coverage of small cap and mid-cap companies, which really affects and attracts capital. So we ought to solve that problem by not regulating it out of the system but by having more transparency of the conflict.

Secondly, our investment banking industry, quite frankly, has a business model, and we've seen a lot about and read a lot about that business model in the economic crisis we've had, that has not been

attuned with doing small IPOs. We forget that if you look at when Cisco went public, it was for less than a valuation of $50 million. A fifty-million-dollar IPO is nonexistent today. A Goldman Sachs, a J.P. Morgan, a Morgan Stanley is not going to underwrite that. They can't make any money at it, and so that eliminates access to capital for the smaller companies that can scale once they get the companies. We need to address that problem.

I think the other thing, getting to costs and Ted's mentioned it, the cost of regulation is important. Right now we have so much rhetoric about regulation, and it is clear that we've had to build confidence in our system. It is clear that we need regulation to assist with risk management, but we run the risk that we're going to federalize regulation, we're going to end up with a federal corporate law.

And that's going in the wrong direction. The federal government ought to get out of the board room. The states and the states' law are more than adequate for that, and, consequently, you take

Sarbanes-Oxley, Sarbanes-Oxley was important because we had a crisis in our capital markets. We needed to restore confidence. It had a lot of good elements to it, but it had a lot of baggage that really increased cost dramatically and tried to get into the board room.

So more balanced regulation, making sure we understand that we need to take risk. We need to take risk, and I think that more transparency accountability is the way to deal with the problem, not by legislating parameters of risk, and that's affecting it.

When it gets to, you know, capital, we got to realize that we have to look at the segments of capital when it comes to financing innovation. It really begins at the low end with venture capital. High risk-taking, very important to support innovation. We've got to realize that venture capital has a problem today. The exit strategy for venture capital has changed dramatically. Prior to this decade, the exit strategy was primarily the IPO, 60 to

70 percent. In this decade, the exit strategy is maybe 10 percent IPO, and now the balances and mergers and acquisitions.

Acquisitions, and, quite frankly, the idea that you build a company to sell it has never been a good business plan; you build a company not to sell it, you build a company to scale it, and maybe you have to sell it, maybe you don't have to sell it. And so that problem we need to pay attention to. We have to change the exit strategy, otherwise we're not going to have capital, and the institutions aren't going to put capital there.

Then you got a second layer of capital after venture as your whole private equity capital. And private equity, really in this decade, is really not focused on the public sector at all; it's all about buyouts. It's about taking control, restructuring companies, and it's so dependent upon access to credit. And with the decline of credit, you have really limited some of the business model of private

equity which has limited its ability to come into these kind of economies.

Then you take what I think is very important for low carbon, and that is project finance. It's another level of financing above venture and private equity and below public market. It can exist, coexist with them, but we need project finance, we need the attraction of capital, we need the liquidity in our markets, we need the government support of that to really help scale these companies.

Because the one thing I am finding in -- we do a tremendous amount of clean tech in our firm -- and the thing I am finding is that we're beginning to understand the difficulty of scaling that kind of business.

Take Tesla Motors. You start with innovation. Okay, they've figured out the power train. They've got a battery technology. You finance -- it's taken a tremendous amount of financing, venture financing, you know, over $200 million. And now it's taking the next stage where it wants to move

into its sedan model which it wants to build in the United States, down in Southern California, where we are going to scale that, and it's going to take more capital.

Now, here's where the government entered, you know, a government loan of almost a half a billion dollars has come in from the DOE that's really tied to that business plan. And now we need more capital coupled with the government loan; now we're going to the public market. We're going to the public market without really proving profitability. We're going to the government market having delivered, you know, maybe 1,500 roadsters, but the sedan is still in design and production. We're going to the public market without, you know, a clear model of what the margins in costs are going to be, all of which is a phenomenal achievement, but it indicates the amount of energy and long-term vision it takes to build this kind of enterprise.

So we need a market, institutional investors and research that really takes the long-term view.

And I think if we can put that all together, I'm very optimistic that we can scale the low carbon companies and we can create jobs, but I think it is a longer cycle, a more complicated cycle, and there are more unknowns than it was when we were taking semiconductor companies public, life-signs companies public, software companies public. It's just a more complex system.

MS. SMITH: So on Tesla, you will -- I mean it will be about one-third private money and two-thirds government money, won't it, by the time you get up to the IPO stage.

MR. AHEARN: Oh, I think that I wouldn't say government money. I think it's going to be money out of the public sector. I mean the government piece is there, certainly, by now, Rebecca, you're about right. But this is just the beginning of it, and -- and we have behind Tesla a lot of other wonderful innovative technology that can come to market, but it is -- it is truly going to require a different way of looking at the system.

So what I believe is the recipe for all of this, entrepreneurialism, liquid capital markets, access to capital, support from the institution -- Berkeley, Stanford, UCSF, Livermore -- independent research. All of that is part of the recipe. What's changed is the proportions of the brew of each of those. And that is something we got to focus on going forward.

There is a role for government in all that, but I think if government tries to over-federalize those areas because it fears risk, it's going to slow us down and clog the system. And I think that's the challenge going forward.

MS. SMITH: Okay.

Mike, you were talking a little bit about manufacturing, and I think you've got some thoughts on what it would take to really have a much larger renewable energy manufacturing sector in this country. Could you talk a little bit about maybe what it would take for you to locate more manufacturing here?

MR. AHEARN: Yeah. I mean if you look at where manufacturing exists in size around the world, it basically collocated with markets where there are markets that offer some transparency over a time frame that will repay investment. I think, to Larry's point, these are all fairly capital-intensive. Whether it's a manufacturing plant or a power plant, the issue in terms of access in capital is risk-return. The biggest risk -- once you get beyond the immediate technical risk, the biggest risk is a market risk. Will there be a market that will drive if you execute your plan sufficient cash flow to pay the capital back and whatever the appropriate return is?

And so when you find a market created like in Germany, which initially did this for wind and then more recently solar that provides multiyear visibility, a price signal so then a way to understand and sort of underwrite the business case, if it's acceptable you can attract capital. And in good conscience you can commit capital to a market like that.

So we built a factory in Eastern Germany that was our first expansion outside the U.S., and people said why. You know, why would you go to Germany? They don't have any sun there.

Because they had an industrial policy and a program, and we could see a payback opportunity and a way to scale, and its corollary to that, you know, what the government was looking for was in return for their subsidy program, their market subsidy program, we want to attract foreign direct investment and create jobs. So we were interested in perpetuating the subsidy program. We wanted to show them a payback. Okay, it's working, we coming, you know, keep going.

So they attract a number of manufacturers, you know, initially, as I say in wind and in solar by creating a market condition that was conducive to attracting investment. Now that's expanded to other European countries. We're building a factory in France, and most people look at that and say, are you nuts? I mean, how's that going to work?

Well, you know, look, we can make the economics work in France based on the market program that they've created, and the visibility we have, you know, which gives us enough time to return the capital and earn a return, it's helpful to provide that feedback to the French government to encourage them to expand their programs. And so why wouldn't we do that?

And I could kind of go on, you know, and talk about Asia. We're actively combing through markets there, and I think we can -- you know, Tom Warner's in the group here, too -- I think every solar company I'm aware of, every wind manufacturer is looking at this the same way. We've got to be where the markets are, we've got to provide a payback to the public sector that's sponsoring us.

Okay, so now step back and look at the U.S. We don't really have those kind of market conditions for any aspect of renewable energy, so the only way to justify it would be, well, nevertheless it's still the low-cost place to manufacture. Otherwise, you know,

based on straight economics and business, this is the place to be, notwithstanding the lack of market. Or, which is not true, you can't get there under that kind of analysis -- you'd never get there, in my view -- or, you know, from a pure patriotic point of view I think we should just do this and create jobs.

And in a globally competitive sector like we're in, you can't afford to do that either. I mean you've got to be pretty hard-nosed about this and go where you need to be to drive your business model.

So I don't know. What would it take? In my view, it sounds tough and yet it's kind of dauntingly close, it would take pulling together the public/private sector with a key group of companies -- of which I think we would be one -- and creating a visible market opportunity that could drive adequate economics to attract and allow you to commit the capital to scale up.

I would say, you know, the other thing. In some technologies, some applications, affordable TAYX being one of them, you can be in a technology forward

sector like we are, thin film, where the cost differential here versus a low labor market like China, it exists but it's not significant. And so it's not like we're so disadvantaged on the numbers that you can't even imagine manufacturing here. It's much more about some of these barriers and issues we talked about earlier and, fundamentally, about just the visibility to warrant the investment.

MS. SMITH: Talk about national renewable portfolio standard or a goal. Talk about feed-in tariffs. And I'd also like you all to talk about Cap and Trade. Is that something that would boost domestic manufacturing, or would it hurt it? Jump in, anyone.

MR. AHEARN: I'll take that one, okay. I'll take that one. I applaud the efforts to drive the national RPS, and I don't take anything away from anybody that's worked hard on this, and I know they have.

I would just say that, you know, we can look around the world at what's worked and what has not

worked in stimulating renewable energy, start-ups and scale, and I would say in every case without exception, these have been industrial plans, you know -- which is a dirty word here, traditionally -- these are industrial planning processes that do a couple of things:

They basically say, where do we want to be by, let's say an intermediate time frame -- 2020's commonly chosen -- in terms of a transition to a low carbon energy infrastructure? It starts really with a commitment to a low carbon energy infrastructure that's multi-stakeholder based, which I'm not sure we have here, but they start with that. Where do we want to be at 2020? What technologies or methodologies have to be in place -- solar, wind, geothermal, biomass, et cetera? What physical infrastructure must be created? What regulatory institutional frameworks have to be created? So, in other words, what are the building blocks that we need to put in place between now and some relevant time period, and how does that integrate with the existing grid? And let's go work

on those things with a view that when we get to 2020, we transition to a more market-driven uptake in the low carbon sense.

And so, you know, if you think about carbon Cap and Trade and the ETS system in Europe, it was never intended to be ramped and those caps ratcheted down immediately; it was intended as a series of experiments that by 2020 or so would be fully ratcheted, and now you've got externalities priced in the market, you can have more of a market-based dynamic.

But in the meantime, they're building a solar industry with scale, wind, biomass, and so forth. And so I think in the U.S. it would take a similar -- you need a similar approach. I mean you've really got to step back and say let's have a vision. Are we committed to a low carbon energy infrastructure or not? It's not clear to me. I mean it's clear that the rhetoric has stepped up tremendously and that you can go find a lot of people that are interested, but I don't think you've got, you know, all the stakeholders

at the table saying, we agree that's where we're going. We agree, roughly, on the time frame. We agree what this is going to look like, and while we may have differences, we're on board with kind of a framework for how we're going to do it.

But we don't have that right now. And I think nor do we have a process, politically, that will get to that. But I think you need something like that, and then you need to take each one -- and let's take solar -- and say, look, solar is not positioned like wind. Wind has had a 30-year head start driven by wind-specific programs in Europe, feed-in tariffs that reduced the cost 80 percent. Solar started five years ago. I mean it's already moving down rapidly, but to throw in a national RPS and say let the market decide, we don't do industrial planning. Let's just let the market figure it out.

Well, solar is not going to get a whole lot of attraction at least initially, and you need a specific solar program.

Now, in just the last point, I mean to say let the market decide on some of these, which I get this a lot, there's no market. I mean I don't know how to -- if you -- these are centrally-planned areas of our economy. They're centrally planned at the state level, and there are pockets of market activity on wholesale power base. There's no free market out there for clean tech to break into. These are regulated markets, so I don't know what that means let the market decide. I mean it's not set up that way, and the other thing is there are externalities at play that we've talked about. There's climate change, there's national security implications, there's maybe economic technology exportability that transcend the interests of a local planning unit, right.

So these are classic cases where market fails, and the government needs to step in and do some planning. So anyway, I'd like to see specific programs. I think they'd look different around wind, solar, biomass, smart grid, whatever, you know. There's various subset, and it's going to require

rolling up your sleeves, and I think people worry about the government getting too involved in that.

I think there's a way to deal with that, too, and it's a public/private effort, and there are precedents for it.

MR. SONSINI: You know, I really agree with Mike. What I see that all of the pieces haven't really been integrated and put together, because we really aren't talking about transforming economy and lifestyle, and we are dealing with some of the old metrics that really were not transforming economies but just building on innovation of technology.

Take the web, take the Internet. It transformed the way we live. It transformed the economy, but the elements were integrated in, we didn't' need a national policy on search, you know. Look at how Google was able to scale so quickly. I remember when I first met Sergei and Larry in 1998, they had this idea, this business plan to start this company. Who would have known that in a decade it

would have transformed what it did without really having to change policy. All the pieces were there.

But as Mike points out, I don't think we have all the pieces integrated here. I don't now what our national policy really is on this. I don't know whether we have all of the institutional infrastructure we need to scale these companies on the same page yet. I think that we talk about things -- I represent a company called Eschelon, which is on the whole smart meter business -- and most of the business has been in Europe. It's been very difficult to penetrate the U.S. utilities to get them to adapt to change and to go to smart meters and to deal with the grid which is behind it.

Why is that? We're dealing with very big pieces of structure that we're trying to change by using traditional methods of innovation and capital and regulatory. And I don't -- I don't see them all -- I'm very optimistic about it, but I think that we've got a lot of plowing to do ahead.

MR. CRAVER: I think one --

MS. SMITH: Yeah, perfectly, I was going to say, Ted, because you're, as someone running utility, utilities are often considered to be obstructionists in this whole process. So --

MR. CRAVER: And I think there's a -- I don't now if I adequately described it before -- but to me there's a rational reason for that, and that is that utilities, the way the model is set up as Mike said, they go before a governmental body, the California Public Utilities Commission, for example, and they have to justify whatever they do in terms of cost. They have to show that there are more benefits than there are costs for the given investment, and then it's approved. The money gets committed, and then it gets recovered over how many years? It depends. If it's software, it'll get recovered over five to seven years, but most of our investments, because it's a capital-intensive industry, most of our investments get recovered over 30 or 40 years.

So if something changes dramatically in that time frame, you're going to have some real breakage.

And that will either be customers are going to have to pay for something that no longer is used and useful, which they typically don't like, and if that gets bad enough like in the energy crisis of 2000, there's a revolt, and then you're looking at potential bankruptcy of the companies that have made those investments.

So it's a very long cycle, very long recovery cycle, and that makes utilities naturally cautious about rapid and disruptive change. Because whenever you have that -- and there are periods in history in utilities -- whenever you have that disruptive change, something has to give, and almost always it's a risk that the company goes bankrupt. So that's part of the reality that I think has to be incorporated into this.

The one part that I think is a struggle, I think it's a struggle in terms of the current economic issue, and I think it's a struggle in terms of this transformative change that we're talking about, in order for it to pencil out you need to have a long

period of either artificial costs being added onto the old way, or subsidies brought to bear on the new way. And it's how long are you going to have those, those things in existence?

In order for us to really jump-start batteries, jump-start solar technologies, jump-start superconducting technologies, I mean just kind of go, start going down the list. All those things that have to be done are not scalable right now; perhaps we don't even really have the right technology. It's hard to say at this point, but they don't pencil, they don't -- they aren't providing more benefits than the cost currently, so you have to subsidize it in order to get there, and the hope is that by subsidizing it you give it enough of an engine that it will ultimately be self-sustainable. But self-sustainable means it pencils out. But there's a reasonable margin in order to return capital to those who have been investing in it. And that's what's missing right now.

And so whether the government is pouring a lot of stimulus money into the broader economy right

now, that works, you know, for awhile, but at some point it gets big enough, you've got to be able to get that stuff paid back, and what is the cost of paying it back?

Likewise in these industries, while you jump-start it, while you provide the subsidies, we need ultimately, for those businesses to be self-sustaining.

MS. SMITH: How important is Cap and Trade to what happens next, or at least for the next two years?

MR. AHEARN: Well, I think -- I'll try a first step there -- we've been very, as a company, very engaged. I, personally, have been very engaged in trying to get a carbon pricing regime. We supported the Waxman-Markey bill, for instance. because we saw it as a step change but relatively -- I guess I'll use the word "moderate." It balanced a lot of different issues, and while probably a little faster than what we think makes sense for the size of the transformation that was at least in the zone of

reasonableness. So a few qualifications around that, but, fundamentally, we were supportive of it and actively engaged in it.

I think the issue that I'm currently seeing is there's not much appetite in Congress for really trying to push that forward, mostly because of the cost equation. I think another element that has crept up is a real distrust of the size and complexity of the market that would have to be created in order to really have a functioning Cap and Trade, or carbon-pricing, market-based carbon-pricing.

And I'm honestly not sure whether it's the cost that's the more dominant problem, or it's the complexity and distrust of creating a market that'll be larger than the U.S. Treasury market -- or maybe not anymore, but it's going to be a huge market.

So I think those issues currently make it at least -- I'll use the word "unlikely." It might be highly unlikely for it to go forward. The only condition that I could see that might somehow provide a catalyst is if we had some big issue with Iran or

another 9/11 such that there was such an intensity around kind of energy independence, energy security that you could couple that with a Cap and Trade type of thing. But I think it's a long shot at this point.

MS. SMITH: So I think it's we're about at a point where I should throw it open to the floor. Is there anything either of you would like to ask another? Or shall we just start taking some questions? Are there some questions?

And also, please, there's a microphone that will be circulated. Please use it if you can.

Sure, jump in.

SPEAKER: I think it's right on the tables at --

MS. SMITH: Yeah.

SPEAKER: I've been thinking of really, really tough questions for Mike Ahearn all night, but I'm not going to do that.

Actually, my question is about electric vehicles and in both Larry and Ted, you guys, both of you have commented on electric vehicles. What's sort

of the time frame? What are the inhibitors on, you know, when will it, you know, be meaningful, and then maybe what's the impact on the grid?

MR. AHEARN: Larry, do you want me to start off? Well, I think the time frame, I think it's here in terms of getting what I call the early stages technology in place and provable. The question is, is whether it's going to be scalable. Battery technology, to me, is at the early stages. And, you know, if you -- if you just take a look at the technology content in these cars, the engine is about this big, right, the power train. And the battery is, you know --

MR. SONSINI: That's the car.

MR. AHEARN: -- the whole car. And are you going to be able to get efficiency out of that and at the same time maintain efficacy and safety? I think that happens.

I think the issue's going to be, do we have a way to recharge as opposed to having to drive home and recharge? So now when you drive, you go to gas

stations. Now when you drive an electric vehicle, we've got to build an infrastructure to recharge, because the technology limits us. I mean you get probably two, 250 miles of the charge today, so the ticket to the next level I think is going to be a few years. But I do think that we're going to be in production, we're going to see many cars, you know, in the next two years. It's definitely there, and they're going to be unique.

I think the market's going to adapt to them, but the long-term scalability gets to many of the other issues we've talked about, Ted, don't you think?

MR. CRAVER: I do. I'm a huge personal advocate for electric transportation with large -- I think it's -- it may actually be a little tricky with electric vehicles. I think the adoption rate may be longer than some of the hype. But I think, broadly speaking, electric transportation has some huge benefits - a lot of the things the company's been really involved in. We have the Port of Los Angeles and Long Beach, and at

least Long Beach is in our service territory. I mean those are gigantic port complexes, and the amount of electrification that can be introduced all the way from, what they call cold ironing the ships, essentially putting a plug into the ship so that they don't have to run their boilers, which pollutes the air and is highly inefficient for the onboard systems, to the cranes, to the movement of containers, to bringing the containers into distribution centers. All of that really we believe the economics, even today, show that those are without subsidy and the rest of it I think can be -- can actually be quite compelling.

With electric vehicles, it's, again, kind of one of those points where fundamentally what you have is a transformational change to the existing system. In order for an electric vehicle to get charged and to be charged conveniently for customers who are used to a fossil-based system. That's a big change. That's a really big change.

And just simple things like I'm in my car. I want to drive my car over to my friend's house who lives

in Pasadena, but I live in Irvine. I'm a Southern California Edison customer. I show up in Pasadena. I'm no longer in Southern California Edison's territory. But I need to charge my car.

Are my friends going to loan me their electricity or make a gift of it or how's that -- how's the billing going to work? How does all that stuff happen?

All those mundane things to much more significant issues: when a Tesla shows up in one of our local circuits, which typically are around 10 homes per circuit, and that has to be charged, that's really what we call stage two charger, a level two charger. That's going to really be equivalent to more than a house, more than an average house load being added to what, as I said, typically a 10-house circuit.

That has a high probability of overloading the circuit, and then you're going to be really un-neighborly when you knock out the circuit for the rest of your, you know, friends in the neighborhood.

And can you imagine an early adopter neighborhood, like Santa Monica or Beverly Hills, where they might have two Teslas or three Teslas in that same little neighborhood circuit, such as where I live. We've got probably a neighborhood of 12 houses and I'll bet there are least five, you know, Prius hybrids in that neighborhood. Those are probably the same people that are going to have the electric vehicles.

Without going on about it more, I'm really trying to paint here is it fits into a much bigger system, and there are a lot of component parts that have to be kind of reconfigured and indeed upgraded in order to allow for electric vehicles to truly be ubiquitous.

And I think that's going to happen, but I suspect the timeframe is going to be a little bit longer. I think the benefits are huge, particularly in a place like Southern California that's always struggled with air pollution and, frankly, an underutilized collective system.

So I think it could be very beneficial.

MS. SMITH: So one follow up on that: Who is going to pay for that upgraded transformer or for the fact that that transformer is going through all these stress cycles now because of the Teslas and so it blows out faster.

SPEAKER: Right.

MS. SMITH: How do you deal with that cost issue?

SPEAKER: In the current set up, the current system that we have, and I mean that both politically, regulatorily, and engineering wise, that would be socialized across all of the customers in that service territory.

So if you have a large service territory -- back to Bruce's kind of metropolitan idea -- you know a large service territory can absorb those types of costs.

Where I think it gets a little trickier is when Mr. Jones decides that they want to buy a Tesla, but they don't have electricity into their garage, and they have to get electricity put in there, but they also need, you know, a 240 in order to make that work.

That whole cost of providing the charging capability and that garage is that going to be socialized across all the customers for that early adopter, Mr. Jones? Or is Mr. Jones going to foot the bill for it?

If Mr. Jones is buying a Tesla, he can probably foot the bill without too much difficulty. If Mr. Jones is buying a Nissan Leaf, you know, that may be a little bit bigger issue.

So I think it's -- those are the kinds of issues that the California Public Utilities Commission right now in its Order Instituting Rulemaking, OIR, is grappling with: Who's going to pay for the charging infrastructure? Is that going to be socialized; done by the utility and socialized or is it going to be the responsibility of the customer? Are you going to make it a third party that can play in it? If a third party plays in it is the third party going to be subject to PUC regulation or what?

Now those are huge issues again back to Tom's question that I think are, to me, fascinating. They're

the kind of stuff we get interested in and feel that we can solve, but they're going to take some time to work through those.

SPEAKER: What does your market look like where you bring all the stakeholders together and the utilities, companies like yours, and (inaudible) power to create a market that allows (inaudible). Is it something new or what's the?

SPEAKER: You know, I don't think it would have to be a feed-in tariff market, George. It could be -- or it could be a PPA market, you know, selling power, you know, through bilateral contracts with the utility. I don't think that matters as much as is there a -- structurally a way to sell electricity with relative certainty over the life of the asset, which is 25 years or more, and with solar, for example, selling into the spot market is not -- that's not an option for a number of reasons.

So you have to have a firm commitment, whether it's driven legally, which would be a feed-in

tariff or contracted by a PPA. I don't think it matters as much.

But I think, I mean, pragmatically, this is just a pie-in-the-sky, but it's as pragmatic as you can get, if you said once a critical mass of solar to get the U.S. scaled and in the game, and get some learning cycles turning and actually kind of be present in a meaningful way, I would say if we thought about starting out and over the next five years and thought in terms of five to 10 megawatts, that's a big lift, believe me.

But that's kind of what it takes. I mean Germany will do three and a half this year, just to give you a sense. China's plan is 20 gigawatts through 2020. India is at 20. Most of the other European countries are moving to multi-gigawatt, so if you thought about trying to get to something like that, the interesting question would be assume the cost is whatever it needs to be. Assume away the high cost of solar. How would you do it? I mean where would you go? And how could you actually get this done?

I would think that there are only a few places in the country where you could actually pull that off today, because of transmission issues, environmental permitting, land-use issues, and regulatory and political snafus. You could only go a few places here.

One place to start would be a market that's already working, you know, where people get it and have done their work. I agree with everything the governor said. California, far and away, is the thought leader and the action leader. The California utilities are very sophisticated when it comes to renewables.

So we might by start by saying how could we bolster, accelerate, augment what's already in place in California. Is there a deal to be made there?

I think you could look at some of the federal hydroelectric projects that are underutilized because of a lack of water; have the transmission in place; have off-takers. Many of them are subject to an RPS.

I could imagine maybe leveraging something that way. And then there are a couple other areas in

the countries where you have a confluence of the factors, you know. Texas comes to mind.

But anyway, I think if you sat people at the table and could make a deal and say here's what the structure looks like, then I would have at the table Dearborn, Madison, J.P. Morgan, some of the project financiers, and then I would have some of the manufacturers. And I say, "Look. If we do this, what are you going to do?" And, you know, if we need to tweak it, I mean that's basically put this together and walk out of here with commitments to X factories, X investment, et cetera, and let's go make this happen and get it jumpstarted.

You know, whether that could ever happen, you know, in real life, you know, politically I don't know, but I think that's what it would take to do anything soon.

If you do the top-down sort of policy, programmatic, let it evolve down, go through the noisy process eventually I think we'll get to something here, but not anytime soon. It's going to take some time.

MS. SMITH: Next question. Somebody -- I'll work this way. Please, sir.

MR. KAPP: It's a question for Larry, a follow-up on the project finance comment you made about how we need a stronger project finance organization industry to support these kind of projects.

A little background. My name is Bill Capp, and I'm with the Beacon Power Corporation. We have focused on providing kinetic energy storage systems using -speed flywheels. And we've developed a market -- entering ancillary services market in a variety of different areas in the United States for regulation, which is the moment-to-moment balancing between, you know, what's generated and what's consumed.

It's estimated that the requirement for that will go up by a factor of maybe three or four times as intermittent resources get deployed. So it seems to be -- it's a big market today, and it could be a multi-billion-dollar market in the future with these kinds of increases.

As we looked at deploying our technology, we talked to a lot of people, and, of course, everybody was concerned with the technical risk, so we decided to do it all ourselves, which we've done. Now we're (inaudible) integrated from research and development to actually selling services, first in the New England market, which we've been doing now for over a year. We've just broken ground on a plant in New York for a 20 megawatt facility serving the New York ISO.

One of the things we've had to do along the way is to open up all the markets. Thank goodness we've had great support from the Federal Energy Regulatory Commission, the Public Utility Commissioners, and the ISOs themselves. So we've opened markets in New England, New York, the Midwest ISO, PJM in California we think is getting close.

We have something like an 80 percent EBDTA with the services, so it's financially very attractive, very high returns. But when we talked to the project finance industry, they keep going back to, well, can you

show me one of these things that's been operating for five years. No.

And so the question is there is anything specific you can think of. And, and by the way, we are a beneficiary of the Department of Energy's help in this area. We got a $43 million loan guarantee for our first plant and a $24 million grant for the second plant.

So absent perhaps the -- an expansion of the loan guarantee program, is there anything else specific that you thought of in terms of, you know, addressing -- I'm sure lots and lots of companies like ourselves that have a great idea, but they don't have a long history of demonstrating how it works.

MR. SONSINI: Well, I think that's the problem, and that's the issue, exactly. And it's a question of whether or not you can come up with enough history to show a return on investment model that meets the kind of demands in the market today. And I think that there's a gap there. And I, quite frankly, haven't come up with anything innovative to deal with that.

I think that a lot of it -- a lot of it comes down to what my exit is going to be. In other words, if I'm going to provide capital at a lower cost, I've got to have a more certainty of an exit strategy in an upside, and there's where I think the tension is in these.

I do believe that as we get the capital markets more informed about what we're talking about and that we get more input, like what we're doing at this seminar these couple of days, so that capital can get aligned more with understanding what the business plan risks are, it will work.

I think it's more an issue of understanding and experience than it is an unique way to finance. I think all the elements of finance are there. I think all of the capital is there.

I think what is missing is really understanding how much risk should I assume, given the fact I don't have any history, and, to me, it's just going to take time.

I think it's time.

SPEAKER: Oh. Might I?

MS. SMITH: Sure.

SPEAKER: I'd like to add in on there. We traditionally have relied a lot in our unregulated business on project financing, and, in fact, Tom McDaniel here has done a huge amount of this type of work in the past. The standard model is you have long-term power purchase agreements, 15, 20 years that match up with also contracted costs, and you're able to package the cost and the revenue components together. And then you get independent engineers that have to essentially certify that, you know, this is a reasonable technology that's actually going to work and this thing will be able to run long enough to generate those.

I mean those are kind of the classic components of project finance. Without the long-term PPA, I think it just doesn't happen. It's one of the reasons, on the other side of our house, in the utility side, we really provide quite a bit, almost -- we're really a purchaser of renewables. We've -- about 16

percent of our total customer load is served by renewables at Southern California Edison.

That's all done through long-term PPAs, typically 20 years that we provide. So, for instance, Mike and his company and others here, in a sense are beneficiaries of those long-term PPAs.

The one part that I found really disturbing is that the U.S. was fairly involved -- U.S. financial institutions were fairly involved in project financing in the '80s and '90s. That all went away, and part of it was, I think, due to kind of a redirection to unsecured financing as opposed to more complex, securitized, or collateralized borrowings, such as what you have in project finance.

Today, actually, just last year, we ended up going back into the project finance market. Not one single U.S. institution was participating. All of the banks that we had -- and this is a bank market -- all of the banks that we had involved in that were foreign institutions. And so I'd say, you know, this kind of fits in a different way to one of Rebecca's themes about

U.S. manufacturing versus overseas manufacturing -- you know, even in the service area, and financial services, no less, we've really lost I think a lot of that expertise in the U.S. or willingness to move in those directions.

In this industry, in particular big capital intensive industries, really needs a robust project financing market.

SPEAKER: Can I -- I just hate to be -- I just think it's such an important issue and that's why I want to talk just a little bit more about the project finance issues here.

There's really two components. I mean there's an equity piece and a debt piece and for renewable, for most renewables, that equity piece is very nuanced and difficult. And the reason is that the federal incentives, the federal subsidy here, is in the nature of an investment tax credit; for wind, it's a production tax credit, but the bottom line is to use those tax credits, you have to have an owner, i.e. the equity investor, at the time the project is placed in

service that has an appetite for the tax benefits and can fully utilize them.

And traditionally, up until about a year and a half ago, that really meant financial institutions. It's an handful of financial institutions with an appetite for tax risk -- very small pool that the -- financed what we have today in terms of wind and solar.

There was a broadening of the -- of the change in the Tax Code really to allow utilities to take advantage of the tax benefits as well and essentially corporate investors.

But by and large, this is a small number of financial institutions. So what happened when the financial downturn hit, you know, the traditional investors here lost their tax appetite. They lost their income. And they had much bigger issues.

They pulled out of the equity market immediately. On the debt side, which is probably looking at roughly 70 percent leverage -- 30/70 -- of course, the bank lending shutdown, just as Ted said.

So in the Recovery Act, what Congress did was authorize the Treasury to provide a cash grant in lieu of tax benefits in order to open up the universe of tax investors -- or equity investors beyond just these tax guys.

What ensued was gradually and increasingly participation on project equity from outside the United States, so and we're looking at a number projects. We've funded some. The equity has come either from utilities looking to take the ownership position or ex-U.S. institutional investors that are comfortable with the risk, and ready to participate.

But the problem is that Recovery Act provision starts to sunset the end of this year, and then next year it phases out. And so, if it's not extended, we're going to be back to a tax-equity type market that I don't think bodes well under any circumstance, because, even before the downturn, it really wasn't working. The costs were excessive. There weren't enough suppliers to have an actual market mechanism, and it would not have scaled nearly where

we've -- pipelines we have to date -- so a pretty bad deal.

On the debt side, the government response through the Recovery Act was to create this DOE -- broaden the DOE loan guarantee program, which has been helpful, you know, to many of us, but what it lacks is any kind of transparency. It's a blackbox. So you just apply and let's see what happens.

We're not sure what the criteria is or whether we'll be lucky enough to do it. That works fine on an individual project basis, but when you're trying to actually scale, like you are, and get some visibility and know what to commit to, you have to be able to -- I mean how would you price something without making an assumption about your debt cost. This is a blackbox. If it works, it's two or three percent.

But even from my perspective, better, is to know for sure I can do something at six percent. And so that doesn’t exist right now, and I think one idea that's been kicked around is the notion of a green bank. I don't know how you guys -- to me, it depends how

that's implemented, but the notion of a green bank that would say, look, there is financing available for this cate -- these renewable projects that have higher perceived risks, et cetera. We're going to treat them a special way for a social reason.

And I've been trying to think about how that could work. I think if it was set up -- if it's blackbox, you know, submit them all to Treasury or DOE; we'll get back to you. I think we're back where we started. If you could somehow leverage the banking community or the existing infrastructure, that's a different thing.

And the two ways I can think about are to replicate something like the SBA loan guarantee program and say look, if you, participating banks, make loans to renewable energy projects that meet these parameters with respect to maturity, interest rate, et cetera, et cetera, we will backstop or guarantee, you know, the lion's share of the principal. That might be one way to do it.

The other would be -- I hate to throw these words out at a time like this -- the secondary market making a la, you know, of Fannie Mae, to get the same result; right? You underwrite them. If they look like this, we'll buy the loans.

And there's an indirect way that the government could -- well, that's more direct, but a loan guarantee at least would be somewhat indirect.

So I don't know. Larry, you work in this area. If you've --

MR. SONSINI: I think the idea of the secondary market is good. I think it's got a lot of risk, and it's going to take time. But, you know, I think that's a way of marrying the equity in the debt and packaging it in a way that allows the risk-taking.

But right now, receptivity to that is pretty low.

MS. SMITH: Next question, please. Yes.

SPEAKER: I wanted to go back to the jobs question at the beginning, and in your --

SPEAKER: Could -- excuse me, could you just use a microphone, if you don't mind?

MS. SMITH: Could you use the phone; yeah. There's a mic on each table.

SPEAKER: I wanted to go back to the jobs discussion at the beginning of the panel. In your responses, you focused a lot on renewable energy, and so my question is what about energy efficiency and how does that relate to bring jobs, because, frankly, no energy is probably better than green energy and then the ability -- I mean the work has to be done here in the U.S. from an install standpoint.

SPEAKER: Well, I'll maybe take a little bit of a crack at it. I think that's right in terms of kind of near-term job creation. You know, going through, renovating homes, installing various energy efficiency -- I mean the -- I forget the catchphrase now, but the thing about the caulkers -- yeah, cash for caulkers.

I usually think cash for clunkers, but, in any event, I think those types of things clearly have an opportunity to provide some fairly immediate, you know,

job creation. I've never been able to completely get my head around or understand exactly long-term how energy efficiency fits in with the socialization of costs of the infrastructure, and, you know, one of the problems that we have with our system, for instance, we're about 49 percent capacity utilization.

Probably the average amongst utilities around the country would be closer to 57. The largest part of that has to do with the weather in Southern California. We really only have a summer peak. We don't have winter and summer peaks. That's a weather-induced issue.

And we tend to basically be air-conditioning load oriented, so the real peak for us is in, you know, in August, a late August day, and, you know, 3:30 in the afternoon.

So you have to have -- because you can't store electricity -- you have to have all of that infrastructure sitting there in order to meet that needle peak. And so the more needle peak you are, the more idle infrastructure you have hanging around to meet that need.

So bringing it back around to the point on energy efficiency, when you have a large system with real capital intensity and a large amount of assets, and that's being covered by the -- in the rates by all the customers who use that system, when you start reducing the electric energy usage, you run into an issue of well, how are you ultimately recovering the costs?

And so it's just one of those kind of pieces I don't really -- I really mean it genuinely when I say I'm not sure I really have it figured out what the long-term impact is of, say, a 25 percent reduction in demand. I just made the number up.

But what that will mean in terms of recovering the costs of the infrastructure that's in place and if, on top of that, you're radically changing the infrastructure, you're shifting from, let's say, a fossil-based infrastructure to a non-fossil-based infrastructure, which at least the estimates I've seen the industry come up with -- you know, you're looking at something over a trillion dollars to make that type of a shift -- that's going to be on top of that, and if there

is lower energy usage, the unit cost, it seems to me, is going to be pretty high.

But I just haven't figured it all out or what exactly the implications are, so I guess in a spirit of pitching tough problems to Bruce here, that's one of those things that I think is going to have to get dealt with somehow.

MS. SMITH: Okay. I think we have time for one more question -- one more question? Okay. Yes, sir.

SPEAKER: (Off mic)

MS. SMITH: The mic, please.

SPEAKER: I'm sorry. You can't hear. How you see the role of energy efficiency in this low-carbon future -- what the business and investment opportunities are, you know, conservation, retrofitting, LED lighting, all that sort of thing. I mean what's the role of energy efficiency for the future?

SPEAKER: At the risk of being the guy to dominate the conversation here, I guess I see it as in

many instances, not all, but in many instances probably the lowest cost form of adding capacity.

Where I think I tend to focus a little more is -- and this is at least my definition of smart grid -- we have about seven percent line -- or not just line loss -- seven percent system loss nationally. At Edison, it's a little higher than that because we have a little higher loading factor. So about, say, seven and half percent for us.

There are a number of technologies that have come to the fore in the last 10 years that really address making the system work more efficiently, less system loss. And I think the other part that kind of relates to that is right now given the systems of monitoring and controlling the grid, pretty much all of that is designed to have a big buffer in it, a big margin of error in it, which makes you build more capacity than you really need.

If you have a more robust set of monitoring devices, digitizing the monitoring and control devices within the grid, you don't need such a huge buffer.

So those are two kind of, to me, obvious efficiencies that relate to the management of the system that we really should be going after and have real high economic payback to them.

Energy efficiency, I think, really mostly at the consumer level is mostly around trying to reduce and make -- just more efficient use of the energy that is used. It's payback is over a much longer period of time in terms of the system, because it just means you -- it forestalls the need to add more generation.

When you're making this shift from a 70, 75 percent of electricity generated from fossil to other means, you're going to end up having to put a huge amount of capacity into the system, because you're shift -- you're trading out, you know, "old capacity," for new capacity, and the energy efficiency, in a funny way, I think kind of complicates some elements of the cost or the recovery of the costs associated with them. That was the point I was trying to make before. So.

MS. SMITH: Okay. Well, thank you all very much. Thank you to the panelists -- Ted Craver, Larry Sonsini, Mike Ahearn.

(Recess)

MR. BILICIC: Okay, folks. Okay. Yeah. We're going to take our seats. Let's see who's back there. I can't really see.

So we're going to take our seats. Governor Rendell has arrived, and I think folks are probably going to come in after just grabbing the last bit of coffee and so forth.

So let me start and, you know, my sense is there's a lot of folks in the room who know Governor Rendell quite well. He's been governor of the Commonwealth of Pennsylvania since 2003; a landslide reelection in 2007.

As many of you know, he served as the mayor of Philadelphia from 1990 to 1999. The New York Times called the renaissance of Philadelphia under Ed Rendell the most stunning turnaround in recent urban history, and anyone who's been to that city has seen really the

dramatic effects of his tenure. At the same time, anyone who's been to Pennsylvania over the last five or six years has seen the effects of what Ed Rendell has done in that state.

In July of 2008, he took a very bold approach by signing into law a $650 million Alternative Energy Investment Fund. These investments have helped businesses develop alternative energy resources, such as wind, solar, biofuels. It's helped small businesses in Pennsylvania acquire equipment, adopt processes that promote energy efficiency.

Pennsylvania really has become a leader in a very short period of time and green technology, and green jobs. As late of last month, Governor Rendell approved the allocation of $9.2 million in grants and loans from these energy investment funds for the development and upgrade of bio-refineries in the private sector.

So all the conversation we were just having about the role of states and on multiple levels -- tax,

spending, regulatory, and so forth -- the governor can speak to as well as really anyone in the United States.

The other reason why we so wanted Governor Rendell to be here and why it complements Governor Schwarzenegger being here last night is that the two of them and Mayor Michael Bloomberg created Building for America's Future, which is a bipartisan coalition of elected officials that have been incredibly vocal on the need to transform infrastructure policy in the United States, of the need to create new institutional vehicles like a National Infrastructure Bank, the need to focus on high-speed rail, smart grid, next-generation infrastructure to lead us back to a competitive future.

When Governor Rendell was Chairman of the National Governors Association, last year, he made infrastructure the highest priority of that powerful constituency group.

So from mayor to governor to national leader, Ed Rendell is the right person to speak to us today. Thank you.

(Applause)

GOVERNOR RENDELL: Good morning, everyone.

You know I've decided that I'm a very important guy, and the reason that I decided that is I got an advance copy of Bruce's speech today.

Before I begin my relatively brief remarks, I want to thank George and Vernon from Lazard for sponsoring this, and, also, of course, the great folks from Brookings -- Bruce and Rob and everyone on the Brookings team who does such a good job.

Sometimes they're like a voice in the wilderness, but they do a great job just keeping -- pushing the agenda.

I flew out here last afternoon. I left Philadelphia at about 3:20, and I'm flying back on a 3:40 plane today. Why did I do that? One, because of my respect for Brookings, but, two, I saw the roster of people who were being here.

And let me start my remarks by telling you nothing significantly is going to change in America in terms of becoming more competitive, meeting the challenges of the future, investing what we should

invest, and doing it now unless the business community steps up.

And I don't mean the U.S. Chamber of Commerce. No disrespect to them. I don't mean the Pennsylvania Chamber of Commerce. They're too interested in short-term issues like taxation and business conditions, et cetera, which are important, but they are, in many ways, not visionaries in their thinking.

We need people who are entrepreneurs; people who've broken the mold in their own businesses to step forward and say, "Guys, we're getting the living daylights beat out of us, and nothing is going to change unless we do some things totally different."

And politicians can't do it on their own. You know, I always question whether term limits are a good idea, and term limits for executives are a good idea. My legislature is sick and tired of hearing from me.

You know, I send them articles all the time. In fact, Bob Herbert's here. I send him his columns all

the time on stuff that supports what I want to do. I send him stuff, and it drives them crazy.

First of all, at least, at the beginning, they started to read it, but now they'd probably trash it immediately. But I send them stuff and I send them issue papers and they say our debt is too high in Pennsylvania. I send them Standard & Poor's ratings that says we've got a great debt rating, et cetera.

So there's -- it's like a football coach who's been around too long -- the players stop listening. That's true for all American politicians, no matter how well motivated or how powerful they may be. It's only going to change if an unusual and unexpected source makes it the front burner issue, and that's why I'm here.

I want to talk about infrastructure, and I'll do so at the end. But I also want to follow up on what Bruce said to you, because it's all about competitiveness. And I'm involved in infrastructure, because it's about competitiveness. Also about public safety, had it's about quality of life, but it's about

competitiveness. And if we don't do something quickly, by the time 2030 rolls around, America will be a second-rate economic power.

Right now, we're in danger, because we spend -- what is it -- 10 times as much as the nearest country and what we spend being the world's army. I think our -- we spend $800 billion a year on defense and China spends 80. We can't do that forever.

But we've got to start, even within the framework of continuing to do that -- we have to start convincing people there's a difference between spending and investment. And investing in the future is crucial.

There's not one of you out here who has a successful business who didn't become successful by investing in your own business. At some seminal moment, you had to make a decision to invest money. Maybe it came from capital reserves, but most often it came from borrowing, prudent borrowing. And you invested in your future and your future growth.

And it paid off.

If we don't do that -- and we basically have stopped doing it -- if we don't do that, we're sunk. We're a cooked goose.

And Bruce's talk -- and it was terrific -- exports it's great. When I became governor, I said I'm going to help our small-and mid-sized firms export, because they don't know how to export. There's a shocking statistic in Bruce's speech about how few American firms actually export. We started something called World Trade PA. It cost me 20 million bucks a year.

We've tripled our exports in seven years since I've been governor, not solely because of that, but that's been a big factor.

But while we're doing exports, we have to do something about trade, because we are the victims -- and I'm a free-trader. I supported NAFTA. I supported NPR. But we are getting our butt kicked because we're not fighting back as well as we should when it comes to fair trade.

China has systematically tried to destroy the American steel industry. They pretty much have destroyed the American pipe industry, because we haven't fought back. And people say, well, we can't fight back against China, because they have all our debt and then if we fight back, they'll get angry at us. B.S.

We still buy 80 percent of their products. We still hold the cards, not for very much longer, but we hold the cards. So let's fight back.

I think the Chinese are waiting for us to fight back. They're probably sitting around laughing at how impotent we are. And we finally fought back on pipe, and I had the good fortune of going down in testifying on dumping. We fought back before the ITC. And I have to tell you I've been governor for seven years. I've been in public office -- public servant for 40 years. I enjoyed my testimony more than almost anything I've ever done, because you understand how close we are to losing American manufacturing?

And I'm not talking about high-tech manufacturing and green energy -- and I'm going to talk

about that in a second. But -- but -- hard manufacturing, the stuff that men and women who dropped out of high school can still do and still make a good living.

We are in danger of losing steel and alloy and so many things that we do. Can you imagine America without a domestic steel industry? It's pitiful.

And American manufacturing is teetering on the brink, and we need to do more exports. We need to be stronger in trade. We need to be aggressive. We need to stop worrying about China. We need to start competing. There's no ifs, ands, or buts about it.

Green energy. President Obama said it best of all: "The country that corners the market on how to produce new forms of energy will be the country that has the most viable economy." Does it look like it's us at this point? Not on your life.

We're behind China and Germany and so many different places. Big American wind energy company announces -- a solar company announces the biggest solar

plant to be built in the history of the world -- not in the U.S. Not in the U.S.

We've got to get on it, and we can do it. I know that cap and trade is going to be difficult to pass. In the long run, I think cap and trade would be obviously great for the environment and would be a good jobs bill.

But if we can't pass cap and trade because of the short-term political environment, then let's turn it into a renewable energy bill. Let's create a federal mandate, like the state mandates that have been so successful in Pennsylvania and in New Jersey and places like that. Let's have a federal mandate, A. B, let's make the renewable energy tax credits permanent once and for all -- B. And C, let's have the federal government become a great off taker.

Now you and I may disagree about natural gas -- and I'm sort of partial to natural gas ever since they discovered the Marcella shale, and its -- Pennsylvania has 60 percent of the Marcella shale, but all the federal government would have to do is announce

we're converting all of our fleets to natural gas vehicles.

And then the State of Pennsylvania announces the same thing, and Illinois, and New York, and California, and then Comcast and Verizon -- and give me some other names -- you know the names. And, all of a sudden, every major fleet is using natural gas instead of fossil fuel, and we're half way on our way to energy independence -- halfway.

Pennsylvania did APS for electricity, but we also did something amazing -- I thought amazing. Pat myself on the back. We sell 12 billion gallons of gasoline at the pump in Pennsylvania. We're a pass-through state. You know, you go from the Northeast corridor to the Midwest through Pennsylvania.

We sell 12,000,000,000 gallons of gasoline. We created a standard that by a certain distribution level, which we think we can reach by 2012, one-twelfth of that has to come from non-fossil fuel, from either bio diesel or ethanol or some other form of energy.

Create the market. Use your buying power. Mandates. Mandates are what will drive renewable energy, and the great thing about mandates is you know what they cost the federal treasury -- zip. Not a dime. Not one cent.

So there are ways to do this without impacting on debt, but Bruce couldn't be more right about energy.

Education. That's the human infrastructure, and it's-in many ways, is the whole ball of wax. How are we doing on education? Bruce gave you the statistic. We're 45th out of 93 countries in the number of science and engineering graduates that we're putting out of our schools. STM education gets lip service, virtually.

I mean there was a gentleman in New York -- and I forget his name -- who put up money to give fellowships to science majors if they would become science teachers, and he gave them fellowships. He helped pay for their education in college, and then he

helped to supplement their salaries if they went into the New York Public School system to teach science.

And he got some of the best scientists out of college to go into teaching. And he asked the Congress to replicate that program with federal dollars. I think the whole cost federally would have been $2 billion. It used to sound like a lot of money.

But if we -- if we're serious about STM education, we've got to do stuff like that. We've got to go into the elementary schools and tell young girls that there's nothing wrong with going into science and engineering and mathematics.

Look at graduate schools now. You've got medicine and law and business -- more than 50 percent women. Engineering, 17 percent women. Math Ph.D.s, two percent women.

We've got -- we're fighting this battle with half of our work force, half of them are not competing. We're fighting with one hand tied behind our back. There's so much we need to do. We need to invest in

education, and we need to invest in it at the early stages.

When I became governor of Pennsylvania, we were one of nine states that gave not one dime to pre-kindergarten education. We now rank number one in the country in Education Weekly's standards in early childhood education achievement. We've moved our test scores at the early childhood level, because we invested in pre-k. We invested in full-day kindergarten. We invested in smaller class sizes from k through 3. We invested in after-school tutoring.

Targeted programs that work. The thing is education is a science like everything else. You know, scientists -- medicine knows that if you mix certain chemicals together, you can produce a statin that can lower cholesterol.

Well, we know that if you have full-day kindergarten, the kid who goes to full-day kindergarten is going to do much better k through 12. It's proven. It's a science.

Don't give blank checks educationally, but give money to programs that work. If we want to be competitive, we have to invest in education.

And lastly, infrastructure. There's no question about how important this is. The American infrastructure is crumbling. Governor Schwarzenegger and I were in San Jose at the big wastewater treatment facility out there, and the facility is falling apart. They have 16 digesters that treat sewage. Five of those 16 are inoperable because the pipes are so old, and the tanks themselves are corroded.

It's unbelievable what we've let happen to our infrastructure, whether it's transportation or water and sewer. Many of the water and sewer pipes that are laid in America are in the East Coast some of them were laid in the 1800s and haven't been replaced. It's absolutely stunning. Absolutely stunning.

And we don't pay any attention to it until a steam pipe burst in New York and it looks like 9/11 all over again, and then people say, oh, my gosh.

We can't be crisis-driven. We've got to be proactive in all of this stuff, and we've got to be proactive in infrastructure. We need this infrastructure bank that the President has proposed. And by the way, give President Obama abundant credit for getting it and starting us in the right direction.

We may differ with him about the scope of what he's trying to do and the amount of dollars he's put in, but give him credit. He's going down the road.

But there are huge political problems with doing infrastructure, because everybody wants their share. You saw that with -- and I know Bruce talked about this -- with the high-speed rail. The high-speed rail everybody got a little.

We in Pennsylvania got $250 million, and our two senators went crazy because they said it was one-third of one percent and it was an embarrassment for Pennsylvania and it was, you know, Pennsylvania was being dishonored or something like that.

And the truth be told is with $8 billion -- and that's $8 billion more than anybody else has ever

given high-speed rail -- but with $8 billion, you shouldn't have given every state something. We should have picked two or three projects. And I would have picked the Florida project, the California project, and I would have picked the Acela. And we should have invested the $8 billion in those three projects. Prove that it can work.

Do you know if we spent a couple of billion dollars on the Acela, you could go from New York to Washington -- right now it takes about 2:40 to go to New York to Washington -- you go New York to Washington in an hour and a half.

If you could go from New York to Washington in an hour and half, no one would take the shuttle. We could end the shuttle. We could end the shuttle. And by ending the shuttle, what we would do for LaGuardia, Newark, Philadelphia, BWI would be incredible.

We would absolutely clear up most of the tarmac time, because most of our tarmac time on our east-west flights is waiting for the north-south flights to go through.

Philadelphia to New York is an hour and one minute. Now on the Acela, it would be 36 minutes, and all those New Yorkers could come live in a cheaper, more habitable place instead of commuting in from Great Neck or Scarsdale or whatever.

But seriously, let's prove it can work, and then let's go for it. Let's go for it. And we have to -- it's investment. It's not spending. There's a difference. And we've to convince the American people.

Look I think we've got about a half a decade. We've got a half a decade to decide what type of country we're going to be. And if we decide against investment, if we remain very shortsighted, if we take the attitude that we don't want government spending, look government spending is like everything else. It's like lawyers. There are good lawyers and there are bad lawyers.

There's good government spending, and there's bad government spending. And we ought to work as hard as we can to get rid of the bad, but emphasize the good. Time is running out on us. Time is running out on us.

And I wish to say that people like me can carry this message successfully or good columnists like Bob Herbert or Tom Friedman can carry this message. You know, after a while, we've -- you know, our stuff bounces off the walls.

You're the men and women who can make this happen. And that's the reason I'm here, and that's the reason I'm real pleased that Bruce gave me the opportunity to speak. Happy to answer a few questions. But let me tell you: if you care about the country, and you care about the future, and as I look around, this is a pretty young looking group of executives, if you do care, and I think most of you do, and if you care about what type of world we're going to leave our kids and in some cases our grand kids, we got to get on the stick and we got to stop this madness that's gripping the country now that we're not going to spend any money, and we're not going to raise any money, and we're not going to invest, and we're not going to borrow.

I mean, gosh, can you imagine if business was restricted to the same principles that we are asking our

governmental agencies to be restricted to? We'd have no business growth. None. No growth whatsoever.

So thanks for being here and for having me here, and thanks for all of you for coming. I'm happy to answer a few questions. I know you've got a tight schedule, but I'm happy to answer. Bruce, are you going to join me?

(Applause)

MR. KATZ: Yes. Right here.

MR. SHAW: Governor, my name is Jigar Shaw. I founded Sun Edison. I -- the last panel had some really good questions that came up, and I'd love to figure out a way to get you to weigh in on this.

The CEO of -- the CEO of Southern California Edison basically said he didn't really know how energy efficiency fit into the long-term, sort of, utility structure. And then Mike Ahearn, who's sitting over there, said that, you know, if we can get five gigawatts worth of solar lined up over the next decade, he'd invest a lot of money here.

Now if you look at the RPSs in Pennsylvania, New Jersey, Delaware, Maryland, D.C. -- that corridor -- that's five gigawatts by 2020.

GOVERNOR RENDELL: Right.

MR. SHAW: So how do we actually figure out a way to sit down with all of the governors -- and you, of course, you know --

GOVERNOR RENDELL: Right.

MR. SHAW: -- one of the most powerful in that area and, well, nationwide -- how do we set all of those business leaders down from this room as well as your state, as well as the utilities who are going to be stuck with a 35 percent rate increase pretty soon, and probably be one of the most hated people in Pennsylvania, and actually figure out how to define Utility 2.0 for our infrastructure, because you've already got a taxing authority with the utility to be able to invest in all of these infrastructure projects. We just can't get them to get off the stick.

GOVERNOR RENDELL: Well, it's a good question, and I think the answer to that is two things.

One, I'd like to see the federal mandate. If we have a federal mandate, a lot of that stuff falls into place automatically. Number one.

But number two, I think that's worthwhile and I think Bruce and I will carry this idea to the National Governors Association. But it will require that all 50 governors, but 10 or 15 interested governors and 20 or 30 really high-powered interested businesspeople to come down and sit in a room for a day and really try to brainstorm and figure out where it goes.

And by the way, there is a great market in renewables clearly. There's also a great market in conservation.

We passed Act 52 in Pennsylvania. It's the second strongest conservation requirement. Our utilities are going to be subject to huge fines if by 2013, they don't dramatically reduce usage. And they can do that, and, you know, there should be a smart meter in everybody's home, because let me tell you we're never going to be able to meet demand without conservation.

But there's also money and jobs in conservation. That's the nice part about it. By the way, I forgot to add one thing, just to go off the question.

The infrastructure bank -- the reason we need the infrastructure bank is where not going to take away basic funding. Basic funding is going to come out through ICT, which is formula funding to all the states. Basic funding is going to come out through the Clean Drinking Water Act. It goes to all the states.

The infrastructure bank will only have projects of national or regional significance, major projects. But the beauty of the infrastructure bank, if it's structured right, the infrastructure bank can say, hey, there's not enough money in $8 billion to do 42 projects, so we're going to do three big ones. And we'll take the heat, because, you know, we're not elected. We're independent.

We'll take the heat, and we'll let it roll. And that's important.

What the President did in his speech and in his budget is put the infrastructure bank in transportation for transportation projects only. It's very important that we get the infrastructure bank created in the Jobs Bill but for more than just transportation -- for water and wastewater, for electric grid, for broadband, for school construction, for all of those things.

So one of the things you can do in the short run. And neither Senator Boxer or Senator Feinstein are opponents of the infrastructure bank, but they haven't been very, very strong advocates. And if you could get in touch with them and say, we'd love to see the infrastructure bank in the Jobs Bill and not just for transportation.

SPEAKER: Is it all right. Governor, I wonder if you would talk about potentially the role of privatizations and of public-private partnerships in the infrastructure buildout, and I wonder if there were any lessons learned or things you might have done differently on the turnpike -- well, but -- whether or

not you thought that was the right outcome or not, but it certainly seems to be a looming question as to whether that's the right role for states, whether Illinois was the only one to do it.

You certainly made an effort on it, and I wonder if there's a larger role for that in the private sector on the other sector.

GOVERNOR RENDELL: Well, there has to be. There has to be. Privatization or private-public partnership have to be one of the components of infrastructure spending for a simple reason: The real way, in my judgment, we should get infrastructure is we should have a federal capital budget. We should say -- the American Society of Engineers says it's 2.2 trillion over the next five years.

If you want to build out a high-speed system, say we need $4 trillion over the next 10 years. That's $400 billion a year. You know, that's what we need to produce in a capital budget.

And that's the real way to do it. What chance of that happening with the deficit being such a huge issue? Zero.

So if we can't do it that way, if we can't do it at scale that way, we have to get the private sector involved. Beauty of the infrastructure bank is we can do that. That's what the European infrastructure bank does. It's a vehicle for private investment, and it works extraordinarily well.

So number one, on a national scale, we should do that. Number two, we've got to start looking at private-public options. The only thing different I would do on the turnpike is find a way -- the turnpike -- the legislature turned it down, the turnpike deal not because of any substantive reason, but because the turnpike is the last place where there is white collar patronage and where there is blue collar patronage. There are a thousand jobs at the turnpike. Half go to the Democratic Party; half go to the Republican Party.

The patronage is split between the two parties. It's the last -- every other job in

Pennsylvania almost is civil service. That's why they turned it down.

Now as it turned out, it was relatively fortuitous, because of what happened on Wall Street. I don’t know if the $15.8 billion could have ever been honored, although we would have required it. And I made a mistake. We were working on an annuity. The reason we were going to turn that 15.8 into an annuity, the reason I wanted it to be an annuity is because if it was 15.8 just laying there, I'm not sure I could have stopped the legislature from raiding it for non-transportation projects.

An annuity would have been better. But if I had gotten an annuity, you think I would have gotten paid in the last year. I'm not sure that I would have.

But we have to talk commonsense to our people. The winning bidder was Albertus. And there was a big hue and cry. It was Albertus and -- City right. And there was a big hue and cry. Oh, we're giving our infrastructure way to a Spanish company, et cetera. I said first we're not selling it. We're leasing it. But

secondly, I said, for all of you who are complaining about this Spanish company coming in, you are not allowed to fly into Disney World ever again. You have to drive if you go to Disney World, because just who runs and operates the Orlando airport. Albertus.

It's a fact of life. It's the global economy, and we shouldn't shun it. We should welcome it.

And there's nothing wrong with that at all, as long as the governmental structure maintains the final control over when calls can go up, what maintenance has to be done -- things like that.

So I think you will see by necessity more and more private-public partnerships. When we were trying to do the turnpike, I was called down before the House Transportation Committee to testify and my Democrat said -- Jim Oberstar wasn't there, and I have a good relationship with him -- but there was a congressman sitting as chairman by the name of Difazio from Oregon, from Oregon, and he'd ripped me a new rear end because I

was trying to take these jobs away from the public sector, et cetera.

And I tried to be as -- you know, you can tell, I'm a nice guy; right? I like to get along with people. But I took it as long as I could, and I finally said, all right, congressman. If you don't want us to do this, here's what I need from the federal government next year in the transportation bill. You're going to give it to me.

And there was silence in the room. It was just like I was on Face the Nation on Sunday, and I had the wonderful experience. Bob Schiffer is a good guy, and there were four of us and John Thune was one of the Republicans, and he had made a statement that I thought was, say, not entirely accurate.

And I said, Bob, can I ask the senator some questions. The senator was in South Dakota. Bob said sure. And I said, senator, the President is talking about a jobs bill that has capital gains tax exemptions for small businesses, tax credits for small business job creation, and infrastructure. Those are core Republican

principles Let's -- can we agree now we can get an infrastructure built through -- I mean a jobs bill through the Senate in the next three weeks.

And Senator Thune said, well, I agree with those principles, but we can't add to the federal deficit. And I said, so let me get this straight, Senator. You're for a jobs bill, but you don't want to pay for it? They don't want to pay for anything in Washington.

So privatization will become more and more a factor in not only transportation infrastructure, but any of our infrastructure. It's a fact of life. Fact of life.

MS. ALLEYNE: Hello, Governor. First of all, my name is Celeste Alleyne, and I run Citizenship for Microsoft in the west region.

You're a breath of fresh air. Thank you for your comments, especially around the human capital. I really feel strongly about our education system. And as somebody who's on the ground in many of the major metros working with the unified school districts, I would love

your opinion on how we in the private sector can better support and help and change the things that are going on in unified school districts, especially because, as you know, 50 percent of the student population is dropping out, and it's not just African-American and Latino students. It's all of our kids.

GOVERNOR RENDELL: Right.

MS. ALLEYNE: So I'd appreciate your remarks.

GOVERNOR RENDELL: Well, first of all, let me just say Microsoft does a great job on education, and they do put their money where their mouth is, not just Bill and Melinda, but the company itself. Microsoft built in Philadelphia something that you just -- it's a wonder to behold. It's called the high school of the future, and it's incredible. And the high school of the future is in a magnet school. It takes kids from the neighborhood. They have to have a certain level of achievement in middle school, but it takes kids from the neighborhood, and you should see the difference it makes for those kids to be in that environment. They're all going to do great things, and it's wonderful.

Microsoft also took one of my Secretaries of Education, Vicky Phillips, as head of your educational efforts. The answer is the same group that I'm talking about, not the Chamber, but the same group of business leaders has to demand sensible education spending, not blank checks that go into stupid things, but sensible education funding like early childhood.

Early childhood clearly makes a difference. And you know it. I know it. More rigorous standards in high schools. We fought that battle with the legislature and the Republicans to raise the standards of our high schools. We've got some help from the business community, but not nearly enough, because you know what happens? And I'm sure it doesn't happen with anybody in this room, but when -- I've always been able to rally my business people to stand up for education, and the leader of the effort my first year as governor was from Equitable Gas Company, Murray Gerber -- a great guy.

And Murray happened to be Chair of the Pennsylvania Roundtable that year. When he came to

Washington and did a press conference with the head of the AFL-CIO, talking about how we had to invest in early childhood. Then he went around and saw some of the Republican senators. And, of course, they said to him, great, Murray, we'll finance this by putting a tax on gas companies. Of course, they were kidding, because gas companies give them far too much money. But that's where it's got to stop.

There's got to be consequences in everything. When you raise your children, you teach them -- my wife was brilliant with our son. She would always say, all right, Jessie. You clean -- you do your homework or you go up to your room and go to bed. She would give him choices, and if he chose one road, there were consequences. And there always have to be consequences.

And businesses have to stop giving to people who don't support long-term investments in education and other things. They can't worry about the -- what I call it is the 12 pieces of gold theory. Businesses get bought off by -- it's not just Republicans -- some conservative Democrats who don't want to do tough long-

range things, like building the human infrastructure. They get bought off because they're worried about the 12 pieces of silver that's in this year's budget request that they're going to make to Harrisburg.

And we can't do that. We can't do that. We have to -- all of us have to take some short-term pain if we're going to have a long-run gain.

So that's what I would do. Get out there and say this is what we want. This is what we need. And if you don't do it, guys, there have got to be consequences. There have got to be consequences. And, you know, it needs to be done.

I will tell you the two businesspeople I have the most admiration for now are Boone Pickens and Warren Buffet, because they're out there. And they're not afraid to say what they say and absorb the consequences.

Now, of course, each of them has enough money to live another couple hundred years each, so maybe it's easy for them. But, still, they're out there. They're out there, and they're talking about. Jeff Immelt.

Talk about water. Jeff Immelt is right now the leading proponent of getting on the stick on water right away.

We should be selling water to China. Do you know that 70 percent of China has serious water challenges, particularly as their growth is going at this rapid pace. They don't have the water to keep up with it.

There's a thought that water may be more precious by the end of this century than oil and that there may be wars over water. And so, we've got to find technology to make water available everywhere and to Jeff's credit that's one of the GE is working on, you know, full speed right now.

So that's what I think you should do. Easy for me to say.

MR. ROSS: Governor, I'm Andrew Ross with the *San Francisco Chronicle*. You issued a very strong clarion call, and especially you talked about businesses -- business leaders in this room are the kind of folks who can make things happen -- need to step up to the plate.

You mentioned Jeff Immelt and others I know have made very strong statements about the problems with the system that we have. Beyond the strong statements that are being made, can you say as specifically as possible what it is you think that business leaders in this room and elsewhere must and need to do to effect change and change especially and how they might address other stakeholders in the system. I mean the federal government and Congress, which seems pretty dysfunctional right now, and whether we like it or not we're going to be involved in this process.

What can business do to actually make -- change things as opposed to saying the right things. No disrespect intended. They are the right things to say, but moving beyond the right things, what could and should business actually do to step up?

GOVERNOR RENDELL: Well, first and foremost, there is a value to saying the right things. I don’t know how many of you know who Jim Hunt is. He was the Governor of North Carolina, and much of North Carolina's success, economically and in terms of education, came

because Jim Hunt, in his early stages as governor, got huge changes in the way North Carolina funded education.

And he did it by having business leaders testify at the hearing. No education advocates testified. It was business leader after business leader. The five or six major corporations in North Carolina they testified.

So just saying it by high-profile people, just saying it has some impact. So words do matter to an extent.

And you know, the American people do look to business leaders. And I know this is a not a great time, you know, in terms of the respect the American people have for Wall Street and bankers, et cetera. But they still look to business leaders for guidance as well. So words matter.

But secondly, business leaders should support candidates who are willing to bite the bullet and be for long-term investment, because that's a -- it's a tough thing to do these days. It's a tough thing to do.

You know -- and the only really strong business leadership in terms of campaign help is the Club for Growth. And their message is disastrous. Their message is a prescription for absolute, flat out second or third rate status for this country -- spend nothing. Government should get out of things, and, you know, stop doing anything and stop spending money and don't invest; don't borrow; don't do this; don't do that. And we will basically grind to a halt. We will basically grind to a halt.

And there has to be some force out there that's willing to, again, support the candidates who do do the right things, and then cease to support the candidates who don't do the right things, even if it might have a short-term little effect on your business.

And you know what the interesting thing is about that retaliation threat? The interesting thing is you've all heard the cliché there's safety in numbers. But guess what, ladies and gentlemen. There's safety in numbers.

If one or two business leaders in a state stand up and stop giving to people who aren't supportive of long-term investment and competitiveness, they might be in the crosshairs. If one or two hundred stand up and stop giving, they're not in the crosshairs. Nothing gets done in terms of retaliation to them and change will happen.

Change can come and it will come, but we need a unified effort. And, by the way, I'm not passing the buck to all of you. A priest knows that I have said when my term is up January 18th of 2011. We're term limited in Pennsylvania. I probably couldn't get reelected anyway, because, you know, I've had to raise taxes and cut services and, oh, my.

But I'm not going why. I'm going to stay with Building America's Future. And I'm going to stay talking about these issues, because it's the whole ball of wax. And, you know, I'll close by telling you one little example.

I went to Haiti a couple of Mondays ago. It was a state holiday, so I was able to tell my citizens I

wasn't leaving work to go to Haiti. It was Martin Luther King Day, and, in fact, I was supposed to give five or six speeches in Philadelphia and I thought that if Dr. King were alive, he'd be much approving of me blowing off those speeches to go to Haiti.

Two Pittsburgh girls worked -- had worked in an orphanage in Haiti for five years. They were in their late 20s. The orphanage was pretty much destroyed. Two buildings out of the three were destroyed. The third was too shaky for them to go into. And they were living on the pavement with 54 kids. They had kept those 54 kids together. No sanitation. Very little food and very little water. Just by love and the force of personality they kept that little family together.

And they called their parents and their parents called this wonderful medical Center, the University of Pittsburgh Medical Center, they tried to move the ball and get the kids out. They couldn’t. They called me. I tried to move the ball and couldn't get the kids out, and then on a Saturday afternoon, the

U.S. and -- the Haitian Ambassador to the U.S., Raymond Joseph, was on TV. The lady from UPMC calls me and says, use your contacts at CNN to get him to call you.

He called me and he started the ball rolling. Then we used our contacts with Secretary Napolitano and Secretary Clinton and the White House, and we got a plane donated by someone -- a philanthropist and the UPMC folks put 25 doctors and nurses and 2.5 tons of supplies on the plane.

We went down to Haiti and long story short, we got the kids out. And I stayed on the tarmac for -- we were on the tarmac for six and a half hours. We lost our plane. We had to get a military plane to fly us back.

But we lost our plane because you can't stay on the tarmac for more than an hour and a half, two hours, because they've got to keep moving planes in and out.

And I thought to myself, as I saw the U.S. military operate, and they were operating so incredibly well. That airport was devastated, down to one runway.

No air traffic control tower. Two guys sitting at a card table in the back of the runway with a satellite phone bringing planes in. And the military was juggling and getting stuff unloaded. Nobody cut their engine. It was as loud as you ever could see, and I thought to myself, this is the America that we used to be. There was no problem too big for us to handle.

We weren't afraid of anything. We didn't say, oh, we can't do that. It's too big or oh, we can't do that. It's too tough. You know, people are telling the President don't have health care, because it's too tough. Stop. Go back. Shelve it. It's too difficult.

Well, those military guys, some majors and some colonels, nothing was too difficult for them. Generator -- lights go out, they found a generator.

You know, the runway buckles, they had a crew out fixing it. It reminded me a little bit -- do you remember after Katrina for three days nothing was happening. People were literally dying for lack of attention. And then we sent down that Cajun general, I forget his name, but he was the head of the Army, and he

walks in with the Army and he says, "Screw all this. You're doing that. You're doing that. You're doing that. Mayor, shut up. Go back to your hotel room. We're moving this out. The EPA says we can't move this water; we can't dump in the water. Forget it. We're doing it."

And all of a sudden, people started getting saved again. We used to be a country that did all that. That used to be what made Americans different than anybody else. When Hitler was out there, were we afraid? Of course, not. Of course, not. We knew what we had to do, and we did it. And we've always done that. Throughout the course of our country, we've always done that. We've always stepped up at the toughest times and got it done.

And in Haiti, I saw Americans -- and not just the military -- I saw, you know, Red Cross people doing -- doing amazing things, and the fact that we got all 54 of those kids out in short period of time, at a time when the Haitian government wasn't releasing a lot of people, that was an amazing thing that I didn't do.

Those two young girls did, and they have the American spirit. And darn it, we've got to get back to it.

And I think most of the people in this room embody that spirit, because you did what you'd done and accomplished what you've done. It wasn't easy. Did anybody tell you it was going to be easy. And it wasn't easy. It was tough. It was hard. You had to put your rear end on the line. You had to make investments that might not have worked, and, if they didn't work, you'd have been out looking for work.

But you did it. And we can do it again. And we shouldn't be afraid of the Chinese, and we should respect them, but not be afraid of them. We shouldn't be afraid of anybody out there, because this country was the greatest country in the world. Still is, but if we don't stand up and embody that American spirit again, ladies and gentlemen, we're cooked. Thank you.

(Applause)

MR. KATZ: So I think with Governor Schwarzenegger last night with Governor Rendell today, George, we've got the challenge before us.

And we are going to -- I'm looking to Lael. We take -- what we do? Okay. So I think George is going to come up.

MR. PUENTES: I'll go ahead. Is this on? Can you hear me okay? So my name is Rob Puentes with the Brookings Institution, and, boy, that's a -- I think a tough act for us to follow. I'm well aware that we're standing between kind of -- this session stands between us and lunch. But like the governor, I think we're all infrastructure fanatics here. Like the governor last night, too.

But deftly I think this is certainly a tough act to follow not just from Governor Rendell and his remarkable comments, but the conversation I think that we've had so far today. This has been really a great -- a great morning. It was a great day last night. I've been trying to take notes and try to pull out the key themes as we've talked about this.

I've really made mince meat of my notes sitting here today, but all these key points -- about sorting out the key government role, what the federal

government should and should not be doing. The governor just talked about his idea for mandates. We should get into that. Sending the right signals -- whether we're really going to commit to a low-carbon future in this country, and this larger conversation about connecting these short-term goals, not just for the government, but for the private sector as well to the long-term things that we need to do. And infrastructure clearly is a big piece of that.

I think Larry talked about this earlier with his notion about this transformation versus iteration and how we really get to something that is quite different. So all that I think really sets the stage very well for this conversation we're going to have about infrastructure.

He didn't say this last night, but Governor Schwarzenegger used to say that infrastructure is sexy again. I don't know if I'd go that far to say that it's sexy again, but the good thing that he has done and the thing that Govenor Rendell has done and all their work with Building America's Future is taking infrastructure

out of its box, because I think we talked about infrastructure for so long in this country about kind of an end in and of itself, and it wasn't really connected to some of these broader goals and objectives we are talking about here today

And Bruce's presentation in the morning, there was that circle that had low carbon, innovation, export-oriented -- these goals for the country.

Infrastructure obviously was a key part of the speech, and I think we all talked about those things, but it wasn't one of the things in and of itself. It's a means to an end and not the end by itself. We forget that a lot, but I think that's been a key theme here today.

Clearly, there is frustration, not just with the decision-making, and I think we've seen that all throughout this morning, but the condition of the infrastructure that we have in place today. We can't really just maintain the stuff that's in place.

We see tragic reminders of that. We see mundane reminders of that every single day. But not

just maintaining what we have, but then making the new investments that we need that connect with Governor Rendell with what he said about competitiveness, competitiveness, competitiveness.

I mean we started to do this with this conversation about jobs. Infrastructure is being used, as you know, as a way to stimulate job creation and retention here in this country. But I do think that we've got to do a better job of connecting infrastructure investments to these national goals, particularly for economic growth.

And that's really what we're going to focus on here with this panel today. So the purpose of this group, then of this panel, is to bring together business and private sector leaders from a range of infrastructure sectors. We didn't just want to focus on one or another, but just look at infrastructure kind of broadly -- renewable energy -- things like wind, electric utilities, the smart grid surface, inter-modal presentation, from sea to airports, roadways and beyond. It's really how we need to think about infrastructure as

these collection of things, not just these siloed things.

Then talk about how we can strategically invest and supports smart, innovative infrastructure projects and sectors and how that, in turn, is going to build American competitiveness globally.

So I've already talked too much, but the goal of this conversation is to really have kind of an informal dialogue with folks here in the audience, to make sure that we engage in early on.

So let me first just quickly introduce the panelists. It's quite a good group. Two down from me is Martha Wyrsch, President of Vestas Americas, the North Amerian arm of Vestas wind systems, the world's largest maker of wind turbines. Prior to Vestas, she was the CEO of Spectra Energy Transmission, and before that CEO of Duke Energy Gas Transmission.

Next to me Thomas Casey, CEO of CURRENT Group, LLC, a leading provider of smart grid solutions; previously a CEO and board member of several

telecommunications companies and a notable stint at the FCC.

Next to Martha Jim Kowalishin is a Senior Advisor at Highstar Capital. He has a long history in infrastructure finance and operations from seaports across the globe and airports such as the London City airport, a great airport from what I understand. I never get to fly in there, but those of you who have can attest to that.

Down at the end George Bilicic you all know from Lazard where he is a Managing Director and Chairman of Power Utilities and Infrastructure. Prior to that, he was the head of infrastructure at KKR.

So a ton of experience up here. Again, I don't know if we can call everybody fanatics up here, but certainly experience spare. I don't think there's any better group to discuss this with us here today. So let me just go ahead and jump in with a broad question for each individually, and, Martha, were going to ask you to help set the stage for us and start broadly. I think when we think about -- windmills seem to be almost

an iconic representation of the new green economy. What is the state of play that in with respect to wind energy today? I know it seems like there's a bit of a slowdown after some ramping up. What is the reason for the slowdown now? Is it because of lack of funding and financing for projects. Generally, order the chief impediments that you're seeing in your sector today? What are the opportunities and what are the challenges right now?

MS. WYRSCH: Thanks, Rob. Well, first I would have to say that it is an enormous market. The wind market in North America is huge, and I think we should forget that because we have had a slowdown, and yet last year, 2009, we built over 10 gigawatts of new wind power generation in the U.S. And there are over 35 gigawatts of U.S. wind power now in generation, and that's a number that continues to grow.

If you look at the five-year average, you've seen growth of 39, 40 percent year-over-year in wind generation. It is true that wind has had a position of

growth for a period of time because we have been in this market for quite some time.

In 2003, you would have seen wind that was, you know, very slow. You didn't see a lot of new windmills. If you drive across Texas today, you'll see wind farm after wind farm. If you go here in California, the Tehacapee area is enormous. We continue to build out wind turbines there.

Vestas was one of the early movers in North America. We actually started in the Palm Desert area, and we've now been in the U.S. for 25 years. This is our 25th anniversary as a company, and it's really exciting to see it, because we now generate enough capacity in the wind industry itself in the U.S. to power nine and a half, almost 10 million homes.

And 10 gigawatts last year was large. That's as large as you've ever seen in new construction. This coming year we expect about seven, 7.5 gigawatts of wind to be put in. And that I a lag.

And what you're seeing right now is that in 2008 lots of orders came in. 2009 was a big build year.

2009 orders were slow, and they were slow for several reasons. Financing is one of the key reasons. I think it's very important that we do get an infrastructure in place that allows for private financing to continue to move forward.

When Lehman went down, Lehman took a big piece of the financing capacity for wind, because they were one of the largest buyers of the production tax credits and we've got an infrastructure right now that is very slow to move. They're cautious. And that's true in any industry, but what we are seeing is that unless a project has a full-blown PPA in place already, it's very hard to get wind built.

You're not seeing merchant wind power investment any longer the way that you used to. And I'm not sure that's a bad thing, because I think people are being more cautious, but it is going to be very important then that as we look at a federal renewable energy standard, as we look at the need for ongoing policy that's very reliable and one that has a long-term view rather than these short-term pieces -- someone said

earlier on a panel today the ITC is beginning to roll off. It's true. By 2012, you have to have your gigawatts in the ground or you're not going to be able to take advantage of the ITC. PTC also has a dropdead date.

We need to take a longer-term view at policy. So those are some of the issues that I see, and, yet, I would tell you it's not a bad place to be. Wind and all renewables have real opportunities here in North America. We should look on this very optimistically, in my view.

MR. PUENTES: That's great. And you're right. We are seeing these everywhere. We were in West Virginia, and we see them on the mountain tops in West Virginia, something I thought I would never ever see --

MS. WYRSCH: Yes.

MR. PUENTES: -- in my lifetime.

MS. WYRSCH: If you go to ski up in Maine and go to Sugarloaf, you'll see a whole new set of wind turbines that are Vestas' turbines along the ridge

lines. It's happening everywhere and in all different climates. We can get these turbines up.

MR. PUENTES: It's certainly amazing. Let me jump to Tom Casey here.

We had the FIRC Chairman Wellinghoff at Brookings back in September, October, and I admit I was surprised to find out from him that he said we've only built about 3,000 miles of high-voltage transmission lines since 2001. That's about how much rail transit that we've built in terms of miles. It was a shockingly low figure to me.

So I think that would suggest then the need then to better manage the system that we have today and get the most of what we got, which is really what I think the promise of the smart grid is through advanced sectors and telecommunications.

So it makes sense to me. But what are the major barriers that you think and the impediments for making the smart grid smarter?

MR. CASEY: The major impediment is the utilities' confidence that they will be allowed to make

money if they become more efficient. I mean we heard from Ted Craver this morning that, you know, the way in which most power utilities are regulated in the United States is not quite the same in other countries. But in the United States they are incented to invest in capital assets, because that's how they make their money, basically, as a return on capital investment.

But they generate their cash to charging kilowatt hours times penny per kilowatt hour. So -- and they pass through all their operating costs.

So if they can save operating costs by becoming more efficient, it's a pass through to their ratepayers and their rates are reduced. If they become more efficient and, therefore, use less power, then they sell less. They have fewer kilowatt hours to sell. They have less revenue, and their costs are largely fixed.

So if you have a high fixed cost industry, and Ted earlier talked about their recovery times in some cases are 20 to 30 years, if you sell -- if you generate less revenue and you can't proportionately

lower your costs, then the difference comes out of your earnings. And there's no public company CEO in America who is going to engage in a long-term fundamental transformational commitment, the effect of which is to lower their earnings over time without any assurance of being able to make their cost to capital back.

So I believe it's a regulatory problem, and the stakes are very, very high. You know, various experts have begun to look at the stakes in this smart grid area, and DOE and the International Energy Administration, McKinsey has done a number of studies. Booze has done a smart grid value model for us. And the stakes are phenomenal.

I mean, you know, McKinsey has assumed that or calculated that $1.2 trillion of power purchased could be reduced in this country annually or in the world -- sorry -- annually.

I mean it's a phenomenal number that we are spending money and the GDP is going to expenditures where it doesn't have to go. It doesn’t create any net incremental value for our country.

A $150 billion is the DOE's estimate on the cost of outages. Just electricity outages in the country. That's $150 billion of GDP that if we could invest money in making the grid more reliable, then we don't have to absorb that cost.

In the renewable sector, you know, the renewables are inherently intermittent, as Martha had mentioned and others have mentioned today. Solar and wind in particular have intermittency. The sun doesn't always shine. The wind doesn't always blow.

So utilities, when you go into your home and hit the light switch, they want -- you want electricity. They want to know that they can provide it. So if they buy renewable energy, they also buy or assure themselves at least of keeping backup coal and natural gas power. So that's it renewable. It's a short supply for that.

What that means is if you're trying to sell a renewable power source into a utility, the way the utility thinks about that is it has to buy that and pay whatever the price is, plus it has to buy the backup supply, which makes it more expensive.

From a carbon emission point of view, all of the benefit of the wind power, for example, is not yet captured, because you also have to associate with it the new gas or coal.

It makes no sense to have, you know, decidedly valuable objectives -- clean power, efficient power, renewable clean technology driven power -- have to overcome these obstacles which are largely legal and regulatory, because we now have a system where our legal structure is an obstacle to the accomplishment of I think universally agreed social objectives.

MR. PUENTES: Yet, these are long-term objectives that we need to get to. I'm interested in drilling into that issue of these time horizons.

Jim, let me go to you. The challenge with infrastructure -- just these things we've talked about here today -- is that it's -- so much of this is caught up in this immediate moment of job creation; right? I mean that's kind of I think what's helped propel infrastructure to the national stage lately.

But most of us know that infrastructure has this -- you know, this very long tail and the costs and the benefits of the investments are accrued over years and years and years.

So in your role at Highstar Capital which is one of the leading port operators -- or owns the leading port operator in the U.S. -- how does this dichotomy then play out? Are you finding your work hampered by this focus on the short-term immediacy problem at the same time you're investors know that this is a long-term thing that they're getting into.

How do you think about this time horizons thing and how should government think about that?

MR. KOWALISHIN: It is a complex issue for us, because, you know, we're -- the money that we invest his 10- to 12-year money. A lot of the projects that we're involved in are 20-, 30-, 40-, 50-year concession type projects. One of the issues that we're dealing with all the time and the backdrop of this the types of things that need to happen, say in the port sector, and were operating -- and for those out there who don't know

us, we're the guys that bought the Dubai ports when they were (inaudible) here, and we also have a large business here on the West Coast. So we're running 91 ports, which is the largest footprint here in the U.S.

It's really the front line of the goods coming back and forth, and there's a number of things which are going to have to happen over the next five, seven, and 10 years to make these ports operate efficiently, but the government isn't so tightly locked together they can't deal with the issues the way that they need to.

So I'll give you a case in point: In 2014, the Panama Canal is going to be widened. The new ships coming through all 14,000 containers on them. Currently, most of the ships have 4,000 to 5,000 containers now. That's got to imprint on a whole bunch of things. One, it's much better from an environmental perspective to have more containers on there, but also just in an efficiency point.

There's only one port right now on the East Coast which can take those ships and that's in Norfolk.

And in order to do it in New York, which is the big port obviously on the East Coast, they need to spend roughly $2 million to move the Bayonne Bridge or tunnel under it. No one is going to make the decision on that, and what I fear, and, you know, you can hear this in the speeches from the governors and everything, what I fear is that, you know, it doesn't get done. There's going to be sort of some slap stick hustle things around. But ultimately, the ships will be lost and the movement of those goods and the costs of moving those goods it will eventually hit the economy as a whole.

And so, you know, when we sit back and look at the business, what we're actually trying to do -- and although a lot of it has to do with, you know, doing the proper investments for our investors, part of that, though, actually has to doing the proper investments for, you know, the U.S. as a whole.

And so, you know, what we're trying to drive at and one of the reasons we're participating in this is that we have to make it a whole cultural shift of how we look at this stuff and realize the importance of it, and

the movement of goods is really the front end of what's going on in the economy. You know, we see a front.

In fact, if you want, in Benicia, California, we handle all the Toyotas. So if you go out right now in Benicia, California, all the Prius that are around here are touched by us in one way or another. We used to get 15 ships a month with Prius's. Right now, we're getting one.

And that's the sort of thing that you see in the economy when what happens when the car sales aren't happening; when this isn't happening. It's very front end.

I think the U.S. has really got to look forward and think hard about what the infrastructure that they need to compete globally, which we've been talking about, and they can't do 400 projects. They've got to pick the 10 and, you know, as Bruce had said, they've got to place some bets.

And I actually think a lot of those bets have got to be in the transportation area, because that's what's moving people, goods, all those things.

MR. PUENTES: So we have squirrels preventing projects in California. We have the Bayonne Bridge in New Jersey.

MR. KOWALISHIN: We got the Bayonne Bridge.

MR. PUENTES: I think that speaks. That probably speaks volumes.

George, so companies like Highstar, that are investing equity dollars, not debt, not government support in these key infrastructure projects, but it appears that these are really more the norm -- more the exception than the norm. So are we lagging, then, internationally? When you look at it internationally, are we lagging in terms of having private dollars invested in our key infrastructure projects? Do you see -- or what kind of infrastructure -- or what kind of projects should the U.S. make available to private capital? What are the pros and cons of all this?

MR. BILICIC: So I like to talk about this topic first by sharing a story. I've gotten to know the head of the civil division of one of the great construction companies in the globe, who is -- it's run

by an American. And he -- when I first met him, he was coming back from this toll road he was building in a small country in Eastern Europe, had I said, "What are you doing building a road in this small country in Eastern Europe where you're probably having a miserable travel experience?" And he said, because -- I said why aren't you trying to rebuild the Tappan Zee Bridge, and he said, "George, we've been trying to rebuild the Tappan Zee Bridge for 30 years. And we've given up on it seven or eight years ago. And we've given up on lots of things in the United States because it is so hard to do things."

And if you look at the behavior of this company and where this fellow is based and what he's spending time on, it is almost all non-U.S. based. I've had the same conversation with him around the California high-speed rail project.

I said, "Why aren't you spending time on that? You're perfect for this." And he laughed at me respectfully, and he's allocating time elsewhere and doesn’t believe that that will get built.

And so I think in the United States this is very hard because of the politics, because of the permitting issues we've been talking about and other factors to do business here. And we think about it in two broad buckets.

One is energy, which in this country is largely in the hands of private capital. There's plenty of private capital available. The impediments largely have to do with regulatory certainty -- being able to earn a fair return to be able to address some of the issues that Tom was just alluding to and being able to be sensitive to the issues of utilities, who have embedded and historic infrastructure -- if you're trying -- if you're starting to disrupt that existing infrastructure with new renewables.

And those are the big impediments in the energy area.

In the non-energy area, so what is being done at Ports America, what is -- what Governor Rendell tried to do with the Pennsylvania Turnpike, the issue tends to be around availability of opportunity, which is greatly

driven by the politics of things. And I think most -- and the complexity of the political process.

Most people that we interact with in the governmental level are not touching the opportunity to bring in private capital as part of the solution. They don't study it. They don't understand how it works, and they're not considering it, in part, because the politics have not been supportive of that.

Right now, according to this poll that we've done -- and we've done it now three times -- the politics have moved. The people of this country, particularly in certain regions of the country, want governments to look at these private capital solutions, and so as this economic angst and crisis builds, which is part of the inspiration for this, we think governments will look more at this sort of situation.

But then when the opportunities are presented in the world that I live in with clients who would be looking at this sort of thing, the opportunities have to be presented with clarity and certainty, because -- so

we're currently working with a non-U.S. company helping them in Chile.

Chile is a spectacular place to invest. It is easy to deal with Chilean government. You have regulatory certainty of long-term certainty. Banks will lend into this on a project-finance basis. There's a lot of equity interested in investing.

Chile looks spectacular relative to California, and so California has to make itself look attractive relative to Chile. It's a much more competitive, multilateral investment choice for folks and so once the politics line up, the opportunity has to be made abundantly clear.

MR. PUENTES: Let's stay on that -- on the international comparison, because I think that's really an interesting point to drill and each of you, like, all global companies or aspire to be global companies. James, let's start with you. Compare -- if you can compare the U.S. and the European, I guess, airport models, Jim, kind of building off of George's.

MR. KOWALISHIN: Yeah. Actually, I'm still living in the U.K. So although I spend a lot of my time -- under 183 days in New York, in case anyone is checking.

You know, there's a couple things, and it's quite fascinating to listen to this conversation that’s gone over the last day or so.

It's amazing to me how far the U.S. has fallen behind, especially in this PPP front. And we just completed -- you know, if you look at the Port of Baltimore, which was a PPP, which was just completed. We financed with (inaudible) here in January.

What we had to go through to get that done against what we would have to do in Europe to do exactly the same thing, and that's coming in now, partly we have been talking about the different financing methods. We've been talking. It's -- Europe has and I think one of the issues you've got here is that all the projects are so large in the U.S. and there's sort of no way to do it except for to hit a home run. And everyone gets so scared about hitting a home run that they just back

off from doing it all. And I think almost what needs to go on is we need to look here at doing some smaller, you know, more bite-sized PPP stuff like we did in the Port of Baltimore and a few other places to build up sort of a backdrop to it rather than jumping right in and, you know, God bless the turnpike, you know, had it have happened.

But that was a very big transaction, which was one of the issues around. But we can do a lot of smaller things, which will build up the backdrop and the history to make it work better. I think in Europe there's such a history of it now. And, you know, there's a lot of mistakes. 2

I think one of the things that you have to realize and I know a bit about the wind regime, having worked in it in both Germany and a bit in Spain an in solar also. There's been a lot of mistakes there, and there's been some real problems. But they are doing it. And that's part of, you know, we look at it and think they're being successful.

Well, if you sit back and (inaudible) in it, they're maybe not quite as successful as we think, but at least they're doing it. It seems like here everyone is just kind of going oh, what do we do. You know, and they can't kind of agree to it. So I think the secret right now is to hit some singles, and try and hit some singles slowly and then build that into a better playbook then, you know, trying to hit a homerun right now.

MR. PUENTES: That's interesting. I totally agree with that. I think that's -- there's a sharp contrast between the comment that was made last night. Somebody was -- in some other areas, we can innovate in this country.

MR. KOWALISHIN: Yeah.

MR. PUENTES: But in the infrastructure area, and particularly when it comes to PPPs, you're right it is this reticence for failure, maybe because of some global things that have happened, but there is this real fear of kind of screwing things up. I guess the Midway Airport.

MR. KOWALISHIN: Now the transaction; yeah.

MR. PUENTES: Right.

MR. KOWALISHIN: I mean they've all been big sort of, you know, groundbreaking transactions, and I just think, you know, if you look at the regime, if you look at how solar took off in Spain, it started off slowly. It didn't turn overnight. And, you know, I think that's -- we have to look at that, and we have to look at some small steps to build it into a bigger process.

MR. PUENTES: So, for Martha and Tom, and so, again, you're global companies. What's so -- there were different standards. There are different technologies that are used.

What are your chief impediments -- compared the -- from the U.S. to international?

MS. WYRSCH: Yeah. I'll start. You know, I think building on what you just talked about. Business case certainty is what companies really need. And when you think about business case certainty, there is an obligation on the part of the company to build that into

their own business plans. And so what Vestas has done, which I really like. You know, I sat and listened last night and today and I've heard a lot of concern about investing here in the U.S. I will tell you we're taking a very different tack.

We have invested over $1 billion in new manufacturing in the United States over the past two years. I'll have my fourth blades plant up and running in Colorado at the end of this year.

And so we'll have blades and the cells and towers all being manufactured here. We did that for several reasons. One is a belief that the U.S. economy must be strong, and we have an obligation to help it be strong by creating jobs here. We do that all over the world.

We have manufacturing facilities, R&D facilities, other activities all over the world, and it works quite well for us. We do a lot of work for the Port of Vancouver, and this is just a small example, but we needed to have new rail lines put into the Port of Vancouver to accommodate our much larger blades, because

if you're looking at wind turbines today, you might have seen the smaller turbines before. Now we're talking about V-100, V-112, 6 gigawatt off shore turbines. I mean it's an enormous piece of machinery that we're talking about, and we have to have the infrastructure to move it.

And so, working with the Port of Vancouver in Washington collaboratively also with another natural gas company called Kinder Morgan , we actually built out the rail system there so that it could accommodate what both Kinder Morgan needed and what we needed.

That was a nice collaboration between two industries and working with the Port to figure out how to get it done. And a lot of it was off of our balance sheet, but we also looked bonding opportunities and so forth.

So, again, a mix of that private-public partnership I think is really important as we think about how we build our business.

The other thing, too, you know, we talk about jobs, and people say is it real. I have seen it be real.

It's -- it may not be as enormous as the numbers that people are putting out there, but there are real jobs. In the U.S. today, 85,000 people are employed in the wind industry.

That's today and if it continues to grow, we'll see more jobs because those jobs are not only jobs working on and installing new wind facilities. They are with all of the manufacturing associated with it, and we are not the only company putting new wind manufacturing right here in North America, because, again, it provides is business case certainty. Other companies see the same. GE is doing it. Siemens is doing it. And it's not just those facilities that are putting the component parts together. It's facilities actually creating the new technology.

We have an R&D Center in Houston now, in cooperation with NASA and Texas A&M, working on stealth blade technology. And stealth blades are important because right now you can't put a wind farm near an airport because it interferes with the radar of the airport.

And so what can we do to overcome that? There's enormous amount of innovation and a lot of very interesting technology associated with the control systems in towers and so forth. It's exciting to be a part of it, and I think we need to get excited about that.

As a foreign company coming into the U.S., these folks have said we believe in this economy. We believe in this market. It is really large. It's worth fighting for, and we're going to invest in it, and I think that's the kind of mindset we need to build with others.

And, you know, I've heard -- when a couple folks say, you know, you've got these foreign companies getting the incentive dollars, the ITC. If you look at who got the bulk of the ITC grant money last year, it was Ebra Jollet . It was EDPR, foreign companies who have large investments, but my view is they're creating jobs here. They're investing here. That money is coming back into our economy. More power to them.

We ought to be figuring out how we work very globally and think about ourselves as a country that can grow because others are willing to invest here.

MR. PUENTES: More power to them. I love that.

MS. WYRSCH: Wind power.

MR. PUENTES: Wind power. Tom, how about you? Internationally, how typical is it for you to operate internationally?

MR. CASEY: Our experience. Well, we started out as a purely U.S.-focused company. And we're now active with companies in Australia, Singapore, and essentially all of these significant companies in the European Union.

And that's a huge transformation for us, and, as a small company, it's very risky for us to do that, simply because the costs of trying to do business overseas are so much greater than the costs for us of doing it in the United States.

But it's very clear to us that the progress going to be made in these other countries is faster and

more certain than it is in the United States. And so we have to move to where utilities and regulators and governments are actually making concrete progress and moving towards this -- the deployment of for us smart grids.

That's -- I think that's a terrible problem for the United States, because, you know, this is going to be a global transformation of a global electrical industry, and every electric company in the world is essentially in need of the same sort of IT technology and management capability and control capability as we're talking about for the U.S.

And if other nations lead in the development, they will achieve technological leadership. They will achieve scale production economies. The jobs will end up there, and, you know, it's one of the truly global transformational industries that's going to be $20 trillion of spending over the next 20 years globally, and, to the extent that we allow the United States to fall behind other countries, then, you know, the United States is at risk, not only domestically for all the

efficiencies that we are not gaining ourselves, but in terms of job creation, in terms of economic and technological leadership on something that's really profound.

MR. PUENTES: That's great. I want to open it up to the audience in just a minute, so thanks for your questions or your comments.

But, Tom, I wanted to -- before we do that, I wanted to follow up with the question. I think this came at the last panel about the fact that this -- when we talk -- think about the energy grid, it's not just about the energy sector, but the transportation sector obviously has tremendous impacts on this.

And we talked about the plug-in hybrids, for example. Can you shed some more light on that from your perspective. What is that -- those changes in the vehicle technology going to do or how does that play out with -- relate to the smart grid?

MR. CASEY: I think that the -- again, Ted Craver said he thought that the deployment of smart -- elec -- purely electric vehicles will be slower than

some advocates might think, and he had a statistic in his explanation of why that was really quite astonishing. And I've seen the statistic elsewhere, so I think it's accurate.

And that is that the amount of power necessary to power on a purely electric vehicle in the course of an average year of driving will be the equivalent of the amount of electricity consumed by the average American household in a year. So, in essence, that enormous incremental demand for electricity is required to be able to support this new clean automotive transportation sector that we want and we don't want -- when we think about why you want that automotive sector to be electric, it's largely so that we achieve energy independence, and we achieve -- we reduce climate contributing emissions.

But we have to build all the generating plants to power that way. We have to build as many generating plants new as are in service now to serve every American household. Jim Rogers from Duke Energy has a quote. I have no idea whether it’s accurate,

but it's pithy, so I'm going to use it. Where he says basically 40 out of the last 40 coal and natural gas fired generating plants have been denied. So in other words, that it's very difficult to get a new coal fired plant or new natural gas fired plant or a new nuclear fired plant -- power plant built in this country. And so if you think that you have to have this enormous influx of new power generating stations to support this rapid deployment of electric vehicles, you have to ask yourself whether or not it's -- it's practical to assume that that'll happen. If you then turn to power -- to wind and solar power as the source of that new power, which would be fantastic because you could power the cars with clean technology. They, themselves, would be clean in operation. You then have to think about what are the limitations on the grid as it exists today for -- is there a cap on the degree to which wind and solar can contribute to the power base of the United Sates or of any market. And there is -- I mean, Belgium has said that at seven percent the intermittency of wind tends to be a

problem for the grid. Germany has said 12 or 13 percent. We know Xcel Energy in Colorado has 14 or 15 percent and they're having to deal with that. So you have to make the grid smarter in order to deal with the intermittency of the renewable load to make it more reliable otherwise you're going to have to, as we talked earlier about backup with coal and natural gas, which aren't going to be available. So, you have these practical impediments in my -- one of the reasons I'm at this session, in addition to the fact that George is so persuasive, is that I think that there are enabling technological investments that we can make as a country -- investments in parts of the technological option set that's available to us for infrastructure and energy that will then contribute to improvements elsewhere. In the electric sector, I think smart grid -- if we don't make the grids -- the actual grids themselves -- smarter, then all of the benefits we see from some of these ancillary technologies -- whether it's wind or solar or electric vehicles or in-home energy management or distributed

generation -- are going to be much harder to capture. If we don't make transportation smarter, then moving the goods around -- as we were just talking about through the ports and on the roads -- are going to be much harder to realize the benefits. So one of the things that Brookings can do and others who are sort of engaged from an analytical and policy point of view, I would hope is begin to focus some attention on where the most impactful energy -- where the most impactful investments are going to be because those in turn can then be leveraged across lots of adjacencies and the beneficial impact would be much more impressive.

SPEAKER: That's good advice. It's clear that we're going to need some comprehensive response. I think as much as I talked about the de-siloing of infrastructure, the reality is we're still -- we're still pretty silent as an industry. So, let me go ahead and -- I still have a ton of questions we'll use, but I want to make sure that folks who have questions or comments get a chance to (inaudible)

them. So let's go right up here. Just talk (inaudible).

SPEAKER: Okay. Carlos Riva, Verenium Corporation. We're an advance biofuels company. And I was listening to the morning hearing a lot about different rules of government -- obviously regulatory and legislative, etc. -- but I thought it was interesting that the governor noted another potential role of government, which was government's custom in talking about the potential for using the purchasing muscle of government quote to promote gas-fired vehicles (inaudible). It strikes me as I think about renewables like advanced biofuels, for instance, where there's no actual long term market, that that's an obvious place for government to step in and play that role. Also, in infrastructure development with the (inaudible) about government's customer, I wonder (inaudible) the family vehicles that that's going to be more of a trend in the United States, the Department of Defense, Secretary of the Navy has come out recently talking about how they want to utilize

their purchasing muscle to (inaudible) roles. Or are the political complexities and the barriers too great to really see that moving forward the same way that it's done -- it's been done in other countries to advance infrastructure and the goals?

SPEAKER: Particularly around defense, we do see the -- anybody want to?

MS. WYRSCH: Yes. Well, I might just say one quick item here. They did announce -- the Department of Defense -- that they wanted to put renewable into all of the different facilities, but there's a very practical problem here. And the practical problem is you don't sit down with the DOE and talk -- or with the Department of Defense and talk about how do we collocate let's say wind generation to serve a number of facilities. You have to go facility by facility. So you go to Fort Warren in Cheyenne, Wyoming and you talk to them. We have three wind turbines there. You go then to the next facility in Oklahoma and the big one in California. It's not a practical easy approach to trying to leverage their spend, if you will. So, I

do think it's an important area for us. I think as a country we could actually help drive that innovation just as we did -- as we, you know, when John Kennedy wanted to put a man on the moon, that leveraged a lot of different technologies and a lot of different businesses. But we have to do it in a really concentrated way and I -- I think that's one of the key -- sort of you look at the practical things that are preventing those things like the permitting, we've talked a lot about that. Our ability to just simply get transmission built would be made so much easier if we followed a model that's already in place. The Natural Gas Act has a very easy approach to building natural gas infrastructure. There's a reason you see natural gas pipelines crisscrossing the United States because the FERC has final authority to the -- to the large extent. And so let's think about other very, you know, practical things that we need to do to make it easier to work within this system so the government can give us the opportunity to leverage that spend.

SPEAKER: It seems like it's such a -- it's low hanging fruit for the governments to look at the need to invest in the infrastructure in the country and this interest in decarbonizing the economy and say when we purchase things, we're going to take that into account. So, we had advised the city of New York on a pro bono basis on their Plan NYC Project, and one of the things that we helped them analyze was converting the whole taxi fleet to hybrids. We also helped them design a solar RFP, which got put on hold ultimately, to put solar panels on the roof tops of their -- of some of their buildings. And that ought to be integrated into the day-to-day policy efforts or really operating efforts of the -- of the governments. I think the P3 thing is a little bit more strategic and more public policy based and I think that needs to develop into a real tool that would be used by the state and local governments. The other thing that we -- just again seems to be low hanging fruit -- is when we look at a government deciding to shut down a hospital so that the poor people who had been using

the hospital have to go somewhere else to use the hospital, and you look at what they own. They might own some parking garages or they might own a water utility. I always ask myself if I'm meeting with the government, well why the hell do you own a parking garage that the people don't even understand that you own, which you could sell for ten times (inaudible) in the world I live in. Take the money and keep the hospital operating and probably the parking garage would be run better and I don't understand why that obvious, perhaps somewhat naïve observation by the laymen from a political point of view here, isn't -- isn't being recognized to a greater extent by -- by governmental officials in this period of financial stress.

SPEAKER: More of a state or local issue, right, for that on the latter, right? It's not really something where the Federal Government is going to be.

SPEAKER: That's -- that's probably correct, although it could be integrated if the national infrastructure bank is going to be a planning device,

as opposed -- as well as a funding device -- it could facilitate some of that. And some of that being looking at the balance sheet of these state and local entities and suggesting that they rotate the capital into more productive uses and put the assets into the hands of people that can operate them better.

SPEAKER: Let's go to Bruce.

MR. KATZ: This is for Chris and relates to the New York ports.

SPEAKER: (Inaudible.)

MR. KATZ: So we know the Panama Canal --

SPEAKER: Yeah.

MR. KATZ: -- is coming.

SPEAKER: It's coming.

MR. KATZ: Okay.

SPEAKER: And the ships are on order.

MR. KATZ: And the ships are on order.

SPEAKER: The big boys are all going to use them.

MR. KATZ: Right. So --

SPEAKER: The Suez Canal and those other big investments.

MR. KATZ: So the -- does the infrastructure bank resolve this or make a substantial contribution to resolving this. The President has four billion in his budget. It's pretty much cordoned off for transport. I think our original idea was obviously more expansive, but obviously this would fit in that. What -- what's -- what are the mix of options for New York -- I mean the collection of states?

SPEAKER: It's a roughly a $2 billion project, give or take a bit, and I don't think -- of that size, I think it's a difficult thing to do under private finance unless they can pull it. So it's going to have to be some combination of government and private finance. And, you know, what essentially are the stakeholders, which is also something the companies are going to be involved in this -- what's going to come through there. Because I think, you know, what you see is the movement of goods and you really see this. I, you know, obviously I sit on the board of the company. We watch how stuff is moving around and you see that depending on how pricing is working,

depending on where they can get stuff to, it moves around the country in an unbelievable way. You know, based on gasoline prices, one port will get busy because they can rail it here. And they're thinking about this all the time and how they're running the business now. If they can't get those 14,000 (inaudible) ships into New York, they're going someplace else and it's going to impact the cost of the goods in New York and the ability to get things in and out. So I do think it's a big issue and I think somehow -- again a bit like the conversations we're having today -- it's not going to be solved totally by sort of private finance. It's not going to be totally solved by government. But somehow we're going to have to get it together to make it work. It's an interesting -- I mean just if you ever read about it in the papers. But the issue is the Bayonne Bridge is seven feet too short to get the ships underneath. So they can jack the bridge up seven feet to get the ships in or they can do a tunnel underneath and get rid of it. It's a crazy issue.

SPEAKER: It's a great bridge. Any other questions? Somebody here.

SPEAKER: I was just -- just a comment first. I'm a little frustrated by the fact that we're sort of saying that -- particularly in the electricity industry -- that we're not moving forward. I mean, you know, with 55 million smart meters and, you know, I think the wind solar geothermal biomass industry contributed 62 percent of all incremental energy generation last year. You have 450 gigawatts worth of natural gas turbines that run less than 15 percent of the time that probably could be put to work if someone figured out how to actually change the queuing for, you know, for how the dispatch curve worked. I mean it just seems to me like, you know, we're on a pathway to get to 100 percent of all incremental energy in this country coming from zero emission technologies within three to five years. I mean we're not that far away from this. I mean the new coal plants that are getting built are ridiculously expensive -- from the $4 billion coal plant that Duke just got authorized in

Charlotte, North Carolina to AEP's plant in SWEPCO's territory is a nine percent rate increase to pay for these things. I mean 17 percent rate increase in progress energy's territory for the -- the fuel price increases plus the nuclear plant plus the $2 billion worth of transmission that they have to build to support that. And so, you know, these -- the economics of what we're doing is -- is -- is not -- doesn't fit well within the public utilities commission process. And I get that. And I think that, you know, more education needs to get -- needs to happen there, but, you know, because the electricity rates have gone up so fast in this country since 2000. I mean about 4.76 percent a year every year since 2000 compared to 0.6 percent a year since 1960. There a lot of pissed off people. I mean everyone from Wal-Mart to Staples to Costco to retail customers, etc. I mean they're pissed about the fact that their electricity prices go up faster than 4.76 right, because you have to make concessions for the residential and the industrial users and so they end

up having to take it on the chin. And so, I mean it just seems to me like the drivers are all there for us to get there. I mean I get the utility companies don't seem to understand, you know, sort of how their business transforms into utility 2.0, but I'd love George's opinion on that as well as the rest of the folks on the panel. I mean it just seems like we've made tremendous progress and we're literally, you know, based on economics, a few years away from just having a huge breakthrough.

MR. BILICIC: Actually, I think the -- the industry has made a lot of progress. I've been watching it for an awfully long time now. And I don't think that the utilities are obstructionist in this area. I think that there's -- they find it challenging depending on the jurisdiction to figure out how to make some of what has been identified happen in a way that's economic for their shareholders. But I think the angst maybe that's been expressed by some and that we talk about with our clients is around the possibilities that people see.

So the tax credit scheme that has -- we use in this country to support renewables is highly inefficient as was discussed earlier. There is not a market design in the United States -- if you heard what John Krenicki said last night or Mike Ahearn said -- that allows -- other than in wind, which is a scale industry interestingly and is producing jobs here -- there isn't an opportunity to really scale the solar industry the way it ought to be scaled in the way it's going to be scaled in other regions of the country or other regions of the world. And then we -- we probably need new nuclear in this country and the regulatory regime -- other than in Florida, which is what you're alluding to -- doesn't exist in any -- and what the southern company is doing, doesn't exist in any jurisdiction and that has to be implemented if people see the need. We're going to use natural gas as a bridge fuel to -- when we need to build new base load generation in this country. But that feels like a bit of a high volatility fix that's going to put a lot of pressure on rate payers. So I think that's --

that's maybe the angst, although even though I do think we're moving forward and we think the smart grid will be deployed. We think more solar will be deployed. We think Martha's company is going to be very successful. But there's a lot of obvious imperfections. The other thing I'd say is people talk about the government needing to get involved in building electric transmission. The Governor talked about the infrastructure bank being a source of capital for electric transmission and other energy investment. I don't think that that's necessary. What's necessary in this area is for government to facilitate the investment because the capital will flow in these areas. It's more complicated in this ports project, for example, where I think the government has got to write some checks to make it happen.

SPEAKER: I want Martha to respond to the government investment in the transmission system, but let me get Tom to react to the question first.

MR. CASEY: I think that -- I think these are -- I think that this is a transitional era where the constraining factor is the impact on -- impact of initial capital expenditures on the political process -- specifically the public service, public utility commissions. You know, Ted earlier talked about he's got 30-year long assets that are being replaced with assets that he will -- if, you know, they're being thoughtful about it -- they'll want to depreciate over three and five and seven years. So he's going to have this bubble -- any utility has this bubble -- for a period of time in which they are carrying the old replaced capital expenditures plus the current capital expenditures getting ready for some new ones. For 50 years -- the last half of the 20th Century -- electricity costs were basically flat in real terms. And in the -- as you pointed out, in the first decade of this century, they have started to go up and they're likely to continue to go up in real terms over the next 20 or 30 or 40 years probably. So, there's a lot of pressure on rate payers. And unlike in

telecommunications where a very similar kind of phenomena happened at the end of the 20th Century -- the ‘70s, ‘80s and ‘90s -- where AT&T, you know, had all these assets. They were depreciated out over 20 years. Suddenly there was competition and they had to transform themselves and government did -- involved itself in that market in a variety of ways. Here, I think, the country and the government and the utility industry is going to have to figure out a transitional financing mechanism. And that’s what I think is required. I think that public-private partnerships, to the extent that they allow investments in some of this new technology without imposing the full burden on rate payers or build operate transfer structures or gain sharing structures and all of those -- and sort of build operate transfer and gain sharing, which we actually think about because we -- we believe that, you know, the MPV of a smart grid on a million homes is over a billion dollars. That’s a net present value. So we would love to be able to figure out a way to go to utility and say we will do this

ourselves. We'll build it. We'll manufacture it. We'll install it. We'll operate it and we'll take the saved energy and we'll monetize it and we'll split the -- we'll split whatever benefits and that's your take. The capital markets don't exist right now for that sort of a venture, but -- so, you know, part of our view is we're going to go out and we're going to try to expose our technology on a more modest level -- a smaller scale -- so that either we can afford it or we and the utility together can afford it. It will then validate that there are huge benefits to be -- to be achieved here and then we think that we'll be able to raise capital and go out and do these sorts of benefit sharing deals. Consumers will benefit. Renewable suppliers will benefit. In-home energy management companies will benefit. And we think that obviously the society will benefit from reduced emissions. So it's a financial -- I believe personally it's a financing problem. And once you start validating that the technology actually will produce a positive result, then you can find risk capital initially to

participate with you. Maybe it's partnerships with other people who will benefit from a smart grid. Maybe it's just pure (inaudible) sort of risk capital. And over time the financing of the transitional double counting, if you will, will work itself out. That's my own view.

SPEAKER: Martha.

MS. WYRSCH: Well, you know, I have to say I agree with you George on whether or not we need the government to build our transmission infrastructure because there are a lot of private entities willing to finance and build and invest in transmission infrastructure. You're seeing it in small ways that the new Long Island line that was just put in. You've got a project in Wyoming and Colorado that's being privately financed that's really got a lot of impetus and it's backed by an enormous potential wind farm there. And yet we don't have again that regime in place that allows for the approvals to happen naturally and to support that kind of investment by private entities. And just one example, you've got

MISO out there saying now in order to build a new transmission line to support any new generation, the cost of that has to be on the potential new generator. It's not going to be distributed across all of the potential consumers in that area. It is causing right now a true gridlock in the Midwest ISO as people try to step back and say how can we generate the kind of return that we need to with that burden on our balance sheet. And they're not going to be able to. So we need to get a much more holistic view nationally, I think, about how we approve this -- what the national purpose is for transmission infrastructure -- the way it communicates across state lines and the way that we approve it across these regional and state -- and state lines.

SPEAKER: I think the stat was 112,000 miles of gas transmission lines since 2001 versus 3,000.

MS. WYRSCH: Yes. There's an amazing --

SPEAKER: It's just shocking. Yeah, it's really amazing. One more question and I think we have to wrap up.

SPEAKER: Tom's comment about allowing people to make some more choices made me wonder whether a role of the government here is also allowing or making it possible for people to have very transparent choices about how they get their electricity for example. So, if I had a choice, I would sort of buy a utility that makes it -- actively makes it hard for me to choose renewable power. And then -- but if I had -- if I had to pay a little bit more money for that -- for Martha's turbines -- but if I had Tom's technology to manage my power and keep my total power bill the same or less, I and a lot of other people would choose that. But my utility makes it hard to do that. And I wonder if there's not a purchasing power side here in the same way that we all had when we went through the AT&T demonopolization and had more choices in long distance, to say this is what we as consumers want to be able to do. Government get in line behind us. You're going to have build this stuff out, but allow me to buy what I want to do. It's going to come with cars. We've talked about that. It seemed to be a

little bit hard on the utility side, but it's got to be possible.

SPEAKER: If they knew where they were getting the power that they were delivering to your home, then clearly they could do that. And I think they will. I mean, you know, these aren't -- utilities are not -- are not the bad guys here so much as the victims of a regulatory and technological investment program that doesn't meet the needs that society is suddenly putting on them. You know, we head a deal with the power industry just like we had a deal with the telecom industry. Build a national network so that everyone has access to your service at affordable rates and make it pretty reliable. And they did that. And now the deal is getting changed on them. And that happened in telecom 20 years ago. Now it's getting happen -- now it's happening in power. Now it has to be -- you know -- be diverse. Enable diverse suppliers and enable diverse centralized suppliers as well as distributed edge suppliers, both of which add volatility and risk. Be clean. Be more reliable. Be

more efficient. And so when you -- when you're just starting to change the deal on an industry that's that fundamental, you know, there has to be some mechanisms to work our way through the transition. So, it could happen. And there are countries in the world -- England, for example. You can buy green power and they have a specific, you know, source deal with some renewables. And it will happen here too, but you have to -- you have to invest in technology to enable the company that's providing you those choices to know how to -- how to give you that choice and how to control your use in the home or in the building or wherever. And that's all about technology, I think.

SPEAKER: Anybody else on that one? I think we do -- we have time for one more question if anybody else -- another burning one. Well, then we'll go ahead and wrap up there. Please help me thank the panel for a really great discussion. I need to ask you though to please pack up for lunch because they're going to reconfigure the room for the video conference that follows afterward. So you can get your lunch.

You can find your seat when you come back in. Again, thank you all very much.

(Recess)

SPEAKER: So if we can get started again. I think the finish will be reasonably quick. I have just spoken to Congressman Markey's Chief of Staff, and Congressman Markey who was to join us by video conference has been called to do five votes every -- for the next -- every 10 minutes for the next 50 minutes. I'm not sure exactly how that works, but it's maybe a sign of the dysfunction in Washington. But in any event, I didn't want to take a risk that it would drag on and so we're going to invite him to a -- to a future event and I think what -- what I'd like to now is just ask Bruce to come up and offer a few thoughts. I talked a bit earlier this morning about our thoughts on follow up, so again this is not just another conference. We build on it. Create some momentum. Go to other cities. Do something similar and maybe come back here later on in the year so we can produce something that makes change and satiate

the thirst for -- of Governor Rendell and Governor Schwarzenegger to reestablish our stature in the world.

MR. KATZ: Thanks, George. First of all, just before I start, again thank Lazard and their team and then there's a whole bunch of folks from Brookings -- you know, Lael Harris and Sean O'Neal and they're all sitting here somewhere -- Sue Burnette and Carrie Kolasky , who really were behind a lot of this with the Lazard team and I just wanted to give a shout out to them because a lot went into putting this together and they just did a superb job. Thank you. So, you know, sort of the major take away I have from the last day is just how strong and deep this conference has been. I mean, a lot of us go to a lot of these things, but from the -- from the Governor Schwarzenegger's comments last night to the panel last night to the panels today and Governor Rendell -- I mean this was like the A-plus team, you know, and it was dealing with complicated issues in a volatile period of time for the country and just laying out the

challenges that face obviously a very complicated and dynamic country. There wasn't like a weak moment and I just feel to everyone who participated -- both on panels and in Q&A in the audience -- you know, from a Brookings perspective and, you know, we're almost like in the professional business of doing these kind of things at Brookings mostly in Washington. This was one of the best I've been to in the past 12 years or so and I've been at Brookings for about 12 years, so it covers my whole tenure there. And that I think goes, George, to what is a very interesting partnership between a national think tank which is independent and objective, empirically driven and an institution like Lazard. I mean there's really a potential here at this moment with all the political noise for collaborations of this sort to break through. Here are my takeaways. The first takeaway is that Emilia Istrate, who is sitting here and has been typing away at her laptop, is putting together the takeaways because there was so much that was discussed of such depth that we thought it was very

important for Amelia to come out here. She's one of our star Senior Research Associates -- doing an enormous amount of work on the infrastructure bank, on exports, on some really critical issues -- to come out here and try to put down the conversation and for us then to assemble it for all of you to look at in a very, very short period of time. So we will circulate something to the participants and feel free to push back and give us feedback because I think we want to perfect this. The second thing -- these sort of fall into the category of what Lazard and Brookings have to think about -- as we go forward both together and in, you know, perhaps in collaboration with some of the people who participated -- is there really needs to be a strong statement from the business community -- and Brookings perhaps might be a vehicle -- about what's at stake right now vis-à-vis the competitiveness of the country particularly with regard to certain emerging sectors and so much of what we talked about today on all these panels was about the next economy -- what is a transformational moment really for the

global economy and what is a challenge to the United States to participate in it in the fullest way and I think the Washington narrative lacks that sense of urgency. It clearly has that sense of urgency with regard to the short term downturn and the job loss that we've experienced and the housing crisis and the upheaval in the lives of so many people. But it lacks a narrative for the long term strategic growth. And I think it's quite possible that this partnership and other work we're doing at Brookings and our sister think tanks might be able to help in some respects in providing not just the intellectual, you know, grist for the mill, but I think the credibility to speak about this -- this fundamental moment. A lot is at stake for the country and if we don't make the right choices, I don't think this is hyperbolic. I think there is a real possibility of us not being able to participate in what could be some very productive and sustainable sectors going forward. So I think, you know, for Lazard and Brookings, there is a narrative piece in collaboration with other business leaders and

political leaders like Schwarzenegger and Rendell, Mayor Bloomberg that I think we could fill and we should think about first, you know, the specifics of that and then the theatrics of that, you know. And then I felt the way the conversation went over the past two days, there was clearly very specific guidance that people gave us as to how we could again tease out for national policy makers that tend to think about these issues in fairly compartmentalized ways because, as Jim Robinson told it, Congress, you know, is compartmentalized. You know, if you go up and describe a multidimensional issue to a Congressman, their first response will be I'm on the subcommittee on, so what you just described to me only one half of one element of your description fits my subcommittee, so I don't quite know how to respond to it. So, given that, I think what came out of the conversation was a need to take certain elements in the next economy -- take either renewable or solar as a particular piece, some of the utility transition issues we were talking about. Take an element of what

we're describing and then to break it down at the Federal level given our global competition as to the tax, the spending, the regulatory, the federalist -- all the different elements that perhaps stand as barriers to the U.S. participating in as full a way as possible, not just an idea generation, but obviously in the production and deployment. So I do think that there could be, as we go forward, you know, several separate research policy efforts around digestible pieces of the next economy so that we can describe -- particularly against our global competition -- what are the barriers to the -- you know -- to the -- to the restructuring. The other piece which Mike Ahearn picked up, which others talked about, is this -- is this notion which gets to federalism. If Washington does not act responsibly in the near term -- two, three, five years, whatever -- or irrespective of whether Washington acts responsibly, the laboratories of democracy will kick in the United States. Thirty-seven governorships are up this year. It's just that kind of year. There a people like John Hickenlooper,

Mayor of Denver running for Governor of Colorado -- very pragmatic, very forward-leaning, very action-oriented. The states will take on their role again as the laboratories -- the major cities, the major counties and the metros will take on the role as major laboratories. It could be and, you know -- based on both what Ed Rendell said and others said -- it could be that we could organize, you know, through Brookings and some other constituents, you know, think tanks, sort of an action oriented table -- and we've been thinking about this like a federalist kind of table where we could take a core challenge, bring in five governors from sister states -- intermountain west where they tend to be pretty damn pragmatic or even parts of the mid-Atlantic -- bring in the multi-stakeholders that we described and problem solve. And again in a way where we're not just talking about what policies would be interesting to have happen at the federal level, but what actions can be implemented at the ground level and in the states. I mean we've been thinking about Brookings about starting a kind of

federalist table because there isn't one in the United States anymore. You know, if you go to Germany -- again another federal republic -- you know, we wrote their Constitution, so obviously we were trying to perfect our own. You know, the upper chamber of their Senate, you know, is like ours used to be -- appointed by their states. So there's an intimate relationship between the states in Germany and the federal government in ways that doesn't really exist here. In Germany, as well, there's a network of metropolitan areas that relate also up to their federal level in a structured and disciplined way. Nothing like that exists in the United States. So, we're thinking there's a vacuum here and with the kind of economic restructuring issues we're talking about -- and particularly clean energy issues -- and the window -- the short window that we have to get our act together, we might be able to serve as a vehicle for not the entire country, but for a certain segment of the country to sort of deal with some of these cross-state issues, market-shaping issues, etc., etc. So, you

know, George, those are like the different levels I'm thinking about here. There's a narrative issue, you know. What's a -- you know -- how will the United States transition effectively to what could be an opportune moment in the next economy? So much of this is about the paradox, particularly when you come out to California. The sense of innovation, the sense of creation -- of market creation -- and then you go back to Washington and the reality of polarization. I mean this is just, you know, it's amazing, you know, in one country you could have such polar extremes, right, and just travel back and forth between them. I think we have a responsibility. I think we have the possibility of laying out a narrative, of the opportunity of the next economy and the challenges, the urgency of us taking action. And then, as I said, perhaps taking that in bite sizes, laying out for the federal government, you know, the intricate issues that came up today between tax, spending capital, regulatory, etc., etc., etc., with regard to one issue comparing that to how our competitors operate. Maybe

that will galvanize certain action in a certain sector. But I am intrigued by taking this down to the ground and really finding a few places in the United States to not just reimagine federalism, but to remake federalism. I mean, you know, city, county, metro, state, private, public, problem solving -- enough of the bull shit. You can see Ed Rendell has affected my focus. You know, let's -- there might be some new ways of acting here that these kind of -- of sessions could -- could generate. So those are some thoughts and, you know, I -- what I would really urge people to do, because people obviously invested a lot of time and a lot of intellectual fire power over the next -- over the last day is, as we circulate our summation, you know, feel free to email, push back, communicate with us. What you'll find is, you know, Brookings is an institution that basically thrives on interaction with the business community because just given the kind of country we are, I think it's that kind of real experiential practice that toughens up, sharpens up both our policy critique and our policy

recommendations. So, I just wanted to say how much we appreciated everyone participating here the last day and I actually think, you know, for us this had a real discernable impact and both on our thinking, but also on the kind of work that we want to do going forward in collaboration with people and I really appreciate people taking the time. Thank you very much.

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

/s/Carleton J. Anderson, III

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