Summary of Presentations and Comments
At the
Quadrennial Energy Review

Stakeholder Meeting #7: Denver, CO
Gas-Electricity Interdependencies
July 28, 2014

Opening Remarks

Dr. Karen Wayland, Deputy Director for State, Local and Tribal Cooperation, Office of Energy Policy and Systems Analysis, United States Department of Energy (DOE)

The stakeholder engagement process is very significant to the Quadrennial Energy Review (QER) process. Information from these meetings will be used in our analysis and recommendations that will come out at the end of the year. It is my pleasure to introduce you to our officials' panel.

Dan Utech, Special Assistant to the President for Energy and Climate, the White House
Main Points:

1. President Obama is committed to an "all-of-the-above" energy strategy. We are undergoing a transformation of our nation's energy sector:
    a. America now produces 7.4 million barrels of crude oil per day and produces more crude oil in America then we import from abroad. We are now the top natural gas producer in the world and renewable energy has become significantly less expensive.

   b. Technological advancements in carbon capture technology, in the automotive industry, and in nuclear plants, combined with the factors mentioned above, created new jobs and reduced carbon emissions (11% reduction from 2007 to 2013). We are planning for a 17% reduction from 2005 levels, by 2020.
   c. By 2030, EPA's power generation regulations will reduce carbon emissions by 30% from 2005 levels. The regulations will also reduce particle pollution, leading to positive externalities in the form of health and climate benefits, all while maintaining a reliable electrical grid and promoting fuel diversity.
2. The inspiration for the QER stems from the many recent developments in the energy sector.
3. Natural gas and electricity networks are essential to economic vitality and to the way of life.
   a. The biggest driver of the natural gas revolution is the rapid increase of shale gas production. We are the largest gas producer in the world. The Marcellus region alone represents the 7th largest producer.
   b. The change in the location of supply has brought with it new infrastructure challenges. About $300 billion in investments will be added between today and 2025, in midstream infrastructure changes.
   c. Our goal should be to strengthen reliability and resilience and establish better coordination processes between the natural gas and electrical sectors.
4. The rapid changing landscape has led to some interesting challenges, but working together we can take advantage of these challenges.

Honorable Pamela Patton, Commissioner, Colorado Public Utilities Commission
Main Points:

1. Natural gas plays a critical role in the electric power industry and will play an even more important role in the future in terms of reliability, safety, costs to ratepayers, flexibility, and environmental benefits.
2. Colorado is a great place to have the conversation on natural gas-electricity interdependencies. According to the Energy Information Administration, Colorado is ranked 7th overall in energy production and 6th in natural gas production. Ten of the nation's top 100 natural gas fields are in Colorado and 35,000 jobs were created in the energy sector from 2003-2013.
3. Colorado committed to addressing environmental issues and passed the Clean Air-Clean Jobs Act, which requires utilities to retire 900 megawatts of coal generation, and to replace coal generation with natural gas. Last year, Colorado wrote first-in-the-nation regulations on methane emissions from oil and gas production.
4. Colorado does not face the capacity-constraint issues seen in the Northeast and other portions of the country.
   a. From 2007 to 2012, Colorado experienced a 38% increase in natural gas production. In 2009, Colorado completed the Rocky Mountain Express pipeline, which was the largest natural gas pipeline built in the U.S. in more than 20 years.
   b. Approximately 75% of the homes in Colorado are heated with natural gas.

c. Industry uses natural gas for integrating renewables. Colorado's current renewable portfolio standard (RPS) requires investor-owned utilities to provide 30% of overall generation from renewable energy sources, by 2050. Colorado has been able to bring more wind and solar renewable resources online because utilities are able to rely on natural gas supplies when renewable resources are not sufficient to match demand.

5. Natural gas and electric systems will become increasingly interconnected. Adequate natural gas supply and capacity are needed throughout the country to ensure that our nation's needs are met. Utilities, regulators, and policy makers need to develop and implement the right framework to ensure that the electric generation sector and the natural gas production markets function efficiently and reliably in the decades to come.
    a. While making these decisions, it is important that unintended consequences be considered. Western states rely heavily on natural gas for home heating. Given the importance of natural gas for home heating, the U.S. must be prepared for winter spikes in demand.

Panel I: Transmission – Can We Build and Operate the Appropriate Amount for Future Needs?

The natural gas and electric systems are increasingly interdependent. What are those interdependencies, in both directions, now and through 2030? There are a number of national, regional, and local efforts underway, both by industry and government, to improve forecasting, nomination, schedules and other forms of operational coordination between the two sectors. Are these efforts sufficient? If not, what additional efforts may be needed, and by whom? Are there any actions that the federal government should take, and if so, what is the appropriate role?

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

Presenter Name: Ms. Rae McQuade
Affiliation: President and Chief Operating Officer, North American Energy Standards Board (NAESB)

Main Points:

1. The gas industry standards board was the predecessor (working on it for 20 years) to the discussions that we are having today.
2. In 1994, the industry began to develop gas transmission nomination timelines.
3. In 2000, industry standards development was broadened to support wholesale and retail energy standards.
4. In 2004, Northeast gas/electric harmonization issues were addressed with an eye toward making standards to better manage interconnections.
5. In 2011, the Natural Gas Council published a development report which asked the industry to continue efforts to harmonize interactions between gas and electric markets.
6. In 2012, NAESB produced a report with recommendations:
    a. Greater flexibility in schedule
    b. Unsupervised market clearing times
    c. Availability of information to specific market entities
7. These standards have not been implemented, yet:
    a. Regulators are still being asked what they think should be done.
    b. The Federal Energy Regulatory Commission (FERC) proposed a set of regulations.
        i. Need to determine if these timelines are acceptable or need adjustments to offer to FERC. Comments due by end of September.
    c. A gas and electric harmonization group has been created to look at timelines and proposed recommendations:
        i. Recommended smaller number of nomination periods
        ii. Did not recommend a specific gas day start.

Presenter Name: Kelli Joseph
Affiliation: Senior Gas & Electric Analyst, New York Independent System Operator (NYISO) on behalf of ISO-RTO Council

Main Points:

1. Natural gas is the new fuel of choice for electricity generation in the United States. Gas fired plants accounted for 6,861 megawatts of new generation in 2013, just over 50% of all new capacity additions.
2. Two-thirds of all electric consumers in the United States are served by an Independent System Operator (ISO) or Regional Transmission Organization (RTO).
    a. Half of the total installed capacity in the ISO/RTO regions comes from natural-gas fired generation. Depending on the location of the plant, generators can be directly connected to an interstate pipeline, or can be located behind a gas local distribution company (LDC).

3. The gas and electric markets have different operating days and different scheduling times. Generators do not know their day-ahead electric schedule before the close of the day-ahead gas timely cycle ends.
4. Generators in organized energy markets rely on secondary released capacity or interruptible transportation contracts, many times purchased through marketers. These markets are less liquid during weekends, holidays, evenings, etc.
5. FERC is working on better coordinating the gas and electric markets.
    a. FERC technical conferences were held in 2012 and 2013, which examined issues related to scheduling and market timing differences, as well as communication and information-sharing.
    b. FERC Order 787 permits ISO/RTOs and interstate pipelines to share non-public, operational information with each other for the purpose of promoting reliable service or operational planning on either system.
    c. FERC's Notice of Proposed Rulemaking (NOPR) proposes modifying the gas operating day (from 9am-9am CT to 4am-4am CT); Modifying the timely cycle nomination (from 11:30am CT to 1pm CT); and modifying the intra-day cycle times, as well as including additional intra-day cycles.
6. The ISOs/RTOs continue to support the 4am (CT) start to the gas operating day. Moving the gas operating day to an earlier time allows generators to nominate gas in the day-ahead timely cycle to cover the morning and evening peaks of the same electric day.
7. The DOE-funded "Gas-Electric System Interface" study is a good example of a public/private initiative to find solutions to gas-electric issues:
    a. Target 1: Develop a baseline assessment, including descriptions of the natural gas-electric system interfaces, interaction effects, and specific drivers of the pipeline/LDC planning process. (Completed)
        i. Reported that the natural gas infrastructure was not designed to meet the coincident gas requirements of: 1) the higher priority core gas loads associated with gas utilities sent out to residential, commercial, and industrial loads, and 2) the lower priority non-core gas loads associated with gas-fired generators lacking primary firm transportation entitlements.
    b. Target 2: Evaluate the capability of the natural gas systems to meet individual and aggregate core and non-core gas demand over a 5- and 10- year time horizon. (Preliminary draft available)
        i. Identified gas system infrastructure constraint points and evaluated infrastructure adequacy to meet generation on winter and summer peak days.
    c. Target 3: Identify contingencies on the natural gas system that could adversely affect electric system reliability, and vice versa.
    d. Target 4: Review the operational/planning issues affecting the availability of dual fuel capable generation, including fuel assurance objectives.

Presenter Name: Lynn Dahlberg
Affiliation: Director, Marketing Services, Williams – Northwest Pipeline Group and on behalf of the Western Gas-Electric Regional Assessment Task Force

Main Points:

1. In addition to traditional customers, such as local distribution companies and industrials, interstate pipelines have been serving gas-fired generators reliably for decades.
2. Interstate natural gas pipelines have consistently demonstrated the reliability of the natural gas system for customers that contract for firm pipeline transportation. Gas-fired generators, served with the appropriate mix of natural gas pipeline and storage services, can ramp-up quickly to meet the demand for electricity.
3. The FERC identified two items it could address on a national basis to improve gas-electric integration – encouraging communications between the two industries and reconciling the mismatch between the electric day, which starts at midnight in each time zone, and the uniform national gas day beginning at 9 am Central Clock Time (CCT). FERC must take into account all pipeline customers and regional differences.
4. The two factors that most differentiate regions across the U.S. are: (1) whether the electric market in the region is an organized market or a bilateral market; and (2) the utilization level of the natural gas transportation system in the region.
    a. In organized markets, merchant generators have no incentive to contract for firm pipeline transportation of natural gas. These markets exist in the East, Midwest, and California. In bilateral markets, like the Northwest, power plants can recover the costs of holding firm transportation contracts through rates approved by the state's public utility commission.
    b. In the Northeast, pipelines often run full during peak demand periods (winter heating season). The Northwest, in contrast, has adequate pipeline capacity to meet the needs of its electric generation customers.
5. Should a region choose to rely on natural gas and gas-fired generation, pipelines stand ready to build the necessary infrastructure to serve increased demand. To do so, pipelines must receive firm contracts to support the long-term investment in these assets.
6. FERC should not impose changes to the national gas day to address concerns in one region, to the detriment of another.
7. Should a region wish to rely on natural gas-fired generation to support electricity reliability, it should ensure that the electric power industry subscribes for the firm transportation contracts necessary for timely pipeline expansions. Changing the gas day and pipeline scheduling alone, without these changes to organized wholesale electric power markets, will not address electric reliability in wholesale electric power markets.

Presenter Name: Joe M. Holmes
Affiliation: Lead Energy Trader, Colorado Springs Utilities and on behalf of the American Public Gas Association

Main Points:

1. The issue of interdependency is important because it will change the way interstate natural gas pipelines provide services to distributors.
2. Current transmission system works for some customers. We need to accommodate the growing electric power generation customers while protecting existing customers.
3. The American Public Gas Association recognizes the need to have pipelines that meet need of all customers and aggressively represents customers with respect to cost increases and system operations.

Panel Questions and Answers

Q: What further coordination efforts can industry and government work on together, beyond the FERC NOPR, and beyond the North American Electric Reliability Corporation's (NERC) standards?

Rae McQuade

- We need more discourse on the potential solutions to these issues. Many of the issues are relatively understood, but the main concern is that there is no silver bullet to answer them. Solutions will need to vary by region.

Kelli Joseph

- These are very complicated, very challenging issues. Fostering discussion to bring up new ideas and new solutions would be a good place for the federal government to step in.
- We have proposed having two gas days (one in the West; and one in the East), both sharing a common energy day.
- We should look further into what we can do with gas storage to address some of the issues.

Lynn Dahlberg

- If there was adequate gas infrastructure all around country, we would not be talking about gas and scheduling. Incentives are needed for generators to take on firm, fixed-delivery contracts.

Joe Holmes

- It seems that at this point that we are facing financial issues. The pipeline corporations want to build pipeline. We need to find the revenue at the RTO/generator level to pay for the construction.

Q: What reforms are useful that answer the structural/financial issues regionally?

Kelli Joseph

- It will take a big effort to understand both the electric and gas systems and how action on one system impacts the other.

Q: What about in Non-RTO/ISO regions?

Joe Holmes

- There is a need to increase capacity/storage specifically for balancing. Ratepayers will need pay for this.

Lynn Dahlberg

- We need storage to have adequate supply and system reliability.

Q: We have heard today about the scheduling difficulties because gas and electric markets have different operating days and different scheduling times. Thinking about these difficulties, how does this play a role in the new development of the electrification of the gas industry?

Rae McQuade

- NERC plays a major role in looking at this issue.

Kelli Joseph

- There is an Eastern Interconnection study on how electric contingencies impact gas, and vice versa.

Lynn Dahlberg

- At this time there is no central planning mission or arm.

Joe Holmes

- We need to look at system as a whole.

Lynn Dahlberg

- In the Pacific Northwest, all of the major and minor players met and discussed various "emergency scenarios."
- The federal government could encourage more discussion between the gas and electric industry.

Q: What should be the role of the federal government?

Joe Holmes

- The federal government can help to ensure that there are no cross subsidies being taken advantage of, and should be careful in dealing with major issues and not attempt to force a one-size-fits-all solution.

Lynn Dahlberg

- Regions must find a way to take care of the timeline management issues and generators need to have the incentive to make their product more reliable.

Kelli Joseph

- Look at the way that traditional financing and the builders of interstate pipeline networks have worked.

Rae McQuade

- DOE should coordinate the efforts to come up with an all-inclusive solution.

Q: Is it important to build additional public/private partnerships?

Rae McQuade

- It is crucial that agencies work with trade associations to get people speaking the same language, and ensuring that solutions do not come from one single perspective.

Kelli Joseph

- The Independent System Operator of New England is building a working group to talk about these issues. It is important to generate consensus from various interest groups.

Q: Can gas storage and efficiency efforts eliminate the need for more pipelines?

Kelli Joseph

- There is a role for gas storage and developing markets around storage and making it more accessible.

Lynn Dahlberg

- Some storage is being used for balancing. In the West, it is put it into customer rates, which pay for it.

Joe Holmes

- Storage is an important part of the solution.

Lynn Dahlberg

- With storage, gas generators could call for gas 24 hours a day. They would not require a nomination cycle and would be able to adjust for any forecasting errors in the next cycle.

Q: What are your final recommendations to the QER Task Force?

Rae McQuade

- Scheduling is a critical issue for the gas and electric markets, which need to be better harmonized. All regional opinions need to be brought in to find a solution that works for everyone.

Kelli Joseph

- My recommendation would be to think though how the different gas markets operate and look for ways to harmonize the various markets.

Lynn Dahlberg

- This must continue to be a collaborative effort. The end solution(s) will need to work for everyone.

Joe Holmes

- We need to consider the range of issues when developing a new gas day and scheduling parameters.

Panel II: Infrastructure Needs through 2030

The natural gas industry and the electric industry use different processes to plan, finance, and build their respective infrastructures. In some areas of the nation, those disparate processes are causing concerns about the lack of adequate gas infrastructure to meet the evolving needs of both the electric industry and gas industry, from a reliability and affordability stand point, over the coming decades. What is the state of efforts to assure the appropriate amount and type of natural gas infrastructure or alternatively, appropriate changes in electricity infrastructure, operations or end use, now and through 2030?

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Presenter Name: David Eves
Affiliation: President and Chief Executive Officer, Public Service Company of Colorado

Main Points:

1. Natural gas is an extremely important part of our strategy to reduce emissions. We have 2,400 miles of high-pressure pipeline. As a corporation, first and foremost, we ensure the safety of the pipeline network. We have been replacing older pipes and installing 16-24 inch lines, in place of 8-12 inch lines.
2. With the high level of renewable energy integration (at some point we had 60% of total generation in Colorado from wind), the ability to plan for the design day on the gas system, based upon morning/afternoon peak, is changing.

Presenter Name: Curtis Moffatt
Affiliation: Deputy General Counsel and Vice President – Gas Legal, Kinder Morgan, Inc.

Main Points:

1. The Interstate Natural Gas Association of America's (INGAA) most recent study states that:
    a. By 2035, we will need to invest $270 billion in dry natural gas and $43.7 billion in liquid natural gas (LNG) infrastructure. With the addition of 7,500 miles of pipeline, in the 2014-2020 periods; by 2035 we will have added a total of 20,300 miles of pipeline.
2. Industry has used long-term contracts to fund this type of investment for decades. One cannot go to FERC to construct and operate pipelines if there is no demand signed up for it. This is beyond a financing issue.
3. The natural gas pipeline industry serves multiple types of customers: residential, commercial, industrial, and electrical. It must provide services on a non-

discriminatory basis. We need to demonstrate this to FERC, before making any changes that impact customer groups.

Presenter Name: Clifton Karnei
Affiliation: Executive Vice President and General Manager, Brazos Electric Cooperative

Main Points:

1. Brazos has 200 MW of gas-fired generation and we are very dependent on the natural gas industry for generating power. We have firm and interruptible contracts, as well as storage contracts with natural gas suppliers to ensure reliability.
2. This last winter, we faced major issues with delivery to power plants. On 25 days, gas pipelines limited deliveries to no more than nominated supply. At the same time, two peaking plants were called on by the Electric Reliability Council of Texas (ERCOT), which prevented these plants from coming online.
3. As we see more significant coal retirements and intermittent energy from wind and solar, natural gas will become increasingly important. We need more flexibility in the natural gas industry.
4. We support the FERC forward start to gas day and the creation of an hourly gas day to support an hourly electric market. We need to be able to accommodate non-ratable flows.
5. We need more capacity – more pipelines and more storage. We need to have natural gas infrastructure to provide the kind of flexibility required by electric power generators.

Presenter Name: Beth Musich
Affiliation: Director Energy Markets and Capacity Products, Southern California Gas Company and San Diego Gas & Electric Company and on behalf of the Western Gas-Electric Regional Assessment Task Force

Main Points:

1. System ability to provide flexibility is not unlimited. Pipeline supply is needed on the system. We cannot rely on storage alone; especially as we witness more frequent periods of low delivery.
2. The industry can make changes to balancing service, enabling customers to manage usage during times when system is stressed.
3. The Los Angeles/San Diego area has seen major growth of electric generation plants, but this growth is not tied into the system as coherently as the rest of the network. Pipeline development is underway to tie the system in better. In California the use of fuel oil is not permitted, even for backup purposes. We need the safe and reliable delivery of natural gas.
4. Sudden changes in renewable resources require quick-starting plants, from 0-100% in about 7 minutes. Such changes impact pipeline pressure which can cause issues for the overall system.

Presenter Name: Arne Olson
Affiliation: Partner, Energy & Environmental Economics (E3) and on behalf of the Western Natural Gas-Electric Interdependency Study

Main Points:

1. Is the current infrastructure sufficient looking out ten years into the future? Will the gas system have the adequate short-term operational flexibility to meet electric industry requirements?
2. E3 conducted a study which pulled together a technical advisory group of industry leaders to look at issues between the natural gas and electric industries.
    a. Created a mock "stressed" situation in the West.
        i. Retired 50% - 23GW - of remaining coal plants.
        ii. 27% Renewable Portfolio Standard in the Western Electric Coordinating Council (WECC).
        iii. Factored-in high-export sensitivity.
3. Under the "stressed" scenario the Western natural gas infrastructure proved to be adequate with the exception of times of extreme winter weather conditions.
    a. Regions linked and events in one region can cause loss of electric load.
    b. Gas generation that does not contract for firm transportation service may be subject to interruption.
    c. Continued growth of the natural gas generation fleet in the West will require infrastructure expansion.
    d. Increased variability in gas demand caused by higher penetration of renewables can be accommodated – increases variability, but reduces overall demand, which allows for easier management of natural gas flows.

Panel Questions and Answers

Q: Reliability and safety are a top priority, but there is a need for flexible service. What are the steps needed to achieve both of these goals? What are the infrastructure solutions?

David Eves

- Continue to provide improvements to LDCs and work with upstream suppliers on capacity contracts.
- Safety can be increased through modernization.
- Continue to add additional capacity.

Curtis Moffatt

- Perform routine maintenance, repair outdated/malfunctioning systems, and refurbish and replace compressor systems to increase safety and reliability.
- From the Mid-Continent to the East Coast, shift how the systems are being used.

- Compressor stations that have not been utilized in many years are reversing flow to move natural gas the opposite direction.
- Replacing and building new pipe increases capacity, which increases flexibility.

Clifton Karnei
- There needs to be synchronization between gas and electric days.
- Support passage of the FERC NOPR. In the long term we need to ensure that we can deliver natural gas on cold days (which will require more pipes and more storage).

Beth Musich
- California is on the forefront of pipeline safety issues, including replacement and testing older lines. Safety is a top priority.
- Reliability is addressed through good balancing rules and having substantial storage assets, which also play a major role in creating a reliable network.

Arne Olson
- Ensure that generators have firm fuel (natural gas) or backup fuel.
- With high renewable penetration, small forecast errors can cause major issues. Solar and, to a higher degree, wind power are difficult to predict in the near term (4/8 hour ahead scheduling timeframes) and require more flexibility in the market.

Q: How does the increase of renewables impact your system/forecasting/plans for new infrastructure?

David Eves
- Often, wind generated electricity is backed up by a flexible natural gas system. Pumped storage facilities can also act as backup plan for wind generated electricity.
- Flexibility provided through natural gas generation due to low heat penalty and quicker start-stop-times proves optimal.
- Electric generators need to look upstream to the gas industry to move natural gas to all of the various resources within their network.
- The addition of peaking plants, rather than combined cycle plants, will put additional strain on the natural gas delivery system.

Curtis Moffatt
- We can find gains in commercial, residential, and industrial efficiency programs. This will assist as coal plants are taken offline.

Beth Musich
- Peaking plants can cause reliability issues on the natural gas pipeline. As additional quick-start units come on, they cause a sudden and significant drop in pipeline pressure. During these events, one cannot be sure that pipeline pressure will bottom out at safe levels.

Arne Olson

- Parts of the West treats these issues differently, as they face different market structures.

Q: What is going on in the region to address issues of adequate supply of natural gas? Are there public/private partnerships and regional efforts taking place that the federal government should be aware of?

Curtis Moffatt

- In the Southwest, we have accommodated uneven loads for a long time, as there is no storage. An incentive would need to be created for traditional buyers of storage.
- Bilateral markets are backed by firm contracts and do not face this issue. In the Northeast's "organized markets," each market must act in accordance with their public utility commission, but geography does not present an opportunity for storage.

David Eves

- Multiple studies in ERCOT have been undertaken due to the high dependence on natural gas. It is unclear that these studies go far enough.
- As a result of the U.S. Environmental Protection Agency's (EPA) proposed Clean Power Plan, many facilities will be taken offline by 2020, and we need to make sure that we have the infrastructure in place to be ready for this change.
- Long-term planning is done bilaterally, but requires more centralized planning between all of the interconnected companies. More regional coordination will be driven by the Clean Power Plan. This will increase gas generation to recoup the loss of load from coal plants.

Beth Musich

- Partnership with the California Independent System Operator and local balancing agencies made sure that there was enough gas to keep up the electric grid on the very cold winter days.

Arne Olson

- The West has long history of working closely with each other. Going forward, we will work together on how to best handle cold weather events.

Q: What one critical recommendation would you put forward to the QER Task Force?

Arne Olson

- The year 2050 is a major milestone for climate – will we reach two degrees of warming? We can continue to plan for 2030 as if the world will end there; that would be a major mistake. We need to bring in the efforts that currently look at 2050 in isolation, with some of the 30-year planning efforts. We need to start looking at what the world will look like in 2035 and beyond.

Beth Musich

- We cannot look at one industry (gas or electric) without looking at the other. We need to make sure that coordination between the two is prominent. You can lose compressors due to loss of electricity and can lose electricity due to lack of natural gas. How are we going to hold up both sides?

Clifton Karnei

- Support the FERC NOPR – starting gas day by 4 am, moving nomination cycle later. The NOPR is very well thought out and is a good start to the coordination process.

Curtis Moffatt

- DOE can propose rules to FERC. Put forward some ideas on appropriate rate designs. Since there are limited resources at FERC to take on policy issues, the resources of DOE could be used.

David Eves

- Encourage cost recovery for not only interstate, but also intrastate (LDC) pipeline builds to get ahead and build a system that has additional capability, flexibility, safety and reliability. There is a need to do this with aging facilities already, but we will need to invest more and more capital in this, which can build a better system.

Q: What is the impact of access to capital markets? Is there money out there to invest in the types of infrastructure that were discussed on this panel? What are the challenges to accessing this capital?

Curtis Moffatt

- Having credit-worthy customers that can sign contracts to cover debt portion projects is very important. Once credit is established, the pipeline industry does not have issues accessing the markets.

Clifton Karnei

- There is tremendous amount of interest in lending groups, if you have facilities (credit-worthy) backed up with long-term contracts.

Beth Musich

- Ratepayers need to pay for developments to the system. Ratepayers are sensitive to paying any more money and want to see a good reason before paying increased rates. This is the challenge.

Arne Olson

- Recourse to captive ratepayers to finance long-term investments in the West is a challenge.

David Eves
Rate recovery, rate impacts to customers are an issue in Colorado as well.

Q: Final thoughts to provide for the QER Task Force? Are there any gaps that we have missed in our discussion?

David Eves
- The interrelationship between the two industries is a continuous circle and works equally both ways.
- DOE should incorporate consideration in enhancement and changes in the electric market that can provide a benefit or reduce demands of instantaneous natural gas generation.
- We can change the way we sell electricity; demand response programs /interruptible programs in areas with bigger footprints, and markets that have a significant change on demand for natural gas, can make a huge difference.
- Support FERC; make the gas market look more like the electric market–more capacity (more pipelines and more storage). We need to start planning now for what the grid will look like in 2020/2030. We need to take similar action on the gas side. Do not underestimate the effort that will need to be undertaken in five to seven years.

Curtis Moffatt
- DOE must continue to be an advocate for the energy industry. Within the executive branch of government, DOE should work on coordinating better with the U.S. Department of Interior, EPA, Council on Environmental Quality, U.S. Department of Transportation, etc., on issues that the energy industry faces (such as pipeline siting/builds).

Beth Musich
- Support the relationship between the gas and electric industries. Creating a relationship like this when there is an absence of stress between the industries is very important.

Arne Olson
- Focus on longer-term needs – will we continue to replace coal with natural gas generation? Will we need to increase infrastructure to achieve this?
- We need more certainty about investment decisions and how they will play out with the larger plan for the future.
- Introduce more hydrogen and biogas to help balance some of the issues of the electric grid.

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 to introduce themselves, their organizations and make their comments. On the stage representing the DOE were Dr. Karen Wayland, Chani Vines, Matt McGovern, Levi Tillemann, and Kate Marks, all of whom are with DOE's Office of Energy Policy and Systems Analysis.

DOE 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: Brad Bullion
State: California
Commenter's Main Points:

1. Gas day starts is not the problem, it is a symptom of the larger issues at hand.
2. Participants like the structure because it gives them price certainty.
3. There is more than one way, more than one solution, not the same conditions in each market. Learn from other's mistakes.

Public Commenter Name: Pam Silberstein
State: National Rural Electric Cooperative Association
Commenter's Main Points:

1. The 1978 Fuel Use Act restricted use of natural gas for electricity. That was not that long ago.
2. There has been an incredible revolution and changes have been very fast, everyone is running to keep up.
3. The QER Task Force should consider the impacts of EPA's Clean Power Plan. We need gas infrastructure now to accommodate the impact of whatever changes come from EPA'S regulations.
4. There needs to be more coordination among federal agencies.

Public Commenter Name: Doug Larson
State:
Commenter's Main Points

1. The QER Task Force should pay attention to methane and ethane leakage, which may lead natural gas to be as large of a greenhouse gas emitter as coal.

Meeting Conclusion

DOE's Matt McGovern expressed appreciation to everyone who took the time to present their views and participate in the process. He announced the next series of meetings which can be found at www.energy.gov/qer. He recognized the hard work of the DOE and Energetics Inc. staff, thanked the panelists and attendees, and he adjourned the meeting.

To provide written comments to the QER process, please submit comments to: QERComments@hq.doe.gov.