

Summary of Presentations and Comments
At the
Quadrennial Energy Review

Stakeholder Meeting #13: New York, NY
Energy Infrastructure Finance
October 6, 2014

Opening Remarks

Dr. Karen Wayland – U.S. Department of Energy

The Presidential Memorandum which announced the Quadrennial Energy Review (QER) tasked the U.S. Department of Energy (DOE) to conduct stakeholder outreach efforts. This is the thirteenth public meeting of the QER. The final date for comment submissions is October 10, 2014, so this is the final public meeting of the first year of the QER.

The Honorable Carolyn Maloney, United States House of Representatives

Main Points:

1. I cannot think of an issue that is more important than energy. Thank you all for coming here today. I would like to thank Secretary Moniz for coming up to New York today to take part in these meetings.
2. President Obama's "all of the above" energy policy has brought about significant positive changes to our energy sector.
3. There are two proposals in front of Congress that are important for the region.
 - a. The Anti-Terrorism Risk Program must move forward so that we are able to insure businesses in urban locations, which is essential for our economy.
 - b. The other involves the Export-Import Bank, which will help domestic businesses increase exports.
4. 85-95% of buildings that we will use 25 years from now have already been built. We need to retrofit these buildings to obtain the energy efficiency savings that result from new technologies. These retrofits will not only lead to energy efficiency savings, but will also create jobs.

The Honorable Ernest Moniz, U.S. Secretary of Energy

Main Points:

1. I would like to thank Congresswoman Maloney for joining us here today. As she mentioned, job creation is a significant benefit of infrastructure development. We have had 55 months and counting of private sector job creation, which has led to 10.3 million new jobs.
2. I was in Corning, New York last week for the National Manufacturing Day and saw the importance of low natural gas prices for the manufacturing sector.
3. The Export-Import Bank is very important for industry throughout the country.
4. We are here today to focus on finance issues impacting transmission, storage and distribution infrastructure. This is the final meeting outside of Washington D.C., and we are now preparing our QER report, which will come out in January of 2015.
5. Energy policy tends to have threads that come from all across the Administration. One of the points of the QER is bringing all of the various interests in the government together to create a comprehensive approach to establish an energy policy for the future.
6. Our current focus is on using the existing Administrative authorities to build energy policy, but the process will also include new legislation from Congress.
7. The President laid out the initial framework for the QER in his Climate Action Plan, and solidified it in the Presidential Memorandum which came out in January of this year.
8. President Obama wants us to be very forward leaning in developing new policy and implementing new technologies.
9. The Champlain Hudson Power Express project is a good example of a public-private partnership that will lead to increased resiliency for the New York grid. This morning the Department of Energy finalized a presidential permit for the project, a 1000 megawatt transmission line, to bring a renewable hydropower from Quebec to New York City Metro area. So, that will strengthen the region's grid security, diversify the power base, and reduce consumer costs.
10. The private sector will finance a majority of changes going forward. In electricity alone, the private sector will invest \$40 billion per year. Transmission and distribution infrastructure will require a \$15 billion per year investment. Incentivizing this investment is critical especially with flat and declining demand across the country.
11. The functioning of markets is itself a tool to increase energy security.
12. We have seen substantial progress in renewable energy. Since 2008 wind power has tripled (currently beyond 60 GW of capacity), solar power has increased tenfold, and California has recently had days where solar generation reached 6 percent of its electricity supply.
13. We have a so called better challenge (11 percent of the country's manufacturing footprint); the goal is a 25 percent reduction of energy use over a decade. On average, we are seeing a 2.4 percent per year decrease in energy intensity.
14. What is the government role in providing the conditions needed to get the investment in infrastructure needed for the future?
15. 26 of the top 100 growing companies (according to *Fortune* magazine) had their growth tied to new developments in the energy sector.

16. We look forward to the discussion here today as well as your subsequent written comments.

Audience Questions and Answers

Question 1: Jonathan Scrag, New York University School of Law – A number of the distributed generation issues are state issues; how is the QER addressing this?

Secretary Moniz

- You are correct in that the closer the issue gets to the consumer, the more the issue becomes a state rather than federal issue.
- We think of this in the framework of what can we do to assist the states in handling these issues. On the distributed generation side, we have lots of different approaches being undertaken by states; we can serve as a best practices collector for states.

Congresswoman Maloney

- I will be discussing creating a point person in Governor Cuomo's office to work with the QER team on providing our best practices and obtaining the best practices from other states.

Secretary Moniz

- New York and Connecticut have been excellent in setting up Green Banks. DOE has taken an advisory role in helping set up these banks.
- In New Jersey, following Superstorm Sandy, there has been a huge push for infrastructure rebuild. Instead of rebuilding systems as they were previously created, we have been discussing building it smarter and more resilient. DOE put in \$1million through one of our laboratories to develop microgrid solutions.
- We are looking for leverage points to see where we can assist states.

Congresswoman Maloney

- After 9/11 we set up a joint federal, state and local taskforce to help protect our nation's assets. We can take a similar approach in addressing issues our nation's energy sector.

Panel I: Attracting and Maintaining Capital for Energy Transmission, Storage and Distribution Infrastructure

NOTE: All speaker presentations are posted on the QER webpage at: www.energy.gov/qer

Presenter Name: Kerri Fox

Affiliation: Project Finance North America, BBVA

Main Points:

1. In today's market, and over the last year or two, there has been a tremendous amount of capital available across the capital stack with tax equity being the one exception. What we have lacked is a dearth of projects that are structured in a way that can be financed.
2. In 2011 the world was experiencing the European Union (EU) financial crisis. European banks were the mainstay of bank lending for projects, and so there was nervousness around whether there would be enough capital to finance projects that needed to be done.
 - a. Supply of capital was being eroded and demand also, but not as much as supply during these crises.
3. Today this not this case. Why? Because to the extent European banks pulled back, there were additional US regional banks that came into the space, the Japanese banks came in, European banks never left. So today, liquidity is overflowing.
4. Now we see a lack of power purchase agreements (PPAs) or other long-term contracts. It is challenging to get financed because many of them are being done on a "merchant" or "quasi-merchant" basis.
 - a. That could suggest that we just do not need the additional capacity. But to the extent we are trying to build transmission and storage, I think those are areas where we see a dearth of contracts; it has made it difficult to get the projects financed.
5. There are a lot of liquid natural gas (LNG) projects in the queue for the second half of 2014; and those require very, very large financing. The numbers for 2014 will be at least as good as 2013.
6. Suggestions:
 - a. We lack simplicity because of our federal and state system, and I would welcome comments that we are looking at best practices, aggregating across the federal and state levels, and move towards simplifying.
 - b. Tax equity has grown out of necessity; we should think about opening markets to multiple investors (versus using a complicated tax equity structure).
 - c. Infrastructure in Canada is tremendous and we can look at overarching federal programs for these types of projects that cross state lines, or best practices developed. We need to get away from the piecemeal approach-developers need more coordination and certainty about where to invest money.

Presenter Name: John Lange

Affiliation: Power and Utilities Group, Barclays Capital

Main Points:

1. The market remains extremely global in terms of competition for capital. There is a lot of capital out there, but everyone on the power utility and infrastructure side is comparing jurisdictions and comparing regulatory regimes. They are chasing the best return for the viewed risk.
2. The U.S. is in good shape. We are viewed as having a stable regulatory regime with a good capital expenditure (CAPEX) program. The utilities in the U.S. are some of the most capital intensive of all of the sectors. They spend on average about 45 percent (17 more than telecom companies and about 200 percent more than your average industrial company). That comes with some risks.
3. The overall market is in a mood where there are about 80 percent of the investors that we deal with who are in the "not sure" mode. 10 percent believe there is fundamental shifting, whether it is new technology, whether it is new technology coming out of shale gas, or some other sort of movement. Then there is a great majority looking at all the new developments and trying to figure out whether it is a "game changer."
 - d. Interest rates are low, and have been low for a number of years. Our rates are low, but it is a good place for yield oriented investors to put money into. When rates go up, when money gets tighter, costs will go up.
 - a. For most of our utility companies, they will see flat to negative growth. What they do see is CAPEX-related, what that does is raise rates from a consumer perspective. I think investors are very focused on consumer costs. They are concerned that if they spend \$75 billion a year on CAPEX and then growth flattens, and then a potential political uprising around increased rates may occur, which is bad from an overall investor perspective.
 - b. Shale gas remains an area of growth for our clients and we believe that the government will continue to support it. It is also seen as a strong movement in terms of strong energy security, manufacturing and providing economic benefits. There is a lot of capital available there.
 - c. We see a focus on the environment by investors because there is uncertainty. They have taken a "go slow" approach. Investors are waiting to see what the comment period looks like on the Clean Power Plan and then the proceeding litigation. They are very focused on trying to make sure they are not putting money into 20- and 30-year investments that later turn out to be stranded because the federal government makes other choices on environmental policy.
 - d. There is a lot of discussion about technology disrupting the sector and making changes. We are still skeptical about technology driving wholesale changes in the market.

- e. DOE should continue to help oversee coordination of energy regulation; making it transparent and coordinated to help investors see where this is going to result in the lowest cost of capital for the sector.

Presenter Name: George Schultz

Affiliation: Green Tech Solutions, Munich Reinsurance Group

Main Points:

1. The key takeaway is that our team is trying to be supportive of innovative technologies. We have insured the largest manufacturers in the world, and we have also insured some of the smallest Silicon Valley start-ups.
2. In the photovoltaic space we have insured projects here in the U.S., in Japan, and in South Africa. The key takeaway is that we learned from various experiences on a global basis to see how we can apply them to new settings.
3. Energy storage is the next step in facilitating renewable energy technologies. We have partnered with another insurer to devote more resources to develop insurance for the sector. This will help create efficiencies from a pure technology point of view and also from a financing and economic point of view.
4. We are focused on performance risks in renewable technologies which translate directly to how investors look at the viability of financing these types of risks.

Presenter Name: Nicholas Whitcombe

Affiliation: New York Green Bank

Main Points:

1. The conventional, clean energy space for large-scale infrastructure is deep and robust. These markets enjoy economies of scale and low relative transaction costs. And the risks are well understood. They have a scale, an abundance of data, and they are readily traded.
2. Developers and equity and debt providers actively compete in these markets, using customized financing with customized contracts for large-scale energy projects. When the risks are well understood, government policy and programs can work to provide comfort to investors to attract greater amounts of private capital.
3. Looking forward to 2030, we should consider how much energy supply will be addressed through larger infrastructure projects, or through smaller local, more distributed projects reduce load in various markets, particularly in New York State.
4. Today, there are market gaps for clean energy projects that are preventing these projects from being financed to the full extent needed to reach a meaningful scale.
5. The Green Bank is implementing a market-based policy along with company financial solutions. The New York Green Bank can help move the market away from reliance on subsidies to address these gaps.
 - a. We have an open-market solicitation, which is encouraging financial institutions and project developers to come to us with their creditworthy

- projects that they want to close but are unable to do so for specific market barriers.
- b. We are only investing in proven technologies so that when developers and financiers come to us, they do not suffer from any technical technology risks.
6. The issue is capital availability. We are working on:
 - a. Warehouse line of credit similar to smaller-sized financings based on standardized contracts. The Green Bank will act as an aggregator.
 - b. Loans to energy efficiency projects, for example, where an energy savings agreement provides a long-term benefit to a public or commercial building.
 7. The New York Green Bank provides guarantees to reduce risks; helps with risk assessment and provides guarantees for transactions that can be completed. Once the Green Bank has helped, projects can do them on their own efficiently.
 - a. High opportunity for 5 MW projects (100 MW not likely).
 8. We can also provide guarantees for larger solar wind or biomass projects that are under the radar screen of commercial financial banks; yet, an ideal size for regional banks is possibly the community banks in the State of New York.
 9. In New York we are seeing a lot of demand for our solicitation. Most of it is in aggregation, quite a bit of it is in distributed energy, and quite a bit of it is in energy efficiency.

Panel Questions and Answers

Question 1: *Do you see a role for the government helping to aggregate distributed generation resources (DER)? This runs counter to the traditional business of transmission and distribution investment. Do you see that as a risk potentially in the near term or long term to your business?*

Nicolas Whitcombe

- The Green Bank responds to demand. And the market is coming to us with the smaller, more distributed projects. There would have to be quite a lot of projects near shovel ready traditional business projects for us to respond. The issue is how much centralized generation do you need in New York?

John Lange

- There is a lot of financing potential for these technologies. Investors are focused on DER, and people investing in new technologies are not the people investing in utilities. DER projects appeal to a different type of analysts who are tech analysts, not utility/energy analysts.

Kerri Fox

- Corporate banks specifically will do smaller scale commercial or residential transactions. The market as a whole is accepting these transactions. The bigger

challenge is aggregation for residential customers with high FICO scores. The Green Bank or the government can participate here.

Nicolas Whitcombe

- We are seeing a lot of talk, and the next step is businesses bringing projects to where they are bankable. Community owned solar projects are the next step. We need to see that there are the necessary platforms in place to develop these technologies.

George Schultz

- As an insurer, we are used to taking large risks. So, distributed energy is a challenge for us too. We are focused on this. We would look forward to supporting market barriers and technologies that might be on the long side of the spectrum of technology risk, either as a direct partner or try to recognize that those are certain technologies that could be covered, at least from a long-term reinsured.

Question 2: *What is impact of Master Limited Partnerships (MLP) parity beyond hydrocarbon? What is the impact if it is passed in Congress?*

John Lange

- Right now, there has been no significant shortage of capital on assets that do not qualify as depleting resources under the tax code. The tax equity market is unique in that it has been developed to meet the regulations that occur as opposed to necessarily being sought out and structured that way. That being said, there still seems to be quite a bit of tax equity money.
- There are a number of institutional funds that focus on MLPs that K-1 requirements work through (the Schedule K-1 is the tax form that reports the amounts that are passed through to each party that has an interest in the entity.) If you talk about having that in and extended out, you could see a greater opportunity for individual investors to step up and invest around some of these projects.

George Schultz

- There is no shortage of assets that qualify as clean resources under the tax code. I would think that if we did not have that requirement, we could attract even lower cost capital. MLPs are traditionally a retail product. They have since become institutional and we need to extend it out, and see opportunities for individual investors to start investing around these products.

Nicholas Whitcombe

- There are energy efficiency measures that are really system integration measures into an existing building where there are generally known technologies and where there is insurance behind that. Technology can work to provide the energy savings that are needed.

Question 3: *Given the characteristics of intermittency for renewable energy, how do you insure against this?*

George Schultz

- Data on characteristics on lack of sun is available. Data on wind is harder. We have a team of meteorologists that monitor and analyze data as part of insurance risk. We are open to addressing these risks.

Kerri Fox

- This is not really such a concern; the concern is really technologies. Commercial banks invest in fuel cell, etc. Crossing this gap of technology is more important.

Nicolas Whitcombe

- The Green Bank is concerned about energy storage, building energy efficiency, and battery storage.

Question 4: *What are your final recommendations for the QER Task Force?*

Kerri Fox

- MLPs introduce clear definition. With regard to the tax equity regime, there are transaction costs, it is complicated, and there is a lot of regulation around it. MLPs attract a lower cost of capital because of its availability to investors, and there is a history, stability, of what is done with hydrocarbon.

John Lange

- There is an opportunity to replace something that is being retired with easier and more appealing technology that is attractive to a broader investor base.
- Also, we need to make sure agencies are all coordinated. We should keep the focus on cyber and security, but our industry is not focused on it. This industry enjoys low competitive cost of capital now; we need a regulatory regime that takes a thoughtful approach to prove an adequate return. We must keep in mind that these are 30-40 year assets.

George Schultz

- A solar panel is a generating asset and it is also property. Energy storage is a bankable technology that is an extension of this asset. It will enhance the entire value of the project. I think right around the corner there will be another technology to focus on.

Nicolas Whitcombe

- The Green Bank covers large opportunities, but not large scale. It is addressing market demand, using existing financing solutions. The issue is scale, data gathering, and comfort. The Green Bank is stepping in to help out until the markets can do it

themselves. Energy efficiency is more about real estate than reducing demand. How is capital paid back? How loans are paid back? In many cases it is via real estate.

Panel II: Bankability of Electricity Transmission, Storage and Distribution Infrastructure

NOTE: All speaker presentations are posted on the QER webpage at: www.energy.gov/qer

Presenter Name: Judith Judson

Affiliation: Emerging Technologies Customized Energy Solutions

Main Points:

1. As an emissions-free technology, energy storage can enhance the resiliency, reliability, and cleanliness of the entire electric grid modernizing the way we generate and deliver electricity.
2. Traditionally, electricity had to be produced, delivered, and consumed instantaneously, creating the need to size up power generation transmission and distribution system to meet the highest peak demand.
 - a. This created inefficiencies, added cost and created underutilization of assets.
 - b. Advances in electric storage technologies are enabling more efficient use of generation transmission and distribution infrastructure.
3. A Carnegie-Mellon University study just found that 20 percent of carbon emissions reduction and up to 100 percent of NOX emission reductions could be lost due to ramping. Energy storage would mitigate these losses.
4. There are several challenges today to financing modern energy storage, including perceived technology risk, lack of market compensation for all the value streams electric and energy storage provides, lack of long-term contracts for services, and regulatory barriers to utility at option.
5. State or federal infrastructure banks (DOE loan guarantee programs) are essential to reduce technology risk.
6. Market products that fully value the benefits of storage or fully value the benefits provided by storage (improved flexibility and efficiency) send appropriate price signals. Another study by Carnegie-Mellon University showed the units of large-scale storage could save consumers up to \$4 billion annually in the PJM market region due to reduced-peak prices and reduced the lines on expensive peaking generators.
7. Storage will help facilitate large amounts of renewable generation that will be coming online.
8. A lack of long term contracts is the biggest challenge for storage developers. The reliance on short-term volatile market revenues makes it extremely difficult to obtain traditional lower-cost project financing.
9. Federal and state investment tax credits would stimulate investment by reducing project development cost and investment risk. The reduction of regulatory barriers would also increase investment in storage facilities.

10. Encourage utilities to incorporate storage in planning conducted by regional transmission operators.
11. Storage does not fit neatly into the categories of generation, transmission, and distribution, and sales and property tax code are divided in those categories. So often, this creates a lot of uncertainty. It requires developers to spend a lot of legal resources just to understand how the projects will be taxed.
12. DOE leadership on guiding principles and best practices in tax treatment would facilitate storage development.

Presenter Name: Gregory Rutherford

Affiliation: Investment Banking Division, Morgan Stanley

Main Points:

1. Market value for transmission and distribution companies, specifically investor and utilities, is driven by an ability to deliver and attract total return to investors through dividend payments and earning's growth. Companies need to continue to invest in this infrastructure base in order to deliver and attract a total return to investors and also to deliver reliability electricity service to customers.
2. As personal demand keeps pace with overall trends, a customer's proportional share of the network should not be impacted by demand despite the fact that the network cost becomes a more significant component on an individual per-unit basis.
 - a. Volume pricing should incentivize individual customers to improve usage patterns along with the overall market.
 - b. Companies continue to attract capital in a time of flat or declining demand.
3. Today there is no shortage of investment opportunities; utility management teams are prioritizing investments to find projects that generate the highest timely returns.
4. Critical investment should have the most attractive returns.
5. The cost of commodity and the cost of capital are both at historical lows. The impact on customer bills has been low due to these two forces working together. Going forward this will not continue to be the case and will be an issue that regulators will need to consider.
6. Financing structures that we are dealing with today will benefit from a rule or from packaging assets, driving down the cost of capital.
7. Green bonds, if investors are willing to pay a premium, will help attract additional capital.
8. Capital markets and pools of private capital are both willing and able to deploy capital to support critical infrastructure projects.
9. Federal efforts to give investors the comfort levels needed for investment will be important going forward.

Presenter Name: Daniel S. Sullivan

Affiliation: Grand River Dam Authority (GRDA), American Public Power Association

Main Points:

10. My comments today are focused on the potential damage that change in tax treatment of municipal bonds could have on public power utilities' ability to finance infrastructure investments.
 - a. Public power utilities rely almost exclusively on municipal bonds.
 - b. \$239 million in bonds were issued in 2010 to support infrastructure by GRDA.
2. Public power utilities can and do issue taxable debt. This attracts a different class of investors and is a good way to refinance debt.
3. Since the global financial meltdown there has been an increase in taxable debt.
 - a. We see this as a temporary change, and expect the ratio to return to historical norms.
4. We believe that if a new federal tax were imposed on municipal bond interest, it would increase the cost of issuing these costs. This in turn would make infrastructure investments more difficult.
5. Supreme Court Justice John Marshall said "The power to tax necessarily involves the power to destroy." A 28 percent tax cap proposed by this Administration would effectively impose a surcharge of 15 percent to bond holders.
6. The cost to issue a private activity bond is 50 basis points more than a municipal tax free bond.
7. Eliminating uncertainty is the best way to make infrastructure investments more bankable.

Presenter Name: Humayun Tai

Affiliation: McKinsey Company Energy Practice

Main Points:

1. Despite flat demand, the industry is facing a significant investment need.
2. While there is sufficient capital, market characteristics challenge the awarding of risk returns to these investments; additionally we have to consider hazard-based funding.
3. Growth of investments that are in the sector:
 - a. Lagging cycle of investment – 15 year cycle
 - b. Renewables growth – distributed solar, and wind power. Renewable portfolio standards (RPS) on some RTOs. RTOs are driving the need for connections.
 - c. Micro and Macro misalignments – overtime there has been unexpected load growth in areas not expected and this causes congestion. We are behind on congestion spending.
 - d. As we see an increase in storage development, the cost of storage will go down.
 - e. Resiliency awareness and need started with the results of Hurricane Katrina and has grown since Super Storm Sandy. There has been a lot discussions around how we start rate basing and how to finance a different kind of grid structure; not just focused on undergrounding, but on strengthening assets in different ways.

4. The impacts of energy efficiency and distributed solar costs have not been estimated appropriately by many of the major models.
5. Risks that are preventing the rewarding of appropriate risk adjustments and returns on investments include:
 - a. Regulatory lag- this is what drives the asymmetric nature of investments and transmission/distribution in particular.
 - b. Risk of physical misalignment
 - i. This emanates through origination of assets where this is a physical boundary question, there is a transmission asset, or a domain challenge; are assets distribution or transmission?
 - c. Federal vs. local vs. state jurisdictional issues
6. The end state of storage will be a major factor, but how we get to the end state is not clear at the moment; there is no incentive to finance this path at the moment.
7. Strengthening the system is important, but it is difficult to quantify and monetize "prevented damage."
8. Can a Green Bank or Agency be used to fund the portion of the investment that is held up by regulatory lags?
9. One option is to pool resilience funds across utilities and combine those funds with federal funds; the aim is to get targeted reactions or preventions where we know are high-risk areas.
10. RTOs have the opportunity to fund large scale storage projects.
11. Private sector interest is there to provide new technology, but the private sector is concerned that the demand for such technology is a few years out.

Presenter Name: Steven J. Zucchet

Affiliation: Borealis Infrastructure

Main Points:

1. Despite a general decline in growth of electricity, we see a real need for continued investment in the utility sector.
2. Residential, commercial and industrial customers are growing increasingly frustrated in times of loss of electricity service. This leads to another need for investment (investing in resiliency).
3. There are a significant amount of assets that are entering the final years of their life cycle and require upgrades or replacements.
4. Pension plans such as OMERS (<http://www.omers.com>) have identified utilities as an ideal asset class in which to invest. Pension plans look to match up cash flows coming in to investment opportunities that provide long term stable cash flows. Utilities represent opportunities to invest in long-term stable cash flows with the added benefit of being able to make investments in capital rate base, not only today, but in the future.
5. Traditional cost of service model has worked well for the utility sector. Most utilities are operated in a safe, reliable, cost effective manner. Utilities have not been asked to take on a lot of risk.

6. Increasing return on equity for utilities which take on risk unfairly burdens end users. These risks should continue to stay with stock holders.
7. Incentive rate making is one easy way to improve rate making.
 - a. Lower costs will be able to stretch capital dollars farther.
8. There is a significant amount of capital looking to invest in this asset class. We need a framework to allow for this investment to come in.
 - a. A centralized planning approach was used to identify the needs on a macro -level for the state in order to connect Texas to a large wind portfolio that was being developed. Those plans were turned over to the private sector to build.
 - b. This created an open framework to allow these assets to be built.

Panel Questions and Answers

Question 1: *In the environment of a reduction of quantitative easing, rising commodity prices and increasing interest rates, what difficult decisions will be faced?*

Gregory Rutherford

- There is the potential for both the cost of capital and commodity prices to rise.
- The cost of electricity and infrastructure will rise for the end user. We need to make sure that we prioritize and invest in critical infrastructure projects.
- The difficult decisions are going to be with regulators, public utility commissions, making sure that critical infrastructure investment, not necessarily a longer return, where some incentive rates are in place, is the type of infrastructure that is focused on initially.
- State level spending is not consistent across states. We need to ensure that in this environment the mechanisms are in place to invest in critical infrastructure first.

Judith Judson

- It is challenging as a regulator when you have commodity prices increasing. The goal is to keep the overall bill as smooth as possible. There is a need for transmission and distribution investment.

Daniel Sullivan

- Reliability is key. Customers expect the lights to come on when they flip the switch.
- Increasing the focus on physical and cyber security will require additional capital investment. Churches do not build for Easter Sunday, but utilities do; we have to have the capacity there to do that.

Question 2: *In an era of flat or declining demand for electricity, how do utilities plan on going forward?*

Steven Zucchet

- It is a careful balance trying to match the level of reliability to what the consumer is willing to pay. The regulator needs to step in and act as an arbitrator to determine what a community needs and what a community can afford.

Humayun Tai

- Growth has been driven by generation investments which are large rate-based scale investments. These generate cash flows.
- In the environment of \$4 gas prices and environmental norms down the road, generation investment is bleak. If there is a 5-7 percent increase in rates you would have a 3-4 percent of disposable income spent on electricity. As we scale up investments in storage, rates will become more affordable.

Dan Sullivan

- In the public power world, the focus is on the rate that customers pay, not the returns to investors.
- Municipal customers have the ability to respond to the individual needs of their communities. On the planning side, we are a unique industry in that we are rewarded by decreasing the demand for our product. We need investment in transmission to bring wind generation to market.

Gregory Rutherford

- If the economy does not grow at the same time and in the same direction as rates, an increase in rates will have a significant impact on end users. We can invest in shorter term, smaller sized investments and look to reduce operating costs to help offset expenditures.

Judith Judson

- There is a shift in the way that consumers are looking at their energy usage. We are also looking at a certain increase in distributed generation.
- Embracing the change and figuring out how to align utility incentives with this change will be the task of state and federal regulators. There is a huge potential with technology innovation in terms of storage. However, reducing overall system costs is hard to capture and or monetize.

Question 3: *Energy storage property and sales tax classification – how do you see the role of the federal government relative to state tax issues?*

Judith Judson

- DOE can provide best practices on what is being done in various states. There is no clear code for storage. A policy to identify storage as an asset class is key. It must be recognized in code.

Question 4: *Final thoughts or comments for the QER Task Force?*

Steven Zucchet

- Knowing the rules and knowing that the rules will not change is important for investors that are looking to invest towards the future.
- There is a lot of capital out there looking to invest in the sector. OMERS pension plan has identified \$1 billion to be invested in infrastructure assets within the next five years. And this is just one pension plan and one investor.
- Finding the framework that allows these sources of capital to develop and finding the mechanisms to work to balance state and federal rules that are in place is really the challenge that we see going forward.

Humayun Tai

- Three constraints DOE should think about: 1) Minimizing costs to ratepayers; 2) Mitigating risk and; 3) anything that gets done where you can match private dollars should be prioritized.
- Then look for projects with the largest return to all users.

Daniel Sullivan

- Conflicting interests across the federal agencies is an issue for utilities.
- We built coal facilities to match up with the federal priorities. We are now decommissioning these facilities and are replacing them with natural gas facilities.
- The competing interests have a major impact on the projects put forward by utilities. Let the markets work, stay out of the way and allow for predictability.

Gregory Rutherford

- Policy consistency and simplicity will benefit the capital markets. State and federal regulatory coordination assists the capital markets as well.
- Remember the rate payer.

Judith Judson

- Storage portfolio standards to incentivize long term contracts would have an impact on financing these projects.

- Ensuring that planning activities done by utilities and transmission operators include storage in the way they are considering the grid investment tax credits would have huge impact.

Panel III: Opportunities and Challenges for Natural Gas and Liquid Fuels Transmission, Storage and Distribution Infrastructure

NOTE: All speaker presentations are posted on the QER webpage at: www.energy.gov/qer

Presenter Name: Curt Launer

Affiliation: American Energy Partners LP

Main Points:

1. New technologies such as hydraulic fracking and horizontal drilling are beneficial to the consumer and the market knows that there is 8 to 10 Bcf of LNG export capacity potential, and yet pricing for natural gas is flat.
 - a. Consumer benefits are taking place in the industry right now.
2. Which country has most natural gas vehicles on its roads? Pakistan. Iran is second. Germany has the most installed MW of solar power – a place where the sun does not shine very much.
 - a. These examples show us that it is all about government incentives, and that is where we have to go in terms of maintenance of the MLP structure and the MLP Parity Act.
3. The U.S. market will support LNG exports to the European Union and Eastern Europe. We need \$20-30 billion of infrastructure spent to have that happen, but under longer term contracts debt support, and through the MLP structure, it can happen.
4. The role of corporate structure of MLPs and real estate investment trusts (REITs) is important. We have unique capital access programs in place right now.
5. American Energy Partners is pioneering a new structure working on access to retail capital. In other words, we are acquiring oil and gas properties and presenting the investor in a non-traded limited partnership with a 6 percent distribution yield and the ability to participate in the upside in the oil and gas business.
 - a. Expanding the capital access beyond private equity, beyond publicly traded companies, beyond debt market, into the retail investor is crucial.

Presenter Name: Lindsay Sander

Affiliation: Sander Resources on behalf of the National Association of Publicly Traded Partnerships

Main Points:

1. MLPs have played a pivotal role in supporting the energy community over the last 25 years. They have financed the expansion of domestic energy infrastructure and delivered a wide variety of energy resources from the production fields to American consumers.
2. MLPs have been in existence since 1981. They were created out of a mechanism by a number of oil and gas producers who saw the need to raise additional capital during a time of great investment. At that time, in 1981, they had spent \$56 billion on new infrastructure, exploration and production activities which, in today's dollars, is equivalent to \$150 billion.
3. This allowed the small investor to have access to traditional partnerships because previously, partnerships were illiquid in the sense that they could not raise revenue or capital from the small investor and was listed on the stock exchange which created an affordable unit that was liquid for individuals to invest, providing a new source of capital.
4. The importance of the MLP structure is it provided a manner for entities which had controlled or very low rates of return to access very large capital because their capital investment is quite large.
 - a. The limited partnership tax treatment has helped to grow the size and investment into publically traded partnerships (PTPs) over the course of the last 20 years.
5. Today, the market capital is approaching \$700 billion, and about \$600 billion of that is approaching or specifically dedicated to the natural resource sector. \$43 billion in capital was raised last year, and as of late September, \$15 billion was raised for this year. Not counting the acquisitions, about \$35 billion in capital expenditures was made in 2013, and we expect the same for 2014.
 - a. The reason for this considerable capital is the construction of the pipelines in the processing facilities.
 - b. We have to build about a half a million miles of pipeline in the next 20 years in this country.
6. Raising capital is necessary to construct the facilities, but once invested, there is less capital that is needed other than the general operations and the maintenance of them.
 - a. Pipelines last a long time and they generate a steady, reliable income stream, and it is a fee-for-service industry in a sense that they are not exposed to commodity prices. This allows them to pay a regular cash distribution to their investors, and it provides the capital for industry.
7. Benefits of PTPs
 - a. They provide stable return on investment and unit value.
 - b. They reduce cost of capital, which would potentially lead to more expensive pipelines and also bottlenecks.
 - c. They provide cost savings to energy producers and consumers. We estimate that the number is around \$13 billion in terms of cost savings. Additionally, it creates jobs. There are currently 323,000 positions that support MLP activity that fund

about \$147 billion in annual salaries. There are local and federal state revenues of about \$700 million a year.

- d. In addition, there is improved safety and environmental performance because of the use of new technologies and natural gas as a fuel source.

Presenter Name: Robert E. Curry Jr.

Affiliation: Charles River Associates

Main Points:

1. This industry needs and is getting a lot of disruption. Whether that is a good or bad, it is going to happen. The disruption is coming from not only renewables such as solar power.
2. Liquid petroleum products and retail level cost factors in New York State for the last six years are important to consider. The delta between the highest and lowest price over six years for heating oil is 500 percent, for propane, 300 percent, and kerosene, 400 percent.
 - a. Some of this is due to the commodity, some is storage, and some is also transportation.
3. What is the ability of the system to absorb cost needs for resiliency and for distribution systems?
 - a. No one knows; it is not transparent.
 - b. The opaque nature of pricing makes the regulators' interaction with people looking for rate increases all that much important.
4. One of the main questions in looking at the revisions to the New York State regulatory system is: Will there be sufficient coverage and dividends to continue to incent people to invest in the business? New York is going to be a template for other states.

Presenter Name: Alfred J. Puchala

Affiliation: Capitol Peak Asset Management

Main Points:

1. Capitol Peak Asset Management was launched at a White House announcement two months ago to create a public-private partnership between the federal government and private investors.
2. CoBank is the lead bank in the credit system and has allocated \$10 billion to address this need. The need is how to bring public private parties together to solve large national problems such as job creation, economic growth, and on infrastructure that drives growth through the economy and based on demands.
 - a. Most institutional investors do not have access to critical infrastructure investments. 20/30-year projects are hard to often put into a fund structure.
3. What we are now doing is connecting the key participants around large projects, trying to leverage the expertise of CoBank, which is active in all 50 states, often focusing on projects of several hundred million dollars to several billion dollars each, including the energy structure.
4. For LNG there needs to be large projects built and an expert lender such as CoBank who is active in this space. But there are also smaller potential investors, i.e. truck stops that want to move LNG.

5. We need to make foreign capital welcome in the U.S. and import capital to create products to be exported potentially to build American growth and prosperity.

Presenter Name: Peter Carnavos

Affiliation: Gas Supply in Energy Management, Con Edison

Main Points:

1. With regard to growing the natural gas business, we talked earlier about the need for growth, and the opportunities that present in terms of reducing cost for consumers over time.
2. Natural gas plays an important role for Con Edison businesses, fueling the economic region and continues to have a major role in the clean-E environment through the New York City's clean-E program.
3. Our natural gas business has been driven by New York City's recent regulations that became effective in 2011, phasing out the burning of No. 6 residual oil by 2015 and No. 4 by 2030.
4. We take very strategic approaches to our investments. Our engineers have identified geographies across New York City, where the greatest clusters of buildings are burning heavy fuels. We achieve a great scale by targeting multiple customer service areas by coordinating construction activities to lower our costs.
5. The space shared between multiple utilities-- electric, gas, steam, water, sewers, and subway infrastructure --means replacing gas pipes that have a major impact on the surrounding population.
6. In the Con Edison projects, we only had built 4-miles of pipeline connecting to our gas system. So the ability to leverage those investments was significant. In the first winter season of operations of the new pipeline, the regional capacity was utilized by over 9 percent, impacting generation in the entire Northeast region.
7. The growing use of natural gas to generate electricity is the largest demand in the gas system. To meet these system needs in the most cost effective manner, regular forward-looking planning studies are needed.

Panel Questions and Answers

Question 1: *If there is a potential increase in the cost of capital, do you have a sense of where gas companies will feel the pinch in terms of projects? Will a certain type of project be impacted?*

Peter Carnavos

- We think that the pinch should be about interest rates. We think that strategic investments are necessary to meet our customer needs.
- When looking at capital projects, we prioritize to determine whether any of those projects need to be converted or advanced based on specific needs of the system and needs of customers.

- A good opportunity for growth is the conversion to natural gas program. This program is a significant change in the way we did business in the past. We now look at individual customer investments on a case-by-case basis and look at those revenues costs. We look for economies of scale and the ability for customers to come off the gas system at a lower cost and in many cases, the cost is zero for those customers attaching to the gas system.
- So we see it as an overall benefit in terms of how our business proceeds.

Lindsay Sander

- The issue of pipeline infrastructure is between aging infrastructure and new infrastructure. How do we handle assets that are older?
- We need regulatory certainty. Until this is solidified, it will be an issue.

Robert Curry

- Regulatory certainty is good except when you consider that Supreme Court with regard to state commissions as being an instrumentality of the legislature. And the legislature is known to be fickle, so policies are known to be fickle.
- It is hardest to get that certainty in the development and construction cycle; it must be done on a state-by- state basis at this point.
- There are federal ingredients involved, specifically the tax code, although that, too, is subject to change.

Question 2: *Earlier we had a discussion on Master Limited Partnership parity beyond hydrocarbon. What do you see as an impact of MLP parity if and when that occurs?*

Lindsay Sander

- This is unknown. There are many ideas about what the Parity Act will do, but no one actually knows. What we do know is that we need structure.

Question 3: *What drives the need to build a half million miles of pipeline in the near future, and what is the federal role in terms of removing barriers to achieving that goal?*

Lindsay Sander

- The need is there because of the energy renaissance that is happening. Hydrocarbons were not supposed to play a role past 2020, but now in 2014, the U.S. is the largest producer in the world.
- Prolific sources of energy are now available that we not only can utilize ourselves, but our manufacturing sector is taking huge advantage of, and consumers are going to benefit because of the lower costs. Europe is going to benefit from it as well and probably others around the world.
- We have to move new sources of natural gas. So we have to build the infrastructure needed to get it from the production fields throughout the country back to the refining centers and the areas of consumption or the ports to compress it and then

bring it offshore to other parts of the world. We have this inherent need for energy infrastructure that we have never quite seen before.

Curt Launer

- 95 years of drilling are still estimated to remain in the Marcellus Shale and the Utica Shale. We need to make sure we have the ability to build pipelines to move that new source of gas.
- We are starting to see real-time needs. New plays have the best new infrastructure. Older plays have produced oil and gas for 50 or 60 years so the infrastructure is in need of need new or rehabilitated infrastructure. It is estimated that the industry will need to spend \$35 billion a year.
- MLP gives assurance to investors. The market keeps getting scared that the MLPs will be changing, but they never actually do. This does not create confidence in market and it needs to change.

Robert Curry

- As Mr. Launer indicated, we have deficiencies in moving gas around, and in addition New York has upstate opposition to pipelines carrying either feeder lines or larger efforts to bring gas to the Northeast.
- So among the other uncertainties in trying to get certainty making investments particularly with midstream companies, you can add to that folks who are just so opposed to fracking.

Alfred Puchala

- The need for new infrastructure will be huge. The role of government is to help make it happen on time. This is critical.
- Look at the Cape Wind project for example. DOE believed that this was necessary, so it helped to get it built. Lawsuits, zoning, and technical issues were handled by DOE and this de-risked the project. Now investors are clamoring to get in on this project.
- Where there is a lack of investors early on, the government can have a role.

Peter Carnavos

- The last five years, 2008-2013, 18 interstate pipeline projects were completed. Some of those projects went as far as 20 to 30 percent higher in costs than was estimated.
- The federal government can determine there is a way to put the siting process together in an efficient fashion; therefore, when the market sends the signal based on pricing and need for new infrastructure, that timeline is not extended outwards, 5+ years.

Question 4: *Final thoughts or comments for the QER Task Force?*

Curt Launer

- Thank you, I want to be a part of this process moving forward.

- DOE can help promote new pipelines.

Lindsay Sander

- Three points
 1. MLPs are a great structure, have proven their worth and are a proven mechanism to funding energy.
 2. MLPs lower the rate or cost of capital to consumers, manufacturers, and producers.
 3. Regulatory certainty going forward is important.

Robert Curry

- DOE staff should look at the three reports prepared by the Electricity Advisory Committee to DOE.
- These reports address storage, transmission and regulatory processes as well as the DOE's role as convener to reduce regulator uncertainty.
- DOE should also consider reaching back out to the panelists today for insight, assistance, and enlightenment on how financial aspects play into what the QER is focusing upon.

Alfred Puchala

- DOE's interest in long term public-private-partnerships is important.
- DOE staff should read Circular A-129 issued by the Office of Management and Budget (OMB) and the U.S. Department of Treasury last year. This is the best declaration of the role of government in the credit markets, and how the government can advance social goals. This is a good framework for DOE's innovating thinking.

Peter Carnavos

- Two parting comments:
 - a. Moving forward the steps to streamline the Federal Energy Regulatory Commission's siting and review process may be beneficial. This should not in any way compromise the need to do a complete environmental assessment.
 - b. Go spend money.

Public Comments

The public is allowed to sign up to provide comments, and each commenter is allowed five minutes in which to make them. Each commenter was asked to approach one of the standing microphones as their name was called, introduce themselves, their organizations and make their comments. On the stage representing the DOE were Dr. Karen Wayland, Matt McGovern, Eric Hsieh and Hugh Ho, all of whom are with the DOE Office of Energy Policy and Systems Analysis.

The Department of Energy encourages everyone to file written comments at QERcomments@hq.doe.gov to ensure a wide variety of public input into the QER process.

Public Commenter Name: Rich Thomas

State:

Commenter's Main Points:

1. Leveling the playing field is exactly right. Taxes are challenging to understand in New York.
2. Since 2008 the cost to transmit energy cost has gone up by 55 percent, while the cost to make electricity has dropped by about 30 percent. New York State energy taxes have increased by 156 percent. Since the cost to create energy has gone down, we should decrease taxes.
3. There is a desire to invest in gas infrastructure or invest in businesses which convert generation facilities from oil to gas. However, with the window of return on investment being 14 – 24 months, many investors are concerned about what steps are in place to protect their investments should the project not be completed.
4. Gas continues to be in demand. The Liberty Natural Gas project off of Long Island taps into a pipeline that has been there for 50 years, and it will expand access to gas. This will have a consumer benefit of \$325 million.
5. We also need to maintain a broader perspective when it comes to our energy assets that we have and protecting the ones that we have, including nuclear. The Polar Vortex was a stabilizing influence.

Public Commenter Name: Raudolph Horner- Silicon Solutions

State:

Commenter's Main Points:

1. As we look across the global energy perspective, by 2050 we take the generational perspective solar power plus storage will be the predominant energy modality for the whole world.
2. The third panel discussed the necessity of aligning policy so that it fosters infrastructure and regulatory regimes that create access to sustainable energy for all of America, not just for environmental reasons.
3. Solar power and storage offers a CAPEX, modest to low operations and maintenance expense and no fuel costs forever.
4. Wind power did not work until there was an alignment of capital, incentives and policies. It will be the same way for solar power and storage. These resources are the most effective and important long-term energy asset for the United States of America in terms of our own needs and in terms of global competitiveness as other economic powers move ahead with their own renewable energy plans.
5. The policies and availability of credit that undergird the deployment of storage will be necessary to make renewable energy the cost-effective, operationally effective, and sustainable in terms of asset value and levelized cost of electricity (LCOE), over time.

6. The next QER will not be backward looking or business-as-usual, but forward looking and will embrace large scale renewable energy and ownership by non-utility actors into the grid.
7. This will reinforce the economic viability of regulated utilities who own legacy assets. If regulated utilities depend upon rate-based investments, but the growth opportunity and grid modernization embraces the deployment of private capital as directed by enlightened policy, then the addition of these distributed energy resources to the overall results of grid modernization will, in fact, bolster the investment prospects, the profitability, and even the economic viability of the regulated utilities.

Meeting Conclusion

DOE's Dr. Karen Wayland expressed appreciation to everyone who took the time to present their views and participate in the process. She thanked New York University for the meeting space and the staff of the Department of Energy and Energetics Incorporated. Dr. Wayland mentioned that the panelists' written statements from the meeting will be up on the web within the next 24 hours. She announced that the closing date for public comments is October 10, 2014. A transcript of today's meeting as well as a meeting summary will be posted within the next month and you can find that information at www.energy.gov/qer.

To provide written comments to the process please see: QERComments@hq.doe.gov.