U.S. Department of Energy
Washington, DC 20585

Date: **August 6, 2014**

To: **Members of the Public**

From: **Quadrennial Energy Review Task Force Secretariat and Energy Policy and Systems Analysis Staff, U.S. Department of Energy**

Re: **Stakeholder Meeting on State, Local and Tribal Issues**

1. Introduction

On January 9, 2014, President Obama issued a Presidential Memorandum establishing a Quadrennial Energy Review (QER). The Secretary of Energy provides support to the QER Task Force, including coordination of activities related to the preparation of the QER report, policy analysis and modeling, and stakeholder engagement.

On Monday, August 11, at 9:00 a.m. MT, at the New Mexico State Personnel Office Auditorium located at 2600 Cerrillos Road in Santa Fe, the U.S. Department of Energy (DOE), acting as the Secretariat for the QER Task Force, will hold a public meeting to discuss and receive comments on state, local and tribal governance and regulatory issues associated with natural gas, liquid fuels and electric transmission, storage and distribution infrastructure. Three expert panels will explore evolving trends in jurisdiction, policy and regulation, and operational issues from the state, local and tribal perspectives. There will be an opportunity for public comment via an open microphone session following the panels. Written comments can be submitted to QERcomments@hq.doe.gov. The session will also be webcast at www.energy.gov/live. Information on all QER stakeholder meetings is posted at www.energy.gov/qer as it becomes available.

Infrastructure siting will be the primary focus of an upcoming QER meeting in Cheyenne, Wyoming, on August 21, but will likely arise during the Santa Fe meeting because of the significance to state, local and tribal stakeholders.

2. Background

Tackling the challenges emerging from the changing energy mix and shifts in energy flows is a priority for the state, local and tribal authorities that oversee, monitor and regulate energy infrastructure. Often their ultimate goal is achieving the delicate balance between meeting economic goals, addressing vulnerabilities and meeting the public need for a safe, secure, affordable, reliable and environmentally responsible energy system. These economic and environmental impacts and opportunities may depend on actions in other jurisdictions, such as energy producing states or states that require significant imports of clean or more affordable energy supplies.[1] There are barriers, however, to meeting the whole of the future energy system needs within an energy network that is already stressed by aging infrastructure and climate impacts.

[1] Hoecker, J. and Smith, D. "Regulatory Federal and Development of Electric Transmission: A Brewing Storm?" *Energy Law Journal*, May 13, 2014.

Within the transforming energy sector, governments increasingly are dealing with shifts and overlaps in jurisdiction and multi-jurisdictional issues in energy transmission, storage and distribution infrastructure, particularly in the electricity and oil and gas sectors. Historically, much of the transformation was of state-federal jurisdictional questions and concerns, but in the transition to a smarter, cleaner and more resilient energy system, the nature of coordination appears to be shifting more to incorporate the unique and distinct needs of tribes, local governments and states across various regions and markets. This move to coordinate among parties is certainly true from an economic development standpoint; however, increasing infrastructure development influences decisions regarding transmission, storage and distribution infrastructure as well. Permitting and siting issues continue to be a challenge to the modernization of these systems and the ability of tribes, local governments and states to meet energy infrastructure needs in the long term. Meanwhile, the vulnerabilities of the energy system are increasing, not diminishing.

State, local and tribal leaders are seeking innovative ways to overcome these issues and meet the goals of a safe, resilient and environmentally responsible energy system. For example, approved natural gas pipeline projects in New England, New Jersey, and New York focus on bringing the gas supply from the Marcellus shale basin in Pennsylvania to the Northeast region. These projects are designed to help increase regional natural gas capacity, deliverability, flexibility and reliability, as well as provide economic and environmental benefit. In November 2013, several pipeline additions in the New Jersey and New York City area went into service which has resulted in lower gas prices for New York consumers. Another example is the gas development ongoing in the Bakken region of North Dakota. In July 2014, North Dakota state regulators adopted new rules that require Bakken operators to submit gas-capture plans before they can receive new drilling permits. The gas flaring issue has been controversial and these new state rules will impact some operators.

On the electricity side, at least four states—Maine, Massachusetts, New York and North Carolina—have pending legislation to establish task forces or commissions to identify energy infrastructure improvements to achieve more efficient and reliable electricity transmission. Montana adopted a resolution to evaluate how the state's renewable portfolio standard has affected its electricity transmission developments. Massachusetts has several pending legislative bills to assess and plan infrastructure upgrades and promote wind energy development. These are just a few examples of the innovative approaches states are taking to modernize their electric grid.[2] Local and tribal governments are taking similar actions to modernize the grid.

The QER will examine the appropriate federal role in a dramatically changed energy landscape, and where appropriate, how the federal government can be supportive of state, local and tribal efforts to modernize energy infrastructure. Industry stakeholders are adjusting from a longstanding institutional approach to energy planning and regulation. They are contemplating new jurisdictional, regulatory and coordination models that will enhance the nation's energy infrastructure and allow them to adapt to

[2] Brown, Cassarah. 2013. "States Walk the Line: Current State Action Towards More Efficient, Secure, and Cost Effective Electricity Transmission." National Conference of State Legislatures. Accessed August 5, 2014: http://www.ncsl.org/research/energy/current-state-action-on-electricity-transmission.aspx

transforming needs. They are also dealing with broader policy implications of this transition: infrastructure's ability to withstand increasing threats; developing the workforce and training needed to build, operate and upgrade infrastructure; designing affordable rate structures to pay for it; and addressing environmental quality concerns.

To support the needs of state, local and tribal governments, the multi-agency QER process will focus on energy infrastructure and identify the threats, risks and opportunities for U.S. energy and climate security, enabling the federal government to translate policy goals into a set of integrated actions. Meeting these goals is essential to improving U.S. economic productivity, enhancing quality of life, protecting the environment, and ensuring the nation's security. The first year of the QER concentrates on the energy transmission, storage and distribution (TS&D) infrastructure that links energy supplies to intermediate and end users.

The QER stakeholder meeting in Santa Fe is an opportunity for state policymakers, public utility commissioners, energy and environmental agency heads, tribal leaders, city and county officials, and related stakeholders to share their input in the QER. The focus of the meeting is how the United States can manage the vulnerabilities and achieve the desirable characteristics of a safe, secure, resilient, affordable, and environmentally responsible future energy system. The primary goals of the Santa Fe meeting will be to highlight the key lessons learned that can be applied to national policy and identify the gaps that could be addressed through executive or legislative action or that require further research and development.

3. Oil and Natural Gas Transmission, Storage & Distribution: Jurisdiction and Policy and Regulatory Priorities

State, local and tribal leaders confront emerging concerns in developing adequate infrastructure to ensure responsible expansion of the U.S. oil and gas industry. Priorities include streamlining siting and permitting processes, preparing for physical and cyber threats, determining who pays for new and upgraded infrastructure, and protecting public health and safety. Infrastructure for the transportation of oil and natural gas must be large enough to support increased production volumes and robust enough to guard against safety accidents and intentional sabotage.

Regulation and planning of pipelines in the United States is shared responsibility among federal, regional, state, tribal, and local authorities and the public and private sectors. Federal, state, and local agencies, public interest groups and citizens participate in inter- and intrastate processes, but the specific entities involved typically vary by state.[3] For projects that will traverse tribal lands, tribal governments interact with industry and the federal government under the planning, review and approval process for pipelines. Local governments typically are involved from a county or municipal level where applicable by state law or constitution, particularly from the perspective of environmental protection or citizen safety. With the

[3] Ibid.

engagement of all of these stakeholders and government at all levels, interstate and intrastate pipeline siting and permitting processes are often complex and lengthy.[4]

The U.S. natural gas industry has a long history, but many of the regulations that govern the industry today are the outgrowth of the gas shortages of the 1970s, resulting controls and regulations, and the subsequent deregulation efforts of the 1980s. The Federal Energy Regulatory Commission (FERC) has primary responsibility for regulating interstate pipelines, and states are predominantly responsible for regulating pipelines that do not cross state lines, primarily under the jurisdiction of a state public utility commission or state energy office.[5] If an intrastate pipeline crosses tribal lands, there is a tribal and federal role through the authority of the U.S. Department of the Interior's Bureau of Indian Affairs. If the pipeline seeks to cross federal public land, then the relevant federal land management agency has a role in reviewing the project and in issuing the appropriate land use authorization for that development. The agencies most involved in this work are the Department of the Interior's Bureau of Land Management and the U.S. Department of Agriculture's U.S. Forest Service.

Natural gas pipeline operators typically function as regulated monopolies under the federal Natural Gas Act, and state regulations are overseen by state public utility commissions. There is no oil industry regulation equivalent to the Natural Gas Act, which governs siting of natural gas pipelines, and no requirements under state law to operate oil delivery utility similar to local natural gas utilities. Federal and state agencies regulate liquid fuel shipping to ensure public safety, protect the environment and discourage monopoly pricing in shipping. Many of the safety and environmental standards apply to any industry, not just oil transportation.

The oil and gas sectors face a variety of important policy and regulatory issues critical among all levels of government and authority. Some of the key areas of concern include:

- Ensuring the safe delivery of resources via America's aging network of pipelines.
- Balancing environmental stewardship with the growing need for additional pipeline capacity in some non-traditional supply areas.
- Streamlining local, state, and federal regulation to support infrastructure development.
- Establishing a pipeline network that serves the needs of generators, industrial customers and transportation customers.
- Reconciling the needs of infrastructure and consumers with various forms of indirect regulation.

3.1 Pipeline Siting and Regulatory Approval

While the Federal government oversees regulation of interstate pipelines, it plays no role in the siting of pipelines that are entirely within the borders of a single state, except where the pipeline is crossing tribal

[4] GAO (U.S. Government Accountability Office). 2013. Pipeline Permitting: Interstate and Intrastate Natural Gas Permitting Processes Include Multiple Steps, and Time Frames May Vary. GAO. Accessed August 5, 2014: http://www.gao.gov/assets/660/652225.pdf

[5] EIA (Energy Information Administration), Office of Oil and Gas. 2008. Distribution of Natural Gas: The Final Step in the Transmission Process. EIA. Accessed August 5, 2014: http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2008/ldc2008/ldc2008.pdf

lands or federal public lands. The state rules for pipeline routing vary significantly, from some states that identify avoidance and exclusion areas for new pipelines to some states that allow the development of alternative routing, to other states that have no regulations at all for the location of new intrastate and interstate hazardous liquid pipelines. A majority of the states regulate pipelines under the jurisdiction of the public utility commission. However, most states do not have a lead agency that coordinates all the reviews necessary to complete the permitting process. Unlike the interstate pipeline process, for the intrastate process, most states do not use a lead agency to authorize and coordinate siting and environmental issues.

Pipeline companies determine the general route for proposed pipeline, then a formal process with various government agencies begins, varying greatly based on the type and route of the pipeline. The responsibility for approval of the pipeline route falls on the individual states. If the state has no agency in charge of pipeline siting, then the responsibility falls to the land use authority of local governments along the proposed route.

Depending on the areas through which a pipeline is proposed, there are a variety of other water quality, environmental, zoning and historic preservation permitting processes that may apply. Once a route has been settled on, the pipeline company has to obtain legal permission to cross each parcel of property along the route. This permission can be obtained by a voluntary purchase of an easement from the landowner or by a court order under state eminent domain law, which can be controversial. [6]

Rights-of-way through federal public lands may be granted by the Secretary of the Interior or Secretary of Agriculture—depending on the jurisdiction of the land being crossed—to qualified persons for a pipeline to transport oil or natural gas or for a pumping station. Permission may be granted for the ground occupied by the pipeline and 25 feet on each side. Unless the pipeline is a natural gas pipeline operated by a person subject to regulation under the Natural Gas Act, or by a public utility subject to regulation by a state or municipal regulatory agency, a pipeline can qualify for such easement only if it is maintained as a common carrier.

Timelines for approval vary and hurdles exist across the process. Many federal agencies will not begin their approval processes until state and local permitting processes are completed.[7] Schedules are also affected by incomplete applications to the federal agencies and delays in the multiple agency reviews required at the local, state and federal levels.[8]

Pipelines that cross tribal lands—inter- or intrastate—must also be approved by the tribe and the federal government. Federal approval will include environmental protection requirements, as well as requirements that apply under other federal laws that protect species and historic and cultural lands.

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[6] Pipeline Safety Trust. n.d. Pipeline Safety New Voices Project, Briefing Paper #9: Pipeline Routing and Siting Issues. Accessed August 5, 2014: http://pstrust.org/docs/PST_Briefing_Paper_09_1.pdf
[7] GAO (U.S. Government Accountability Office). 2013. Pipeline Permitting: Interstate and Intrastate Natural Gas Permitting Processes Include Multiple Steps, and Time Frames May Vary. GAO. Accessed August 5, 2014: http://www.gao.gov/assets/660/652225.pdf
[8] Ibid.

3.2 Oil and Natural Gas Infrastructure Safety

In recent years, regulators, policy makers and the general public have intensified the focus on improving the safety of pipelines after several major incidents across the country demonstrated the vulnerabilities of aging infrastructure. Ensuring pipeline safety is a shared burden between states and the federal government. The U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates transportation of liquid fuels and pipelines for hazardous liquids. The Hazardous Liquid Pipeline Safety Act (PSA) of 1979 (as amended) authorizes the DOT to regulate pipeline transportation of hazardous liquids, including crude oil and other petroleum products. PHMSA regulates transportation of natural gas and other gases as well as transport and storage of liquefied natural gas under the Natural Gas Pipeline Safety Act of 1968.[9] The PSA permits states to regulate, inspect, and enforce pipeline safety requirements for intrastate pipelines pursuant to a certification program. Through this delegation, states have primary inspection and enforcement authority over intrastate pipelines.[10] The PSA authorizes the imposition of civil and criminal penalties, as well as corrective action that can include the suspension of pipeline facilities in the event the facility "is or would be hazardous to life, property, or the environment."[11] While the federal government is primarily responsible for developing, issuing, and enforcing pipeline safety regulations, the pipeline safety statutes provide for states to assume intrastate regulatory, inspection, and enforcement responsibilities under an annual certification.

Arizona, California, Connecticut, Iowa, Michigan, Minnesota, New York, Ohio, Washington, Virginia and West Virginia also act as interstate agents. In this role, state personnel inspect interstate pipelines and submit reports to PHMSA, which carries out compliance and enforcement action as necessary. PHMSA also consults with Indian tribes to provide technical assistance to help the tribes regulate oil and natural gas pipelines subject to their jurisdiction.

Each state is different with respect to the risks posed to its pipeline infrastructure by diverse geographic, economic, political, social and environmental factors. Some state regulatory and commercial entities assert that a one-size-fits-all policy for all intrastate pipeline systems would be counterproductive and would limit the state's ability to go beyond the current federal requirements. Most states can and do adopt pipeline safety regulations that are stricter than the federal regulation. Currently, these state-specific regulations can only be enforced by state regulators and not by the federal regulators.

Of the nation's 240,000 miles of gathering lines, only about 10 percent are regulated. When leaks or accidents occur on the remaining 90 percent, operators are not required to notify regulators. The lack of publicly available information regarding the location of these lines poses a challenge for safety regulators. States with increased shale gas and oil production, such as Pennsylvania, are also considering regulation

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[9] PHMSA (Pipeline and Hazardous Materials Safety Administration). n.d. Legislative Authority. U.S. Department of Transportation. Accessed August 5, 2014: http://www.phmsa.dot.gov/pipeline/state-programs.
[10] B. McCown & D. Theiss. 2008. "Safeguarding the Energy Pipeline Transportation System & the Pipes Act of 2006," 3 Tex. J. *Oil Gas & Energy* L. 22, 43 (2008).
[11] The PSA authorizes administrative civil penalties up to $200,000 per violation per day and up to $2 million for a related series of violations. PHMSA also may refer claims to the Attorney General who can result in both civil and criminal penalties. It may also order operators to remedy conditions that pose a less imminent pipeline integrity risk to public safety, property or the environment. [34 *Energy & Min. L. Inst.* 5 (2013)]

of gathering lines. Of particular concern to state and local regulators are homeowners that seek gas hook-ups in exchange for right-of-way agreements with gathering line companies. State environmental laws and regulations are applicable to intrastate pipelines. Typically no single entity is responsible for coordinating all of the environmental reviews—including federal and state authorizations, during the intrastate permitting process.[12]

Nearly one-quarter of the methane emissions in the United States come from the natural gas sector, including gathering lines, processing, transmission pipelines and gas storage, and distribution to end users. [13] Methane emissions from leaking pipelines, compressor stations and poorly maintained or operated equipment pose risks of serious accidents. Recent pipeline explosions in California and New York resulted in heightened public scrutiny regarding the scope and enforcement of our nation's pipeline safety rules, and led to the passage of The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011. This Act directed the Department of Transportation to consider adding more robust leak detection and pipeline inspection requirements that have the potential to both enhance public safety and reduce emissions.

States are primarily responsible for pipeline replacement. Although PHMSA requires operators to replace, repair, or remove from service pipelines that are "unsafe,"[14] there is no definition of unsafe nor is a timeframe specified as to when replacement must occur. Generally, local distribution companies have discretion to design their own programs regarding pipeline replacement, subject to approval by state public utility commissions.

States generally allow gas distributors to recover costs of shipping natural gas to their customers, including gas lost between the transmission hub and the gas meter. Massachusetts, for example, passes the cost of lost and unaccounted for gas on to ratepayers using the state's cost of gas formula in its utility regulations.[15] In some cases, this type of formula reduces the incentive for gas distributors to repair gas leaks or replace old gas lines that are especially prone to leaking.

The nature of oil and natural gas infrastructure planning, siting and permitting is complex, crosses multiple jurisdictions and requires several stages of information sharing, approval and coordination. As the nation adapts to the changing energy mix, federal state, local, and tribal leaders will continue to grapple with new ways to facilitate new and modified oil and gas infrastructure.

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[12] If a pipeline crosses tribal lands, there will be federal environmental reviews as well, as described above.
[13] EPA (U.S. Environmental Protection Agency). 2013. Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2011, (3), Table 3-44: CH4 Emissions from Natural Gas Systems (Gg). EPA, April, 2013. Accessed August 5, 2014: http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Chapter-3-Energy.pdf
[14] 49 C.F.R. § 192.703.
[15] CLF (Conservation Law Foundation). n.d. Into Thin Air. 10-11 (citing 220 C.M.R. 6.00). Accessed August 5, 2014: http://www.clf.org/static/natural-gas-leaks/WhitePaper_Final_lowres.pdf.

4. Electricity Transmission, Storage & Distribution: Jurisdiction and Policy and Regulatory Priorities

Over the past two decades, the roles of electricity sector stakeholders have shifted: generation, transmission, and delivery functions have been separated into distinct markets; customers have the ability to become generators using distributed generation technologies; and vendors have assumed new responsibilities to provide advanced technologies and improve security. These changes have created new responsibilities for all stakeholders in ensuring the continued security and resilience of the electric power grid.

According to a 2014 "Utility of the Future Pulse Survey" which surveyed more than 200 energy leaders, 78% of respondents said advances in distributed generation-related policies and regulations such as net metering, interconnection, greenhouse gas emissions controls and competitive retail markets, will have the greatest impact on the industry's evolution by 2020.[16] State policies are driving much of this change.

At the same time, energy from utility-scale renewable sources continues to grow. Wind generators provided the largest share of additions to total U.S. electric generation capacity in 2012[17] requiring new transmission lines to bring that power from the generators in the middle of the country to the load centers on either shore. In the same year, cumulative installed solar photovoltaic capacity grew more than 83% from the previous year and has become cost competitive to other fuel resources.[18] Balancing these intermittent renewable resources often requires generating capacity from natural gas as a backup fuel. These significant developments are transforming electric transmission and distribution infrastructure capacity and changing existing patterns for the state, local, and tribal roles in electricity infrastructure jurisdiction, planning and cost allocation.

The major issues and responsibilities for state, local, and tribal leaders include the following:

- Ensuring the reliable, affordable and resilient delivery of electricity over an aging and vulnerable grid;
- Moving renewable energy from new resource centers in the Midwest and Central United States to the more heavily populated demand centers along both coasts;
- Streamlining local, state, and federal regulation to support infrastructure development;
- Modernizing the grid to adapt to new technologies and automation and demand for distributed generation;
- Balancing and leveraging the efforts spent on updating transmission with the need for distribution modernization; and
- Identifying innovative ways to allocate the costs for new and modified infrastructure.

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[16] DNV GL. 2014. Utility of the Future Leadership Forum. Accessed August 5, 2014: http://www.dnvkema.com/services/conferences/utility-future-series/Pulse-Survey.aspx

[17] EIA (U.S. Energy Information Administration). 2013. "Wind industry installs almost 5,300 MW of capacity in December." *Today in Energy* (February 11, 2013). Accessed August 5, 2014: http://www.eia.gov/todayinenergy/detail.cfm?id=9931

[18] NREL (National Renewable Energy Laboratory). 2013. 2012 Renewable Energy Data Book. U.S. Department of Energy. Accessed August 5, 2014: http://www.nrel.gov/docs/fy14osti/60197.pdf.

- Exploring ways to share data and information across the public and private sectors.

The development of new transmission lines and related facilities is overseen and influenced by a mix of local, state, tribal, regional, and federal laws and policies. States have laws, policies, and regulations that govern or influence the building of new electric transmission. First, just as with the federal government, states can and do influence generation and demand-side resource choices made by the electric power industry, which in turn have the important impact on where and when transmission is built. More directly, states retain primary authority over the siting of transmission lines on private and state-owned land, with siting decisions made at the local level in a few states (such as Idaho and Washington). Coordination with federal land-management partners is critical, especially in Western states with large amounts of federal public lands. Coordination with federal land-management partners is critical, especially in Western states with vast federal public lands.

States can, at their option, become involved in transmission planning and cost allocation, even though it is regulated by FERC, since states regulate the retail rates of electricity for those electric utilities for which they have jurisdiction.[19] Charges for transmission, even when approved by FERC, are part of a utility's retail rate, and therefore a state public utility commission's refusal to allow its jurisdictional utility to recover transmission costs in its retail electricity rates can provide a state leverage over transmission planning and cost allocation. Some states are involved with transmission planning beyond oversight of electric utilities that are subject to state regulation. A number of states have created infrastructure or transmission planning authorities to encourage building of transmission so local resources can be better developed.

While planning for transmission is done mainly by transmission-owning utilities and regional transmission operators/independent system operators (RTO/ISOs),[20] there are a number of ways that states influence transmission planning. State public utility commissions often comment on transmission plans that are done by the transmission planning authorities in their footprint. State public utility commissions have authority to mandate transmission investment, with that authority varying from state to state. Such authority in practice is reduced for state commissions that are in RTO/ISO regions, generally, since states are but one of many in the RTO/ISO's stakeholder processes. How strong a voice a state commission can have in a RTO/ISO varies. FERC Order 1000 requires consideration of "public policy," and states may then have enhanced roles in RTO/ISO planning processes.

In the last decade seven states in the West and in the Plains have instituted transmission planning development authorities: Colorado, Idaho, Kansas, New Mexico, North Dakota, South Dakota and Wyoming. Some state transmission authorities have jurisdiction only over transmission development while other state authorities also have jurisdiction over development of generation as part of their mission.

[19] All states regulate the retail operations of investor-owned electric utilities, but most states leave some or all regulation of publicly- and cooperatively-owned utilities to local elected or appointed governing boards.
[20] The exception is states that are transmission owners themselves through state-owned public power utilities, such as with the New York Power Authority, and Santee Cooper (SC).

Governors' offices, state legislatures and energy and air regulators all play a role in the decision-making of fuels and resources in generation portfolios as well as the extent of use of demand side resources—all of which influences new transmission. Examples of such decision making are found in the 29 states and the District of Columbia that have renewable generation requirements. Additionally, Maryland and New Jersey legislatures, supported by their Governors, recently attempted to mandate construction of nearby natural gas generation to help reduce high wholesale market electricity prices.

The Texas legislature took another unique approach, and in 2005 enacted legislation that required the Public Utility Commission ("Commission") to identify "Competitive Renewable Energy Zones (CREZ)" where wind generation can be built. In 2008, the Commission designated five CREZs, together with assigning $4.93 billion and 2,400 miles of new transmission to be built by nine utilities to enable 18,500 megawatts of wind resources to be developed and moved from west Texas to the Texas grid. The last of the seven CREZ transmission lines was energized in December 2013.[21] All of these developments are encouraging innovative approaches to build and modernize infrastructure.

State utility commissions also have jurisdiction over decisions regarding integrated resource planning and/or resource adequacy.[22] Integrated resource plans are still filed with state public utility commissions by vertically integrated electric utilities largely in the western and the southeastern United States. In areas without RTO/ISOs, a variety of voluntary mechanisms are employed to improve regional coordination. The Western Governors Association, and to some extent, the Midwest Governors Association, are both involved with analyses, discussions and activities around transmission development. Additionally, transmission siting protocols among member states have been signed through both of these two regional associations, which may provide options to consider for other regions and coordination nationally.

FERC has issued a number of rules that provide requirements for how transmission planning is to be done by entities subject to its jurisdiction. These rules, with the latest being FERC Order 1000 issued in 2011, have a substantial influence on the practice of transmission planning. FERC Order 1000 is a major fundamental shift in how transmission planning is to be conducted, requiring it to be done by North American Electric Reliability Corporation (NERC)-registered regional transmission planning authorities, and then filed with FERC for its review of adherence to the Order's processes. States have not necessarily embraced these new requirements and some are pursuing court challenges, particularly associated with

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[21] PUCT (Public Utility Commission of Texas). 2010. PUCT – CREZ Home Page. Accessed August 5, 2014: http://www.texascrezprojects.com/; and Reuters. "AEP venture completes Texas CREZ power transmission lines." Reuters, December 9, 2013. Accessed August 5, 2014: http://www.reuters.com/article/2013/12/09/utilities-aep-texas-idUSL1N0JO0UN20131209

[22] Integrated resource planning, where generation, demand side, and transmission resources are equivalently evaluated to address an identified need for electricity to serve a utility's retail load is largely practiced in the West and Southeast, with some parts of the Midwest as well. States in the East that have RTOs/ISOs, will have less of a say on generation and transmission that is built, as the RTO/ISO markets and transmission planning processes, respectfully, in reality make the decisions on what is built. There is a role for states in RTO/ISO areas in transmission planning through their own voice, one of many, in the RTO/ISO stakeholder processes, but it is generally much less so than non-RTO/ISO areas. California and Texas in relation to their ISOs would be exceptions to this generalization.

the decisive role states and cooperative regional planning processes play and related delays caused by the FERC order, cost and public policy consequences.[23]

How the cost of new transmission is paid for ("cost-allocation") ultimately among electricity consumers that pay their electric bills, varies by region, state, sometimes even by specific transmission project and type of electricity market structure (i.e., centralized or not in an RTO/ISO). It may not be a specific state policy or law that governs cost-allocation, but instead may be a custom for that state or region, or a specific negotiated agreement for a specific transmission project. As expansion and modernization of electricity infrastructure continues as a high priority, the issue of "who pays" remains.

In general, cost allocation is generally easier in the western United States where the population, and thus the transmission network, is less dense and thus more point-to-point than it is in the more populous eastern interconnection where it is easier to assign transmission costs. In the West, for example, a collection of load-serving entities may contract with a distant generator for electricity, which will provide the cash flow to justify a new transmission project that may be needed to connect the new generator to load. Midcontinent Independent System Operator (MISO) RTO and in the Southwest Power Pool (SPP) RTO are exploring cost-allocation as well, which may provide potential options for national policy recommendations.

Implementation plans that state and tribal air regulators file with the U.S. Environmental Protection Agency (EPA) may have implications for future transmission needs as well should pending greenhouse gas rulemakings on future and current fossil generation go forward. State energy offices, public utility commissions and air regulators continue to explore ways to address these issues that will impact transmission, storage and distribution. Tribes have primary jurisdiction over the siting of new transmission lines and energy generation projects on tribal lands. This jurisdiction to approve and control the development of new energy infrastructure is shared with the federal government, which must approve any leases or rights of way for energy infrastructure projects. This attendant federal responsibility necessarily includes the federal environmental review process.

Planning and development will continue to shift toward RTOs/ISOs and transmission-only utilities to accommodate the growing pressures for interstate development.[24] However, these efforts must be coordinated with the sometimes overlapping or exclusive authorities of the affected states, tribes and localities affected.

Historically, upgrading the transmission system has been the primary focus in the electricity sector from an infrastructure standpoint. In the 1990s, many policymakers sought to create a national electricity transmission system for interstate commerce in electricity that would replicate the national highway system. Investment in transmission infrastructure has improved over the past decade following legislation such as the National Energy Policy in 2001 and the Energy Policy Act of 2005; but there is still more to

[23] National Regulatory Research Institute. "FERC Order 1000: Public Utility Compliance and Impacts on States." Feb. 2013.
[24] Hoecker, J. and Smith, D. "Regulatory Federal and Development of Electric Transmission: A Brewing Storm?" *Energy Law Journal*, May 13, 2014.

be done. Further, a new focus on distribution modernization is gaining momentum as the nation broadens its primary energy resources. State, tribal, and local governments are identifying ways to overcome these issues.

4.1 U.S. Department of Energy (DOE) Transmission Congestion Studies

In order to assist in meeting the demand of all electricity customers, the Energy Policy Act of 2005, Sec. 1221 added a Sec. 216(a) to the Federal Power Act that requires DOE to conduct a study and then issue a report on transmission congestion on a tri-annual basis. DOE has issued reports in 2006 and 2009, with a third report as of March 2014 under internal Administration review before public release. DOE released in February 2014 a report on "Transmission Constraints and Congestion in the Western and Eastern Interconnections, 2009-2012." These periodic DOE reports on transmission congestion, as well as FERC's incentive rates, may spark a transmission developer to propose a new transmission project or a state or region to take action(s) to encourage solutions, whether transmission or non-transmission, to solve any significant identified congestion.

4.2 Energy on Federal Lands

The U.S. Department of Interior's Bureau of Land Management (BLM) oversees a considerable extent of public lands with the potential to make significant contributions to the nation's energy portfolio. The BLM ensures that proposed projects meet all applicable environmental laws and regulations and works with local communities, the states, tribes, industry and other federal agencies in the approval process, maintaining four Renewable Energy Coordination Offices and five oil and gas Pilot Offices to facilitate reviews. BLM also participates in a Cabinet-level working group that is developing a coordinated federal permitting process for siting new transmission projects that would cross public, state, and private lands.

BLM manages regulatory compliance to ensure developers and operators follow specific requirements and regulations. Although the Bureau of Indian Affairs issues mineral leases on Indian lands, the BLM approves and supervises mineral operations on these lands.

Sec. 368 of the Energy Policy Act of 2005 required the U.S. Departments of Interior, Agriculture (USDA), Commerce, Defense and the DOE to work together to designate energy rights-of-way corridors oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on federal lands in the West in one phase and, if warranted, in the rest of the United States in a later phase. Section 368 also directs the agencies to take into account the need for upgraded and new infrastructure and to take actions to improve reliability, relieve congestion, and enhance the capability of the national grid to deliver energy.

Energy corridors include areas on Federal lands that are most suitable for siting transmission projects because the chosen areas minimize regulatory conflicts and impacts on environmental and cultural resources, and also address concerns of local communities. Designated energy corridors provide an opportunity to co-locate projects and share environmental and cultural resource impact data to reduce overall impacts on environmental and cultural resources and reduce the need for land use plan amendments in support of the authorization of transmission rights-of-way. The designation of energy corridors can help expedite the siting, permitting, and review processes for projects within such corridors, as well as improve the predictability and transparency of these processes.

A 2013 Presidential Memorandum required the Secretaries to undertake a continuing effort to identify and designate energy corridors, including revising corridors that have been previously identified.[25] It also required the DOE to provide a Transmission Corridor Assessment Report for both the Western and non-Western states. This work is ongoing.

5. Limitations, Vulnerabilities and Desirable Characteristics of the Future Energy System

In the pursuit of a safe, secure, reliable, resilient and environmentally responsible energy system, there emerges a new layer of broader policy and regulatory challenges and implications. State, local, and tribal leaders are examining the related limitations and vulnerabilities to the energy system and defining innovative actions to manage the transition and prepare for future needs. The following priorities are being addressed across the country at the state, local, and tribal levels and across these government sectors. While these issues have been addressed at previous public input meetings, they are of critical importance to the policymakers, agency heads, tribal leaders and city managers who will oversee, manager and create the policy and regulatory framework for much of the infrastructure development that will occur.

5.1 Resilience

Ensuring a resilient energy system is particularly important for state, local, and tribal governments. The term resilience means the ability to "prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions…[and] includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents"[26] After a recent series of extreme weather events highlighted major vulnerabilities in the nation's energy infrastructure, the threat of increasing climate impacts and advancements in the automation of the energy sector, resilience has become a top priority for both the public and private sectors. While states, localities and tribes have long histories in emergency preparedness, questions remain about how to build and invest in resilience particularly in light of rising climate change, physical threat and cyber security concerns.

The electric grid is arguably the most complex and critical infrastructure that other sectors depend upon to deliver essential services. There are many ways in which states, local government and tribes can adopt strategies that ensure resiliency of their electric grid. Traditional strategies to ensure grid resiliency include upgrading power poles and trimming trees near power lines. However, several communities are adopting newer approaches, such as development of microgrids and energy storage facilities, which allow operators to quickly reconfigure the system when portions of the grid go down. Lessons learned from

[25] Presidential Memorandum on Transforming our Nation's Electric Grid Through Improved Siting, Permitting and Review, June 2013, http://www.whitehouse.gov/the-press-office/2013/06/07/presidential-memorandum-transforming-our-nations-electric-grid-through-i

[26] Presidential Policy Directive/PPD-21 Critical Infrastructure and Resilience. Accessed August 5, 2014: http://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil.

extreme weather events such as Super Storm Sandy could inform other states and regions on the steps needed to ensure a resilient energy system.

Oil and gas infrastructure is vulnerable to physical threats, hurricane damage and other losses, particularly with regard to offshore assets. The infrastructure is also aging. The industry is undergoing major system improvements to harden existing and install new equipment. Innovative technologies are also being deployed—notably the combination of hydraulic fracturing and horizontal drilling that launched the shale revolution, deep water drilling, enhanced oil recovery and more. The National Petroleum Council has spent some time examining resilience on the oil and natural gas infrastructure side. Key government and industry stakeholders are providing input to this process. In May 2014, the council analyzed the responses to recent infrastructure disasters and considered improvements for future responses, particularly seeking recommendations on emergency preparedness, enhanced communications, improved situational awareness to inform decision-making and response, and expedited restoration of fuel supply and service to customers. The DOE is coordinating with the Council to incorporate their findings into the QER where appropriate.

5.2 Reliability

Reliability is separate from but related to resilience. Reliability is much easier to navigate and predict than resilience because of the applied probabilities which involve more common events.[27] NERC is the regulatory authority in the United States that is responsible for the reliability of the bulk power system. NERC, which is subject to FERC oversight, [28] develops and enforces reliability standards; assesses seasonal and long-term reliability of the system annually; monitors the bulk power system through system awareness; and educates, trains and certifies industry personnel.

Reliability of the system is a shared overall responsibility of the federal government, states, local governments, tribes, and the electric power industry. Each entity has a significant role in ensuring that the electric grid is reliable to meet the needs of society, but clarity in those roles moving forward may be needed. Approval of new transmission lines and upgrades to existing lines, modernization of the distribution system including distribution automation, interregional system planning, deployment of smart grid technologies, including installation of automated metering infrastructure (AMI), and oversight of utility demand response programs all work toward enhancing reliability. State public utility commissions have the responsibility to ensure the reliability system at the distribution level.

There are currently collaborative efforts underway to meet the needs of a reliable electric system. Some of these efforts include NERC's efforts to review and revise its reliability standards for cost effectiveness and other system improvements. Due to the increase in data provided by AMI, large data sets are being produced that aim to help system operators have better information and awareness, thus enhancing system

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[27] Zarakas, William, et al. *Utility Investments in Resiliency: Balancing Benefits with Cost in an Uncertain Environment*, Science Direct, June 11, 2014. http://www.sciencedirect.com/science/article/pii/S1040619014000967

[28] North American Electric Reliability Corporation: http://www.nerc.com

reliability. An increase in real time system operations data should enhance system awareness and reliability, but coordination across the right stakeholders is critical to this process.

Collaboration on reliability has been ongoing in the West for many years. The Western Electricity Coordinating Council (WECC) is the regional entity responsible for coordinating and promoting bulk electric system reliability in the Western Interconnection. In addition, WECC provides an environment for coordinating the operating and planning activities of its Western state members.[29] Similarly in the eastern U.S., the Eastern Interconnection Planning Collaborative (EIPC)[30] represents a first-of-its-kind effort to involve planning authorities in the Eastern Interconnection to model the impact on the grid of various policy options determined to be of interest by state, provincial, and federal policy makers and other stakeholders. Those processes will be informed by the EIPC analysis efforts including the interconnection-wide review of the existing regional plans and development of transmission options associated with the various policy options. The Eastern Interconnect States Planning Council (EISPC)[31] participates in the EIPC. The EISPC represents the 39 state public utility commissions, the District of Columbia, New Orleans and eight Canadian Provinces located within the Eastern Interconnection electric transmission grid. These entities work together to evaluate transmission development options throughout the Eastern Interconnection with reliability of the bulk power system a priority.

5.3 Physical and Cyber Security

The energy industry has long been engaged in physical security of infrastructure, protecting the network from widespread instability and cascading issues. Energy infrastructure is vulnerable to the threat of increasing extreme weather events and other observed and projected climate change impacts (e.g., rising sea-levels, higher storm surges, more intense precipitation events and heat waves, forest fires and drought). Further, a more intense focus is being placed on the cyber security of the energy system due to rising threats and an automated and dispersed framework. America's energy system depends on the exchange of timely, accurate information to system operators. These massive and distributed controls require complex communications channels, which expose the system and its interconnected networks to cyber attack. As these threats continue, state, local, and tribal leaders are working with industry to consider new tactics to address these risks and manage the associated costs.

According to a report published by the National Association of Regulatory Utility Commissioners (NARUC), state governments are working to implement energy assurance plans across the country that help respond to vulnerabilities, as well as preventing and protecting against cyber threats. There is an important distinction between threats and vulnerabilities. A threat is the potential for an actor, circumstance or event to adversely affect assets, people or organizational operations of the electric power system. Vulnerability is a specific weakness at any point in the system that can be exploited by a threat

[29] Western Electricity Coordinating Council: http://www.wecc.biz
[30] Eastern Interconnection Planning Collaborative: http://www.eipconline.com
[31] EISPC: http://communities.nrri.org/web/eispc/community-home-and-charter.

source.[32] Approval of cost recovery of cyber security systems is also the responsibility of the state public utility commissions, who work with industry to ensure that cost-benefit analyses and prudence reviews are completed so costs to deploy cyber security tools and systems are just and reasonable.

The installation of automated infrastructure and other measurement devices requires investment in sophisticated cyber systems. Better data from these smart grid systems will help to modernize the electric grid, while at the same time open it up to more entry points onto the grid, making the system more vulnerable to attack.

NERC adopted a new set of Critical Infrastructure Protection (CIP) standards in May 2014 in order to increase the physical security of the energy system. Compliance with NERC CIP standards is mandated for all owners and operators in the bulk electric generation and distribution industry. The U.S. Department of Homeland Security (DHS) has also published a report to help tribes implement cyber security processes and tools.[33]

The oil and gas industry also faces increasing threats of physical and cyber security. In March 2012, for example, the Department of Homeland Security (DHS) reported ongoing cyber intrusions among U.S. natural gas pipeline operators, which heightened concern about cybersecurity in the U.S. pipelines sector. Pipeline safety is addressed above as it has become a major priority for states, localities and tribes to prepare for the constant and ever-increasing sophistication of these threats.

5.4 Environmental Quality

Ensuring environmental and public health is also a major priority concern for states, localities and tribes. Understanding the environmental impact of transmission, storage and distribution infrastructure requires an evaluation of several factors, including whether construction of the pipeline or transmission line will: affect endangered species (e.g., sage grouse), open new areas to development (e.g., roadway construction), cause land-use impacts (e.g., top-soil erosion, GHG emissions), involve sensitive ecological areas or give rise to visual or aesthetic concerns.

Of particular importance now for state, local, and tribal leaders are the environmental impacts from natural gas pipelines. This infrastructure is typically buried, necessitate clearing and rights-of-way during the construction phase that impacts local habitats for plants and wildlife. There are also potential erosion and sedimentation concerns from this development. Accidental and routine releases of gas may impact drinking water supplies. Methane and other gas emissions from compressor stations and pipelines, as discussed above, affect environmental quality. Where states allow gas distributors to recover costs of shipping natural gas to their customers, including gas lost between the transmission hub and the gas meter, there may be a disincentive for gas distributors, in some cases, to conduct line repairs and replacement.

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[32].Keogh, Miles, and Cody, C. 2013. *Cyber Security for State Regulators 2.0.* National Association of Regulatory Utility Commissioners. Accessed August 5, 2014: http://www.naruc.org/grants/Documents/NARUC%20Cybersecurity%20Primer%202.0.pdf.
[33] DHS (U.S. Department of Homeland Security). 2013. Tribal Resource Guide. DHS (Last updated June 2013). Accessed August 5, 2013: http://www.dhs.gov/xlibrary/assets/iga/dhs-tribal-resource-guide.pdf

As described above (on page 6), nearly one-quarter of the methane emissions in the United States come from the natural gas sector. About 32% of these methane emissions come from gas wells, 14% are emitted from gathering lines and in processing, nearly 34% are emitted from transmission pipelines and storage and 20% is emitted from distribution to end users.[34] Concerns about methane emissions will continue as a top priority for the states, in particular, as they consider the response for their implementation plans under potential new federal limits for greenhouse gas currently being considered by the U.S. Environmental Protection Agency.

5.5 Affordability

Maintaining affordability in electricity service has long been a central tenet of utility regulation. State public utility commissions have the responsibility for ensuring that costs to the consumer are just and reasonable and require utilities under their jurisdiction to provide extensive evidence before approving rate recovery of system improvement costs. They are tasked with the difficult challenge of identifying the appropriate rate designs and structures that meet both utilities and consumers' needs. Yet, significant investment in infrastructure to ensure the electric and natural gas systems continue to provide reliable, yet affordable service.

According to the Advanced Energy Economy, some examples of how investments can help answer the affordability question include the following: 1) efficient, flexible natural gas generation can support deployment of renewable resources that are increasingly cost-effective; 2) high-voltage direct current (HVDC) transmission can connect wind and large-scale solar installations to population centers with minimal transmission losses; and 3) intelligent grid management solutions and demand response technologies, coupled with granular energy use data, can lead to customer choices that respond to price and other signals to flatten the demand curve. This can avoid the need for investment in peaking capacity and transmission and distribution upgrades, freeing up capital and leading to greater asset utilization across the network while keeping costs down.[35]

Deployment of energy efficiency and demand response programs are other examples of cost-saving measures to ensure that the grid remains reliable and affordable. Effective energy efficiency programs can result cost savings for the consumer. For example, installation of intelligent, programmable thermostats can help consumers manage their energy consumption. Demand response programs have been in place for many years at various utilities. However, the use of demand response programs is on the rise and can help the utility manage cost-effective utilization of its system; but, they also present challenges to managing future infrastructure needs.

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[34] Ibid.
[35] Advanced Energy Economy. 2014. Modernizing the Electric Grid, Part I: Striving for Efficiency in Energy and Capital. *Advanced Energy Perspectives* (May 21, 2014). Accessed August 5, 2014: http://blog.aee.net/modernizing-the-electric-grid-part-1-striving-for-efficiency-in-energy-and-capital.

5.6 Workforce Development and Training

With the build out of new and modified energy systems, the nation is experiencing a graying energy workforce and a potential shortage of engineers and similar professionals. Industry statistics predict glaring gaps in the energy workforce, stating that nearly 55% of the energy industry workforce may need to be replaced in the next 10 years.[36] Building new energy and modified infrastructure will require an educated and trained workforce in technical and engineering proficiencies. For states, localities and tribes, providing a skilled workforce offers great economic opportunities. They are working closely with community and technical colleges and industry to ensure a diverse and qualified workforce that can meet the challenging and changing needs of the energy sector. Training and certification is needed for line workers, while system engineers and cyber security experts are critical to utility operations.

Many short and long-term jobs will be created from natural gas development presenting both employment opportunities and workforce development challenges. Natural gas pipeline planners and operators are also needed. Science, technology, engineering and math (STEM) education programs are gaining in interest during the drilling and completion process requires a diverse set of skills.

6. Conclusion

State, local and tribal leaders face many difficult challenges ahead in defining the shifting authorities, managing increasing threats and taking on potential new responsibilities in modernizing the nation's energy infrastructure. As the nation's agents of change and innovation, these stakeholders will help to lay the policy and regulatory foundation for decision-making in the near- and long-term.

7. Key Questions

State, local, and tribal governments are grappling with critical questions regarding new and modified energy infrastructure. These and other questions will be considered during this meeting in Santa Fe, New Mexico and under the QER.

- What are the best ways to ensure a safe, reliable, secure, affordable and environmental sustainable energy network while still taking hold of the economic opportunities?
- Will existing authorities for siting, permitting and planning allow the nation to achieve long-term security, economic and environmental goals?
- What are the lessons learned from current state, tribal and regional efforts to develop and modernize energy infrastructure that could be shared with other states and regions?
- Are there particular processes relevant to regulating energy transmission, storage and distribution infrastructure where more jurisdictional clarity is needed?
- Are there examples of innovative cost allocation models for new and modified infrastructure in each sector at the regional or state level?

[36] Gaps in the Energy Workforce Pipeline, 2013 Survey Results, Center for Energy Workforce Development, http://www.cewd.org/surveyreport/index.php.

- Where is more coordination needed in the siting and regulatory process and how do we move toward meeting those needs? What is the federal role in coordinating with states, local governments and tribes on these issues?
- How would enhanced coordination allay some of the jurisdictional issues now and moving forward?
- What are the data needs across the natural gas, liquid fuels and electricity sectors that will enhance policymaking and infrastructure modernization?
- How will states, local governments and tribes ensure the development of a skilled workforce?