Issues at the Interface of the Gas and Electric Industries
Initial Comments from the Western Gas-Electric Regional Assessment Task Force

The following is a compilation of comments from the 13 Task Force members who responded to our request for their views on the issues we should address at the interface of the natural gas and electric industries. Some members provided their comments as issues or concerns and others provided study specific parameters they would like to have included. Thus some of the categories into which the comments are organized can be considered "issues," and some, common segments or phases of an interdependency study.[1] The bulk of the comments are in three areas: (1) operational issues; (2) resource adequacy and infrastructure assessment; and (3) cost allocation for infrastructure and firm services (policy). The following sections incorporate all of the comments provided:

The comments are included verbatim without using quotes –any adjustments made were only minor corrections or a few words to provide context that may have been lost when separating one comment from the author's full set. The initials at the end of each comment indicate the author and a legend for the initials is included at the end of the report. Endnotes are provided by staff to provide further explanation or resources relevant to a comment. Staff comments are included in the body of the document to provide additional information the Task Force may want to consider.

I. Overarching Priorities

A. "Regionality" as a Key Study Consideration

Regional differences were described in a number of comments both in terms of potential vulnerabilities and best practices (see for example, operational issues, resource adequacy and infrastructure assessment, and solutions and mitigation plans). (Staff)

Fundamental differences are important in understanding how the two industries plan for the long-term, communicate with each respective stakeholder, and operate within different regulatory frameworks. In the west this would obviously entail differences even within the WECC Region (Desert SW, California, Northwest) (JM)[2]

The West is really driven by local utilities and State authority. . . . Our view is that utilities and their generators should work to make sure that the system is reliable and that customers are served at a reasonably low cost. (LN)

B. Build a sustainable process

A sustainable process should be implemented for ensuring that the quantitative analysis is performed and refreshed on a regular planning cycle. (HJ)

C. Build on existing work

I would suggest that this task force begin with education and with the goal of developing best practices in the region. There are some issues that are more important in some areas than in others, non-jurisdictional entities should be included as well, and I am sure that the details will evolve over time, but developing general guidelines will likely be helpful to those involved. (LN)

BPA is working through regional groups such as the Pacific Northwest Utilities Conference Committee (PNUCC), the Northwest Gas Association (NWGA), and ColumbiaGrid to assess issues within our footprint. A joint PNUCC/NWGA joint assessment has concluded that there is presently enough capacity to meet existing I-5 Corridor winter peak firm gas demands with all major pipelines and storage facilities in service, but with little margin. ColumbiaGrid has recently launched a detailed technical investigation of transmission system reliability issues that could result from a potential limitation in natural gas supply to generation in the I-5 corridor. (HJ)

This effort is ongoing in some areas—so we don't need to reinvent the wheel; we just need to look for ways to continuously improve what we are doing (CR) (referring to regional groups that are studying the adequacy of critical infrastructure and other interdependency issues)

Four examples of model inter-industry efforts in the West are the following: (1) the Northwest Mutual Assistance Agreement for cooperation and assistance in gas supply emergencies established under the auspices of PNUCC and the NWGA;[3] (2) the Procedures for Gas Derates and Outages established by the California ISO;[4] (3) the gas-electric coordinated training and table top exercises established by Kevin Johnson, Kinder-Morgan Pipeline (formerly El Paso Pipeline);[5] and (4) the NW Power and Natural Gas Planning Task Force.[6] (Staff)

D. Generally agree with approach presented at the October 4 CREPC/SPSC meeting[7]

In general, I was in agreement with ICF's approach on infrastructure assessments. (JM)

The purpose of this kind of assessment would be to determine if more complicated engineering/hydrology analysis would be worth pursuing . . . consistent with the explanation given at the Oct. 4 SPSC/CREPC meeting. That is, the first step would be to decide whether more complicated analysis is justified. (PP)

This also appeared to be implicit in many of the comments as many were organized in a similar fashion or covered many of the same issues. (Staff)

II. Operational Issues (communication, coordination, scheduling, etc.)

Scheduling Timelines: Pipelines should be open to discuss changes to the national gas scheduling timeline if it allows generators with firm transportation to more accurately match supply and deliveries. But progress in this area depends on the electric industry agreeing to a set time for next day activity and for producers to agree to support with physical flow changes. (SH)

Concerned that scheduling differences between electricity and gas (day-ahead and hourly electric vs. daily gas, no day-ahead scheduling on electric side) that might leave a vacuum when weather changes drastically. (CK)

Long-Term Planning: Coordinated Planning and Pipeline Infrastructure: There is currently no framework for coordinated planning between pipeline and electric industry. (JM)

Customers often want to wait to make infrastructure commitments too close in time to the need. The Permitting, right of way (ROW) and FERC certificate process can take considerable time. Consider how to sync planning horizons. (SH)

Generators and electric utilities, in coordination with regional planning authorities (regional transmission organizations and planning authorities in non-organized markets), should consult with pipelines early in their planning processes if they anticipate the need for additional pipeline capacity or transportation service. (JC)

Communications: How do the utilities/generators communicate with gas transportation and supply? Are there internal best practices? (LN)

Communication between the electric and gas industries is an issue of concern. (RW)

Recent disturbances have demonstrated the need for better communication between gas and electric operators during emergencies. FERC Order 587-V requires gas pipeline operators to provide notification to electric system counterparts on operational flow orders and other critical notices beginning December 1, 2012.[8] (HJ)

Survey natural gas plant operators to determine their awareness/preparedness for BA/RC communication in critical situations (assumes PPGC[9] is not mediating such communications). (CW)

Education & Communication is paramount to success:

- Both industries need to understand how the other industry works and what issues are considered critical to reliable operation
- Greater understanding allows the for reasonable solutions to be developed
- Communication enhances understanding – just having a dialogue breaks down barriers

- Communication must be meaningful and relevant – i.e., a system operator subscribing to an interstate pipeline's shipper notice list is going to result in a lot of useless information that will eventually get ignored, even when a critical notice comes out
- Communication protocols must be established for use during extreme weather events, near emergencies and emergencies—regional networks must be established to react in a coordinated and collaborative manner (CR)

Coordination: Concerned about the lack of coordination between electric generators/utilities and gas pipelines (CK)

Coordination has been improved in the Pacific Northwest through the gas/electric coordination through the PNUCC/NWGA Power and Natural Gas Planning Task Force. Examples including the Northwest Mutual Assistance Agreement (NMAA) and joint emergency drills. (HJ)

Best Practices: CAISO and others have discussed how stakeholders should form industry groups to communicate in emergency situations such as power station outages, so that they are not strangers when the time to act together comes. I would support such efforts; it makes sense to have stakeholders communicate to smooth out their aggregate needs for the benefit of the group as a whole. (MF)

Study Operational Differences: A primary issue of concern would be to study the key differences in standard operating procedures between the two industries that prevent seamless operational interaction. (MJ) If substantially more gas is needed for electric generation, a number of changes will be needed by both the gas and electricity industries. Some of these include changes in nominating and balancing services, curtailment rules and subscription levels on interstate pipelines. It will be important to understand the differences in operation of the natural gas and electricity systems, including:

- The extent of mismatch between natural gas industry nomination and scheduling natural gas day versus electricity scheduling and dispatch. Natural gas is nominated before electricity dispatch is determined and electricity markets operate on weekends, but natural gas markets do not. A thorough examination of these scheduling and nomination practices will be important.
- The extent to which tariff provisions require transporters to match nominations to their usage (balancing requirements) and the ability to provide the additional flexibility electric generators need. Currently, electric generators that take more natural gas than what they have scheduled are subject to fines. If they schedule more gas than they actually use, then they incur a financial loss. For reliability purposes, natural gas generators need to be able to quickly respond to system conditions.
- How different natural gas pipelines and state regulators treat curtailment when supply or pipeline capacity is constrained. In California, large customers like electricity generators, which are non-core customers, are the first to be curtailed when gas shortages occur. In other parts of the Western Region electric generators are also curtailed before residential or commercial gas customers. It has been suggested that natural gas pipelines, electric generators, and compressor stations should be recognized as critical elements in

providing for public health and safety and therefore they should not be subject to curtailments. The feasibility of this should also be assessed. (MJ)

In addition, the February 2011 cold weather event that caused rolling outages of electricity in ERCOT and natural gas curtailments to parts of Texas, New Mexico, Arizona, and Southern California helped demonstrate the importance of operational issues. Some of the operational issues resulting from this event that should be examined are the following:

- The need to ensure continued operation of important natural gas facilities that are operated with electricity and the protocols needed to ensure continued operation of those facilities during rolling electrical outages.
- The need for more advance information about the status of natural gas pipelines, and what the pipelines and local natural gas distribution companies might be doing to prepare for extreme weather events.
- The need for both industries to share data on maintenance, outages, and emergency events. Better information sharing can give both industries more time to respond and reduce the impacts of such events. (MJ)

Operational Planning (1 day to 1 year):

- Seasonal and day-ahead "observability" on the availability of fuel and generator requirements for operational reliability reserves: Are generators providing operational reserves on an interruptible contract?
- Development of agreed upon operational procedures and nomination scheduling for gas delivery: (1) Generator commitments and dispatch that do not match fuel nominations; and (2) Use of flow control and interruption rights will increase for firm AND non-firm customers
- Gas Supply Disruptions: Pipelines are able to operate with a temporary supply disruption, provided the gas pressures are maintained within acceptable limits. However, within a relatively short time, a major failure along an interstate gas pipeline could result in a loss of electric generating capacity that could exceed the electric reserves available to compensate for these losses. Maintenance should also be considered.
- Dual-Fuel Assessments: Seasonal preparations to ensure capabilities of dual-fuel gens (ramp time, inventories, preparedness) are sufficient (JM)

Operations (Real-time to 1 day):

- Information and visibility of supply availability and gas flows
- Coordinated execution of operating and emergency procedures
- Documented plans should be developed for how the two industries will coordinate during emergencies (JM)

The NAESB Gas-Electric Harmonization (GEH) Committee Report was issued in September 2012 and the recommendations therein approved by the Board with a unanimous vote. The Committee identifies three areas where existing standards could be revisited with an eye towards modification: (1) market timelines and coordination of scheduling; (2) flexibility in scheduling; and (3) provision of information. These items will be included in the 2013 work plan as "provisional."[10] (Staff)

III. Resource Adequacy & Infrastructure Assessment

There were many comments recommending elements that would be included in Phase I and II of what was presented by staff at the October 4 CREPC/SPSC as the framework for a regional infrastructure assessment: Phase I - inventory of existing system; and Phase II - trends and adequacy in an expected future. Those comments are included in this section.

Coordinated Planning and Pipeline Infrastructure (Long-Term Planning): Planning studies needed to determine whether pipeline system is sufficient for projected gas-fired generation. (JM)

A primary issue of concern: The adequacy of the natural gas infrastructure system to reliably meet growing demand from electric generation. (MJ)

Pipelines shifting to oil service and the impact on the adequacy of the natural gas pipeline system. Natural gas pipeline can be shifted to oil service as is being contemplated by El Paso Natural gas. El Paso has announced it is preliminarily considering converting a large portion of its existing gas pipeline to oil service, thereby depriving CA of used and useful natural gas capacity, and the link between parties not signing up for firm pipeline transportation service and the existing guidelines using firm service as the measurement tool as to whether pipelines can abandon existing pipelines. (MF)

Regions and sub-regions need to identify how interdependent the industries are in their area:

- Take inventory of gas-fired generation facilities and electric driven natural gas compression
- Determine if such facilities are critical assets (likely)
- Take inventory of which generation facilities have alternate fuel capabilities
- Determine if critical facilities are sufficiently firm to be considered a firm resource
  - Are electric driven compressors on a non-firm rate schedules?
  - Do gas-fired generators have access to firm resources (storage, firm pipeline capacity, delivered supply arrangements, alternative fuel)? (CR)

Identify key components of the supply chain from production to burner-tip (with respect to generation). The goal is a relatively simple check on each critical component of gas infrastructure that such infrastructure is sufficient to meet peak capacity needs and flexibility to ramp up/down. (PP)

- **Supply-Side:**
  - Processing facilities: Peak/sustained peaking capability.
  - Production Upstream of Processing Facilities: Gas production capability, peak and up/down ramping capability.
  - Pipeline: Peak transport capacity and some measurement of pack/drafting capability (complicated-it is state dependent)

- Storage: Max injection/withdrawal, max storage capacity, withdrawal and injection rule curves (physical vs financial?)
- Distribution: Inventory whether gas-fired generation has firm distribution capacity if connected to LDC. (PP)

- **Demand-Side:**
  - Peak Loads by relevant zone-LDC, Generation, Transport Customers
  - Sustained Peak Loads by relevant zone
  - Swings in load by relevant zone--LDC, Generation, Transport Customers (PP)

- **Electric Transmission Specific:**
  - Engineering/flow studies on importance of gas fired generation to grid stability.
  - Example: Columbia Grid study on normal peak...expand to examine a few data points as temperature deviates from normal.

The purpose of this kind of assessment would be to determine if more complicated engineering/hydrology analysis would be worth pursuing... That is, the first step would be to decide whether more complicated analysis is justified. (PP)

Identify all interstate pipeline areas that are end-of-line (i.e. there are no other interconnecting pipelines or injection points) (CW)

Estimate dig-in pressure loss rates for each end-of-line area. (CW)

Identify all natural gas generation facilities with their own compressors and determine total amount of generation dependent on each compressor. (CW)

Trend line-pack and other critical pipeline data for baseline analysis and historical evaluation. (CW)

End of Pipeline: California, which is located at the end of the major interstate pipelines, is particularly concerned that it has sufficient supply and pipeline capacity to reliably deliver natural gas to electric generators, especially during stress conditions. An assessment of the current and potential natural gas pipeline infrastructure will help inform regional entities on needed additions. The following issues should be addressed:

- The recent and projected utilization of pipelines throughout the Western Region to determine the amount of spare capacity on the pipeline system. The changing pattern of flows of natural gas on pipelines as new additions have been made to the system and new shale gas has come on-line, and possible changes in flows on pipelines in the next ten years are important aspects in determining adequacy of pipeline infrastructure. (MJ)
- The need to explicitly address the "reliability" of natural gas infrastructure. Currently pipelines are only built or capacity increased when a financial opportunity exists, since the market establishes the need for new infrastructure under FERC regulation. Unlike the electricity system, no one is checking into the overall "reliability" impacts of new pipeline additions or the addition of new electric generation loads on the system. (MJ)
- The status of pipeline additions and potential abandonment of existing pipelines in the Western Region, as well as pipelines being constructed to export natural gas to Mexico

and Canada. In particular, natural gas export to Mexico for planned gas-fired generation could reduce supplies available and impact pipeline availability. (MJ)

- A 10 year outlook for demand in the Western region for electric generation to assess the adequacy of pipelines infrastructure to deliver sufficient natural gas to prospective gas generators. While natural gas may displace coal generation and existing transmission and other infrastructure could be used by new gas fired generators, the location of these sites relative to the natural gas pipeline system is an important factor in determining whether existing pipelines can serve electric generators. (MJ)
- The changes in balancing requirements between deliveries into the interstate pipeline system and the quantity of gas consumed by end-users that may be necessary to accommodate natural gas generation, since natural gas plants burn fairly large quantities of gas and can result in significant imbalances. (MJ)
- Any environmental policies that may affect pipeline transportation rates or utilization rates (e.g. the EPA advanced notice of proposed rulemaking on PCBs.[11]) (MJ)
- A close examination of any potential pipeline capacity constrained areas since storage can sometimes act as a substitute for transportation. Both storage and transportation should be evaluated in circumstances where both options would be beneficial. (MJ)
- The extent to which electric generators have alternate fuel capability in the event of natural gas curtailment. (MJ)

Regions and Sub-regions should identify the adequacy of critical infrastructure. The electric industry oftentimes has bodies that do this on a regional basis, but such analyses generally take into account generating and electric transmission adequacy and establish certain reliability criteria that have to be met by generators and system operators, without consideration of natural gas adequacy; the gas industry does it at the utility level and pipelines expand to meet customer needs as they arise. Both methods have proven successful, but as interdependency increases, collaboration and coordination between the two sectors are paramount:

- Determine codependent demand and service requirements (what type of service is required, do the sectors have coincident critical peaks, etc.)
- Determine adequacy of current infrastructure and service offerings
- Evaluate shortfalls and determine need for pipeline or storage expansion or service offerings to meet operating needs
- Determine if there needs to be changes to operating rules and/or regulatory framework, either regionally or nationally (CR)

Pipeline capacity: A number of pipeline companies are considering changing the character of their service for underutilized natural gas pipeline infrastructure (i.e. gas to oil conversion). A canvas of all pertinent pipeline capacities and proposed changes of service should be addressed. (SH)

Interstate/Intrastate Pipeline Flexibility: Due to the current natural gas environment and the potential need for more flexibility when it comes to ratable service, the ability of a pipeline to handle non-ratable takes should be evaluated. For instance, in Transwestern's opinion, the very

best way to serve generation loads is to take their needs into account in the design of the facilities. Pressure, hourly rates, sculpted volumes are all important characteristics of designing service for generation shippers. For Transwestern, the 16-hour day allowed in our FTS-5 rate schedule is an important first step in recognizing load profile. (SH)

Concerned about intra-day flexibility for gas generation, is there enough, are there times of year where limits exist and others where it does not. (CK)

Study firm nonfirm availability: The need to take into account that while a natural gas-fired unit may be physically present, it may not have the necessary firm natural gas delivery capacity or supply contracts that would ensure they could operate in extreme conditions. (MJ)

Concerned about the reliance by electric industry on non-firm transportation, especially for "peaking" gas units. (CK)

Dual-Fuel Assessments: Understand the capabilities of dual-fuel gens (ramp time, inventories, preparedness) (JM)

Peak day requirements: Concerned about the heavy reliance on storage (gas and diesel) to meet peak day requirements on system. (CK)

Supply: The unprecedented growth in shale production is expected to contribute greatly to the future gas portfolio. The shales will likely make a significant contribution to the U.S. supply portfolio—potentially doubling over the next 20 years. (JM)

Assumptions/standards/criteria. Apparent lack of pipeline models that evaluate loadings beyond peak planning day. Electric utilities use hourly fundamentals-based models for their work. (CK)

Resource adequacy studies assume fuel is always available (fuel expectations for hydro, wind, and solar are generally considered and convoluted into analysis). Common-mode failure to generation not considered in probabilistic resource adequacy studies (i.e., February 2011 Cold Weather Outage). Independence is assumed. (JM)

Clarification is needed on acceptable performance criteria during a gas supply shortage. The gas system is planned to meet firm peak loads under the assumption that all major pipelines and storage facilities are in service. The electric system is planned to withstand single contingencies and common mode contingencies in accordance with the NERC TPL Standards. Because these standards don't apply to pipelines, the electrical performance requirement of pipeline outage affecting many generators in a load service area is unclear. (HJ)

Potential enhancements to NERC Reliability Standards: Planning studies should review and assess impacts from lack of fuel and potential pipeline disturbances (JM)

Contracting decisions made by the electric industry drive electric reliability. A central question that must be answered by the electric industry is: How much pipeline capacity is needed to ensure electric reliability? (JC)

What is needed to maintain an appropriate level of reliability?

- How do you study what is needed?
- Is there a seasonal (winter vs. summer) difference?
- What impact does non-dispatchable generation have?
- Does the resource planning process include fuel reliability? (LN)

Include regional specific issues, for example in the Northwest:

- Use of Natural Gas in the I-5 corridor and associated storage (Jackson Pairie). How this will change with the closure of Centralia in 2020 and 2025
- Divesture of Coal in PNW (Centralia and Boardman) and in California (Reid Gardiner, San Juan, Four Corners - 2,000 MW of coal import)
- Lack of fuel diversity on West Coast in 10 years (SONGs could also be out, Diablo Canyon may not relicense)
- California at 33% rps and gas ramping - impact of fuel delivery to these flex plants (RD)

Region specific issues (NW): A joint PNUCC/NWGA joint assessment has concluded that there is presently enough capacity to meet existing I-5 Corridor winter peak firm gas demands with all major pipelines and storage facilities in service, but with little margin. (HJ, repeat)

Region specific issues have inter-regional impact: From a natural gas reliability perspective, California is relatively well-prepared compared to her neighbors. California has natural gas storage facilities and access to multiple basins in Canada, the Rockies, and the Permian and San Juan basins, via multiple pipelines. This means California can react better to ebbs and flows of electric demand due to reasons as varied as heating/cooling to renewable energy intermittency to unplanned power plant outages. The Pacific Northwest is also well-situated, having access to Canadian gas as well as gas that could be flowed up from Ruby, tapping into the Rockies basins. The largest and most contentious problem in the West is in the Southwest, where extreme temperatures can affect electric demand and therefore natural gas demand (due to natural gas power plants) on a relatively short timeframe (days or even hours). Southwestern LDCs' weather forecasting is imperfect, and therefore electric and gas load forecasts are imperfect (MF)

Gas market is highly integrated: Currently, California's major gas utilities have indicated that electricity – natural gas interface or harmonization is not a major issue because of their decades of experience with supplying natural gas and because of the flexibility of spare pipeline capacity. However, this situation could change significantly as the electric generation system uses more gas to integrate increasing amounts of renewable resources. In addition, increased use of natural gas throughout the West is likely to impact spare capacity on pipelines, and thereby the flexibility that now exists. (MJ)

Storage:[12] Storage provides flexibility in operating interstate pipelines that will become increasingly important as more natural gas is used for electric generation in the Western Region. An assessment of current and potential additional storage will be important to a thorough

understanding of whether the pipeline infrastructure will be able to meet the needs of electric generators. Gas storage is very useful in providing flexibility to support gas burns by electric generators, allowing them to ramp up or ramp down operations quickly; manage imbalances, potentially hold less firm pipeline capacity; and maintain reliability. California currently has significant storage operated by gas utilities under state regulation, which provides some flexibility for electric generators. However, storage on interstate pipeline systems would increase flexibility in the delivery of gas throughout the Western Region and would also benefit of electric generators. An assessment of the following issues should be included:

- Existing storage capacity on the interstate pipeline system and potential sites for additional storage, including current patterns of use and their operational capabilities. Some storage is operated on an annual cycle, while other storage can be cycled several times during a year. In addition, withdrawal rates for storage can vary. Storage can also be a remedy for imbalances on the pipeline system caused by increased electric generation. These are factors in determining how storage can be used to provide flexibility for electric generators.
- The operational flexibility of pipelines without storage, since pipelines that are not connected to storage tend to impose stricter balancing rules. Stricter balancing rules make it harder or more costly for electric generators to operate.
- Safety issue associated with building additional storage capacity. Safety issues have become of paramount importance in California and a recent proposal for independent storage in the Sacramento area was denied by the CPUC, partially due to opposition from local residents. It would be important to asses let level of concern over safety in the region.[13] (MJ)

V. Contingency Analysis

Electric System Planning: Contingency analysis to identify impacts to generators as a result of a disruption on the pipeline (triggered either by interruptions or curtailments) (JM)

Electric System Planning: Worst-case scenarios: what if no gas-gen? (JM)

V. Solutions & Mitigation Plans (including Regulation)

There should not be a presumption that an electric transmission upgrade is always the best mitigation for a reliability problem. Gas infrastructure upgrades and demand side alternatives should be considered with equal priority. (HJ)

What options are available to utilities/generators to meet their reliability needs? What are the issues associated with these options? (LN)

I would suggest that this task force begin with education and with the goal of developing best practices in the region. There are some issues that are more important in some areas than in others, non-jurisdictional entities should be included as well, and I am sure that the details will evolve over time, but developing general guidelines will likely be helpful to those involved. (LN, repeat)

A close examination of any potential pipeline capacity constrained areas since storage can sometimes act as a substitute for transportation. Both storage and transportation should be evaluated in circumstances where both options would be beneficial. (MJ, repeat)

Are there energy market improvements that will improve reliability or lower costs related to gas/electric coordination such as the potential EIM market? (LN)

Demand response in a commercial setting may be feasible, but I am very skeptical of demand response measures in a residential setting. That is, I am not optimistic that such a program would have many participants wiling to be in discomfort in exchange for uncertain savings. Gas prices are on a monthly basis and not seen in real-time like electric prices (in theory). Therefore price signals are muted and rewards are deferred. The administrative cost of residential demand response programs may well dwarf the savings from such programs. (MF)

Energy efficiency is something that should be more heavily encouraged, as it helps stave off the need to put additional, expensive capacity into the ground in the form of storage or pipelines. I am neutral as to how to further push energy efficiency. Strict regulatory requirements could help, but if we allow the market to send price signals via higher prices, that may also encourage users to modernize their equipment as well. (MF)

After all this good work, how do we proceed to address identified shortcomings:

- Utilities have to look out for the best interest of their customers and will work to secure resources at the lowest reasonable cost
- Pipelines, under the current regime, don't expand for the "good of the system or region" – customers drive expansion
- Costs must be allocated to those who require services – in an organized market who absorbs the cost of adding infrastructure?
- How do we facilitate optimal regional solutions when there is bound to be winners and losers
- Legislative and/or regulatory mandates don't always derive the best solutions; the market is pretty resilient, creative and efficient but, again, there will be winners and losers (CR)

Are there barriers in state rules or regulations that impede:

- Trading of gas or energy between areas or states?
- Communication between gas distribution companies and electric generators?
- Development of gas infrastructure, including storage and trading of related services? (LN)

Regulation: FERC, in coordination with the North American Electric Reliability Corporation, should establish a mechanism for determining the amount affirm pipeline capacity (or some

other form of firm back-up fuel) needed in each region to ensure electric grid reliability. Wholesale electric market design-which rewards generators for having the lowest marginal cost-acts as a disincentive for generators to sign up for firm transportation. (JC)

FERC should reform wholesale power market rules to assign responsibility for holding such pipeline capacity and provide a means to recover the costs incurred for this purpose. Merely addressing communications and scheduling protocols will not ensure electric grid reliability. (JC)

Solutions tailored to regions. As described above the Southwest has weather vulnerabilities. There are various ways in which Southwest LDCs can ameliorate the Southwestern problem:

- They may increase the accuracy of their weather/load forecasts to better schedule their gas demands with natural gas transmission companies such as El Paso Natural Gas (recently acquired by Kinder Morgan) and Transwestern.
- They may increase natural gas storage facility throughput and capacity. This is a tried-and-true method that has worked well for California. Some LDCs have complained about transmission bottlenecks so that one could not schedule gas downstream of the storage facilities due to capacity bottlenecks, but that is possibly something that may be worked around, via physical transmission upgrades or contracting with upstream parties.
- They may utilize pipeline shaping services and hourly nominations to sculpt their capacity to better reflect actual use during the high-demand day. Although this is an extra expense that relatively stable areas such as California do not incur, it should be stressed that California is not causing problems and therefore should not bear the costs of such problems. Cost-causation ratemaking principles should be observed. Also, the ability to load-shape or do intra-day adjustments is not a complete fix due to the relatively slow-changing source flow. A truer fix would involve LDCs signaling to producers in the basin that they need more or less gas, but such communication may be cost-prohibitive, and furthermore, it may be cost-prohibitive to vary production flows by enough to make a difference. (MJ)

Maximize current infrastructure. Before we put a great amount of money into building new infrastructure or new storage, we need to be sure we make maximum use of the system that we have. It is an interdependent system including a transmission system and gas fired generation.[14] (CW- Aug. 28, 2012 FERC conference)

At the FERC West Region Conference there was discussion of a wide range of mitigation strategies which included: LNG, dual fuel, pooling or mutual assistance agreement, alternative service arrangements, demand response – decreasing injection into storage, demand response – smart meters, weatherization of equipment, and infrastructure redundancy not limited to pipelines such as storage or compressors.[15] (Staff)

FERC reports that demand for gas-fired generation in the West is declining, in contrast to the rest of the country. The data shows that generation equipment fueled by natural is being used at lower capacity rates.[16] (Staff)

VI. Policy: Cost of Infrastructure & Firm Services

Who will hold and pay for the pipeline capacity necessary to ensure reliability? (JC)

Cost Allocation: There could still be a cost allocation mismatch after FERC Order 1000. Though mechanisms will be implemented for allocating electric transmission costs, gas capacity expansions still rely almost exclusively on participant funding with incremental rates. (HJ) Regulators should understand that improvement of gas and electric issues may result in costs and those costs are prudent and are required to insure reliability. (LN)

Unlike the electric system, pipelines do not have a reserve margin. FERC requires a demonstration of market need-usually in the form of firm contractual commitments from customers-before it approves a proposed pipeline. The pipeline infrastructure we have today is the result of the historical decisions by local distribution companies and producers regarding the level of firm service they desired. (JC)

Non-firm service and reliability. Although generators have an obligation to perform, the performance incentives in a wholesale electricity market design are not strong enough to cause generators to procure firm fuel supplies – gas or oil – and to operate in accordance with their obligations. Until recently, these generators have largely been able to meet their obligations under normal operating circumstances, i.e. when the power or gas system is not stressed, without firm fuel. However, when conditions become constrained or there isn't operating flexibility on the gas pipeline, the interruptible generator customers may not be able to secure fuel to operate in accordance with their operating characteristics to meet the firm electrical demands of the grid. These fuel limitations generally happen with little time for electric system operators to adjust, and can affect the reliability of the power system. Gas pipeline industry representatives have made clear that electric system reliability is threatened so long as generators continue to rely only on interruptible "non-firm" gas transportation, and that the pipelines will not hesitate to solve their operational problems by interrupting these customers. (JM)

The customers who hold pipeline capacity in secondary capacity markets such as interruptible capacity and capacity obtained through capacity release markets. These customers who do not subscribe to firm capacity are the first to be bumped off the pipeline. As more natural gas is used for electricity generation, we may see more interruptible customers bumped off their pipeline. (MJ)

It is unclear if there are sufficient incentives in place for ensuring that an adequate amount of pipeline and storage capacity is held for gas generation. In the Pacific Northwest, load serving entities generally procure firm pipeline and storage service for higher capacity factor plants and rely on dual fuel backup for low capacity factor peakers. (HJ)

The economic incentives (or barriers) for pipeline operators to build more storage and for investors to provide merchant storage, as well as electric generators ability to pay for storage since current market-based rates for storage entail a significant commitment to pay firm reservation charges. (MJ)

The extent to which current electricity market structures impede natural gas‐fired generation facilities ability to operate reliably under all conditions. Current market structures do not support generators holding firm pipeline capacity or firm supply contracts when they cannot predict when and for how long they will be called on to operate to integrate renewable resources. In addition, natural gas‐fired generators may operate only on‐peak therefore are unable to hold firm pipeline capacity or contract for firm natural gas supply because they are uneconomic under current market structures. (MJ)

Electric generators-even those without firm transportation service-historically have benefitted from highly reliable gas delivery service largely because a pipeline's firm capacity holders only use their full pipeline capacity on certain peak or high load days. On non-peak days, generators can buy capacity not needed by firm customers on the secondary market through capacity release or from the pipeline as interruptible transportation. During peak or high-load conditions on some pipelines, interruptible transportation likely will not be available as pipelines meet the needs of their firm customers. As a result, new pipeline infrastructure will be necessary to accommodate demand growth. (JC)

Concern that tariffs that don't envision the flexibility electric system needs (CK)

What sorts of contracts are used and available? Are there common pitfalls, are there aspects that should be standard in contracts for various generator types? (LN)

The need to examine current market based rates for pipeline capacity and necessary changes to better align pipeline rate structures with the economic needs of electric generators. There is currently a mismatch between the costs for a natural gas‐fired generator to acquire firm capacity on pipelines so it can operate reliably and the recovery of those costs in electricity market prices. (MJ)

Pipelines shifting to oil service. Natural gas pipeline can be shifted to oil service as is being contemplated by El Paso Natural gas. El Paso has announced it is preliminarily considering converting a large portion of its existing gas pipeline to oil service, thereby depriving CA of used and useful natural gas capacity, and the link between parties not signing up for firm pipeline transportation service and the existing guidelines using firm service as the measurement tool as to whether pipelines can abandon existing pipelines. (MF, repeat)

Financing. Something that all areas of the West should pay attention to (including California) is financing. Financing is possibly a major issue for smaller electric generation companies who may not be able to afford long-term firm service contracts yet also need the reliability of firm transport service in order to fulfill their contractual obligations. If financing for firm transportation service could be provided, it is possible that there would be more aggregate firm transport demand that could help keep compressor stations open and capacity up. The customers who demand reliability need to send a signal to the market that they are willing to pay for more reliability. Absent such a signal, the pipeline companies may get the wrong message and shutter compressor stations to the point where it impacts reliability down the road, especially as the

population grows, and economic recovery picks up speed. The aphorism "you get what you pay for" is apt. (MJ)

Comments submitted after Nov. 1

Philip B. Jones, Commissioner Washington UTC; 1st Vice President of NARUC

- The focus should be on understanding the IRP's (resource planners) at the state level, and how they deal with issues of both natural gas adequacy (supply and demand), and gas transportation issues. The focus will be on the power generation sector, of course, but the total resource need should be examined;
- At the same time, the study should examine options and methodologies to take these state-level IRP analysis and recommendations, especially relating to natural gas and power generation, and developing more of a regional perspective (perhaps following the SRG's for electricity markets – Columbia Grid, NTTG, CAISO, etc.) And then perhaps go to a WECC-wide look from there.
- Within this analysis of state IRPs and perhaps a regional IRP, examine the resource adequacy issue and the overall reliability of combined gas-electric system, and its resilience to certain events and possible disruptions (e.g., cold weather events);
- Examine the need for additional gas storage capabilities, and the design characteristics of a more "nimble" storage system (faster ability to discharge hourly or so to meet the needs of gas-fired units to meet the needs of the electric power generators;
- Look at the fleet of gas-fired turbines, both existing and proposed: how much incremental cost, and is there an assurance of fuel delivery to those turbines and peakers;
- Longer-term analysis: how much more infrastructure do we need in various locations throughout the WECC, based on this bottoms-up analysis? Both pipeline infrastructure and gas storage. Does a regional analysis (built up from the IRPs) develop some recommendations for infrastructure that don't appear in the utility-specific plans – if so, where are the possible "aggregation" of needs?
- Better coordination with CAISO, and the Columbia Grid and NTTG footprints on the electric side, in terms of the gas-fired generation fleet, and the seasonal exchange agreements in place between load-serving entities and transmission owners.

Legend for attribution of comments (in alphabetical order):

CK - Clint Kalich, Avista Corp.
CR - Clay Riding, Puget Sound Energy
CW - Craig Williams, WECC
HJ - Hardev Juj, BPA
JM - John N. Moura, NERC
JC – Jan Caldwell for Lynn Dahlberg, Williams - Northwest Pipeline
LN - Liam Noailles, Xcel Energy
MF – Mike Florio, California PUC
MJ - Melissa Jones, CEC
PP - Phillip Popoff, Puget Sound Energy
RD - Robert Diffely, BPA
RW - Rebecca Wagner, Nevada PUC
SH - Steven Hearn for Shelley Corman,Transwestern Pipeline Company

Endnotes

[1] One type of gas-electric interdependency study is an infrastructure assessment. This is typically structured in four segments or stages: (1) inventory of existing system; (2) trends and adequacy in an expected future; (3) fuel backup and mitigation strategies in an expected future; and (4) modeling impact of contingencies. This was presented in part at the October 4, 2012, SPSC/CREPC meeting. See SPSC/CREPC Combined Meeting, October 4, 2012 , ICF International presentation, webinar archive at 3:08:00, available at: https://westgov.adobeconnect.com/_a976899620/p3qqlxbem22/?launcher=false&fcsContent=true&pbMode=normal; and *Staff Background Paper on Proposed Motion on Natural Gas - Electric Evaluation*, available at: http://www.westgov.org/wieb/meetings/crepcfall2012/briefing/spm_ng.pdf. This is not intended to limit the framework or parameters for a Western study, but to serve as a starting point for consideration.

[2] FERC has analyzed the makeup of electricity generation in West (sources of fuel for electricity generation) using six subregions: (1) Basin with 70% coal fired generation and 13% natural gas; (2) California North with 50% natural gas, 22% water and 16% nuclear; (3) California South with 59% natural gas, 16% nuclear and 8% water; (4) Desert Southwest with 42% coal, 33% natural gas and 18% nuclear; (5) Northwest with 56% water, 17% coal and 15% natural gas; and (6) Rocky Mountains with 74% coal and 16% natural gas. All of these regions use other fuels for electricity generation but in smaller proportions than those noted here. See October 28, 2012, Technical Conference on Coordination between Natural Gas and Electricity Markets for the West Region, Docket No. AD12-12-000, *FERC Western Presentation*, slide 6, available at: http://www.ferc.gov/EventCalendar/Files/20120831090350-West-correscted.pdf.

[3] **The NMAA** was put in place in March 1999. It defines terms for cooperation in an emergency, encourages communication, and establishes an Emergency Planning Committee. Each signatory to the Agreement is an entity that utilizes, operates or controls natural gas transportation and/or storage facilities in the Pacific Northwest (British Columbia, Alberta, Washington, Oregon, Nevada, and Idaho). Members share emergency contact information and participate in planning meetings and emergency exercises. The Emergency Planning Committee meets twice a year and is working on region-wide emergency protocols. *The Role of Natural Gas in the Northwest's Electric Power Supply*, Bonneville Power Administration, 14 (August 2012) available at http://www.pnucc.org/sites/default/files/BPA%20Power-Natural%20Gas%20Whitepaper%208-24-12.pdf; copies of the NMAA are available from Kevin Sullivan, Western Energy Institute: (971)255-4734 or online at: http://www.westgov.org/wieb/meetings/crepcfall2012/10-12agen.htm (scroll down to Gas-Electric Panel, October 4, 2012 at 9:50 a.m.)

[4] **The California ISO Procedures for Gas Derates and Outages** are detailed procedures for the roles, communications and actions related to natural gas transmission reductions or curtailments and impacts to the electric system in real time, two days advance notice, and more than 2 day time frames. *Gas Transmission Pipeline Derates or Outages*, Procedure No. 4120, effective August 27, 2012, available at: http://www.westgov.org/wieb/meetings/crepcfall2012/10-12agen.htm (scroll down to Gas-Electric Panel, October 4, 2012 at 9:50 a.m.)

[5] **Cross Industries Communications: Collaborating to Improve Emergency Response** is a two day training developed by Kevin Johnson, Kinder-Morgan Pipeline (formerly El Paso Pipeline) for utilities with gas operations. This training has been provided for every utility in the Desert SW and the Rocky Mountain regions. He has also provided an abbreviated presentation to the NW Task Force and has been asked to present at the California ISO.

[6] The **Northwest Power and Natural Gas Planning Task Force** was formally established in April 2012 under the auspices of PNUCC and the NWGA. They meet every two months to assess the growing interdependence of natural gas and electric generation. In addition to publishing a number of reports, work underway includes: demand/supply assessment of the I-5 Corridor; and I-5 transmission analysis (led by ColumbiaGrid). *Power &*

Natural Gas Planning Task Force, Priority Projects October 2012 Update, Materials from October 12, 2012 Task Force Meeting (Attachment E). More information is available at the Task Force website: http://www.pnucc.org/system-planning/power-natural-gas-taskforce.

[7] See Note 1 above.

[8] FERC Order 587-V, incorporating NAESB Gas-Electric Communication Standards, became effective August 27, 2012. The Commission requires natural gas pipelines to comply with the Standards on December 1, 2012 after filing tariff records that reflect the new standards by October 1, 2012. The Standards ensure that pipelines have relevant planning information to assist in maintaining the operational integrity and reliability of pipeline service and to provide gas-fired power plant operators with information as to whether hourly flow deviations can be honored. The standards will enhance the clarity of the content and format of critical, non-critical, and planned service outage notices issued by pipelines. Fifteen additional notice types for planned service outages have been added (from 12 to 27) so that public utilities may more easily identify relevant pipelines' system conditions. Also the parties to whom pipelines are required to provide operational flow orders and other critical notices have changed: under the Order pipelines are required to provide notification to Balancing Authorities and/or Reliability Coordinators, and Power Plant Gas Coordinators. Order No. 587-V , 140 FERC ¶ 61,036, 18 CFR Part 284, *Standards for Business Practices of Interstate Natural Gas Pipelines* (Issued July 19, 2012) Docket No. RM96-1-037, available at : http://www.ferc.gov/whats-new/comm-meet/2012/071912/G-1.pdf . WECC has organized a conference to coordinate procedures for these required communications and notifications. For more information go to: http://www.wecc.biz/committees/StandingCommittees/20121112/default.aspx?InstanceID=1.

[9] The Power Plant Gas Coordinator (PPGC) is typically the person who purchases and schedules the natural gas on behalf of a power plant, utility, or industrial customer. This is the acronym used in the NAESB WGQ standards. NAESB WGQ standards 0.2.1 (definition of PPGC).

[10] Provisional status means that prior to these items becoming "active" and committing time and resources of staff and other stakeholders, the Board will evaluate the likelihood of success. Gas-Electric Harmonization Committee Report, NAESB GEH Committee, pp. 3-4 (September 2012), available at: http://www.naesb.org/pdf4/bd092012a1.pdf.

[11] On April 7, 2010, the Environmental Protection Agency (EPA) issued an Advance Notice of Proposed Rulemaking (ANPRM) entitled Polychlorinated Biphenyls (PCBs); Reassessment of Use Authorizations. In this ANPRM, the EPA proposes to reassess the existing PCB use authorizations under the Toxic Substances Control Act (TSCA), including the use authorization for PCBs in natural gas pipelines, air compressor systems and porous surfaces. As part of this reassessment, the EPA has proposed to revise and/or eliminate these use authorizations in a way that could impact natural gas pipeline operations. The comment period for the ANPRM closed on 08/20/2010. The Notice of Proposed Rulemaking (NPRM) is projected to be published in the Federal Register on 04/20/13. EPA Regulatory Development and Retrospective Review Tracker, *Polychlorinated Biphenyls (PCBs); Reassessment of Use Authorizations*, available at: http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2070-AJ38. See also, *PCBs in the Interstate Natural Gas Transmission System – Status and Trends,* S.S. PAPADOPULOS & ASSOCIATES, INC., commissioned by INGAA, p. 7 (August 2010), available at: http://www.ingaa.org/File.aspx?id=10753.

[12] There are three states in the Western Interconnection that have no underground natural gas storage: Arizona, Nevada and Idaho. The following reports/studies provide more information about this issue: *Gas Storage Needed to Support Electricity Generation: an Update to Implications of Greater Reliance on Natural Gas for Electricity Generation (2010)*, Aspen Environmental Group, prepared for the Utility Air Regulatory Group (UARG) and the American Public Power Association (APPA), p. 4 (June 2012) (not yet available on line, a copy can be obtained through WEIB staff); *Implications of Greater Reliance on Natural Gas for Electricity Generation (2010)*, Aspen Environmental Group, prepared for UARG and APPA (July 2010), available at: http://www.publicpower.org/files/PDFs/ImplicationsOfGreaterRelianceOnNGforElectricityGeneration.pdf; *The*

Value of Natural Gas Storage and the Impact of Renewable Generation on California's Natural Gas Infrastructure, ICF International, prepared for California Energy Commission (2009), available at: http://uc-ciee.org/downloads/CNGStorage.Brock.pdf.

[13] This is a reference to the California Public Utilities Commission's (CPUC) Risk Assessment Unit (RAU) within the Consumer Protection and Safety Division (CPSD), formed to improve the CPUC's ability to prevent high-profile accidents and incidents by developing a system of risk identification, risk analysis, and risk management. The RAU's first priority has been on gas pipeline safety. They have developed a Natural Gas System Hazard Database with 100 potential hazards. By March 14, 2012, they had identified 17 potential hazards that impact public safety for which they recommend current and continued CPUC attention. See *Hazard Database Project Report on Status and Initial Recommendations,* CPUC Risk Assessment Unit, March 14, 2012, available at: http://www.cpuc.ca.gov/NR/rdonlyres/381B6603-37A4-48C0-A1B7-D4A56928F6CC/0/RiskAssessmentMarch2012ReportFINAL.pdf.

[14] Craig Williams, WECC, comment at the FERC Conference on the Coordination between Natural Gas and Electricity Markets for the West Region, Portland, Oregon, August 28, 2012 (Docket No. AD12-12-000). Audio at 396:30 : http://capitolconnection.net/capcon/ferc/082812/fercarchive_flv.htm . FERC Commissioner John Norris has made similar comments. Explaining that the need for new pipeline should not be the first consideration, he stated that the first question is "How do we max our existing infrastructure to get the most out of it? Then how do we make sure we are using all other cost-effective solutions such as demand-side resources to make sure we are not over-building infrastructure to solve this problem*?"* Peter Behr, *NATURAL GAS: New incentives needed to bridge operational gaps in grid, regulators say*, Energywire, July 25, 2012, available at: http://www.eenews.net/ew/2012/07/25.

[15] *Id.* Component redundancy was a comment from Phillip Popoff, Resource Planner, Puget Sound Energy, at the October 4, 2012 SPSC/CREPC meeting.

[16] OE Energy Market Snapshot Western States Version – August 2012 Data, Federal Energy Regulatory Commission Office of Enforcement Market Oversight, slide 29 (September 2012), available at: http://www.ferc.gov/market-oversight/mkt-snp-sht/2012/09-2012-snapshot-west.pdf.