September 19, 2014

To: U.S. Department of Energy Office of Energy Policy and Systems Analysis
Submitted via electronic mail: QERComments@hq.doe.gov

Re: **Natural Gas Transmission, Storage and Distribution; formal comments**

Sempra Energy, on behalf of its subsidiaries, San Diego Gas and Electric Company (SDG&E), Southern California Gas Company, (SoCalGas) and Sempra U.S. Gas & Power,[1] supports the U.S. Department of Energy's (DOE) efforts to promote energy safety, reliability and affordability and appreciates the opportunity to comment on DOE's public meeting regarding natural gas transmission, storage and distribution. DOE's support in coordinating synergies among federal agencies and driving innovation through its role as a convener will be invaluable in supporting stakeholders in meeting the goal of providing safe, reliable and affordable energy; as further discussed in our comments below.

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Key Questions from the Department of Energy with responses provided by Sempra Energy.

1. **Who should pay for new pipeline capacity and how should those costs be allocated? How can electricity markets incentivize flexibility and reliability of gas-fired generators, to ensure they have fuel when they are most needed?**

   SoCalGas and SDG&E fall under California Public Utilities Commission (CPUC) jurisdiction for their natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering and billing. As SoCalGas and SDG&E add new intrastate utility-owned pipeline capacity, the cost of the new infrastructure is allocated to the utilities' ratepayers in accordance with CPUC-approved formulas established in various regulatory proceedings. SoCalGas and SDG&E believe this process of determining who pays for and how costs of utility-owned intrastate pipelines are allocated works well at the state level.

   Most of the natural gas used in California comes from out-of-state natural gas basins and is delivered to California via interstate natural gas pipelines regulated by the Federal Energy Regulatory Commission (FERC). SoCalGas and SDG&E contract and pay for capacity on interstate pipelines on behalf of their core residential and smaller commercial customers. SoCalGas and SDG&E often participate in FERC proceedings to represent the interests of their natural gas customers.

   For new interstate pipeline capacity, the advent of the shale gas revolution and the resulting glut of gas in the producing regions and lack of infrastructure to bring this gas to some load

[1] Sempra U.S. Gas & Power, LLC is not the same company as the California utilities San Diego Gas & Electric Company (SDG&E) or Southern California Gas Company (SoCalGas), and Sempra U.S. Gas & Power, LLC is not regulated by the California Public Utilities Commission.

centers, has led to significant seasonal gas price differentials in some areas, like the Northeast.[2] These price signals to interstate pipelines provide incentives to invest in new capacity to move gas from producing regions to load centers.

2. What have been the key safety trends recently in the natural gas transmission, storage, and distribution segment of the gas industry? What are chief actions that could be taken to improve safety for this segment?

Various regulatory agencies, including the CPUC, are evaluating natural gas pipeline safety regulations, practices and procedures. These activities have largely focused on efforts to evaluate existing infrastructure safety with emphasis on the need to update aging infrastructure. For example, in February 2011, the CPUC opened a rulemaking proceeding to examine what changes should be made to existing pipeline safety regulations for California natural gas pipelines. In this rulemaking, the CPUC directed the California utilities to file implementation plans to test or replace natural gas transmission pipelines that lacked documentation of a pressure test to modern standards and consider retrofitting their systems with improved valves and in-line inspection technology. The Commission issued a final decision on SoCalGas and SDG&E's Pipeline Safety Enhancement Plan (PSEP) in June 2014 that approved the proposed plan but did not pre-approve the recovery of the costs of implementing the plan. Instead, the Commission adopted a process for reviewing and approving PSEP implementation costs after-the-fact.

Beyond these more macro efforts to reevaluate regulations, practices, and procedures, there should be efforts to address specific pipeline system issues such as excavation damage.

Despite efforts by regulatory agencies to enhance pipeline safety through new regulations, practices, and procedures applicable to pipeline operators, the largest contributor to incidents from 1994-2013 on all pipeline systems (based on PHMSA's statistical data) is Excavation Damage (37%).[3] While these statistics have improved over time with the implementation of the Pipeline Inspection, Protection, Enforcement and Safety (PIPES) Act of 2006, there are opportunities to improve safety in the areas of excavation damage. For example, programs such as 811 "Call before you dig" are critical in providing the public awareness as to the consequences of damaging pipelines while digging. Programs such as 811 are good tools to prevent damages but damages continue to occur, and in certain instances are caused by the same entity. Considering the consequence and the impacts on safety, state and local agencies should consider additional penalties for entities that damage pipelines on a frequent basis.

[2] Cunningham, Nick. OilPrice.Com. Natural Gas Pipeline Bottlenecks Lead to Price Spikes in New England. 1/8/2014. Web. 9/18/14. http://oilprice.com/Energy/Natural-Gas/Natural-Gas-Pipeline-Bottlenecks-Lead-to-Price-Spikes-in-New-England.html

[3] U.S. Department of Transportation. 9/3/2014. Web. 9/18/14. http://primis.phmsa.dot.gov/comm/reports/safety/AllPSIDet_1994_2013_US.html?nocache=7838#_ngdistrib

3. What could be the impact of distributed natural gas generation on infrastructure demands?

Distributed natural gas generation, if properly implemented, has the potential to provide a number of benefits as recognized by the U.S. Department of Energy: [4]

- **Enhance our energy security** by reducing our national energy requirements and help businesses weather energy price volatility and supply disruptions
- **Advance our climate change and environmental goals** by reducing emissions of CO_2 and other pollutants
- **Improve business competitiveness** by increasing energy efficiency and managing costs
- **Increase resiliency of our energy infrastructure** by limiting congestion and offsetting transmission losses
- **Diversify energy supply** by enabling further integration of domestically produced and renewable fuels
- **Improve energy efficiency** by capturing heat that is normally wasted.

The benefits of distributed natural gas generation can largely be achieved by using the existing natural gas infrastructure. Although there may be some necessary infrastructure expansions to serve new customers or areas with increased consumption, distributed natural gas generation should largely be able to function using the existing natural gas infrastructure.

4. Are there conflicts between federal, state, regional and local policies and regulations that serve as a barrier to improving gas-electric coordination? If so, what's the best way to resolve them?

We are not aware of any such conflict in California. Efforts to improve gas-electric coordination in California have not been hampered by conflicts between the FERC, CAISO and the CPUC-jurisdictional Local Distribution Companies (LDC). Market participants here realize that natural gas supply and transportation capacity have to be available to keep the lights on and they act accordingly. Other regions of the country are not as dependent on natural gas for electric generation which contributes to less enthusiasm for accommodation for the adoption of a nationwide policy on gas-electric coordination. During the NAESB Gas-Electric Harmonization meetings, LDCs from other regions stated that they have a limited obligation to keep the lights on since their corresponding regional electric generators and grid operators have expressed a preference to rely on alternate fuels instead of natural gas for grid reliability.

[4] Benefits of Combined Heat and Power. U.S. Department of Energy. 3/18/2013. Web. 9/18/14. http://www1.eere.energy.gov/manufacturing/distributedenergy/chp_benefits.html

5. What natural gas-related interdependencies should be examined from an energy security and resilience perspective?

The interdependency of power generation involving the use of renewables should be examined. As natural gas is used more for power generation and as a back-up for renewables, the energy security and resiliency of the pipeline system will become more important. This means the failure of a critical system could impact both gas transmission as well as power generation, which in turn could cause brown/black-outs. This may have to be evaluated on a regional basis.

In addition, the industry should examine the resiliency of key facilities located in areas subject to flooding and or sea level rise potentially caused by climate change. This again might be a local issue but in some cases may impact security and resilience on a broader basis.

6. What existing policies are problematic for maintaining system reliability, adaptability and resilience?

First, a large issue faced by SoCalGas and SDG&E is undetected third party damage to the gas system, particularly to large diameter critical pipelines. Third party damage not only causes safety related incidents, but can impact reliability and increase the unintended release of methane emissions. There should be stricter enforcement and strong penalties for third party damage. While this is generally controlled by each State, there could be federal government rules or policies requiring a standard level of enforcement and a minimum set of penalties applicable to third party damage of transmission lines.

Second, a security concern exists as a result of the pipeline system information that must be supplied to PHMSA. The amount of information provided could be expanded in the next year. Information provided must be limited and safeguarded. If it gets into the wrong hands it could present a significant security and reliability risk.

Third, during a major failure or catastrophic event, environmental requirements may cause delays in the gas system recovery process. While most environmental agencies are very supportive and provide waivers during emergencies, it may be beneficial to have streamlined environmental permitting procedures in place to facilitate emergency recover efforts.

Finally, excessive regulations on storage well stimulation techniques could hinder the deliverability of gas supplies during times of heavy demand.

7. What emerging technologies offer opportunities or pose challenges to improving the delivery of natural gas?

Emerging technologies could expand natural gas use and create additional uses for the existing natural gas infrastructure. Some examples include:

Fuel Cells

The emergence of cost-competitive fuel cells for transportation and stationary applications offer new opportunities for natural gas use. Research and development of compact, modular fuel cells will create new opportunities for residential natural gas by providing both electric power and thermal energy for water heating, space conditioning, clothes drying and cooking. With interest in Zero Energy homes and buildings (discussed below), it is critical to maintain customer fuel choices. Continued introduction of cost competitive natural gas generation technologies through intensive research, development and demonstration will ensure this choice. Larger fuel cells can play an important role in the development of Zero Energy communities in single family sub-divisions, multi-family and low-income communities and mixed-use building clusters.

Distributed Methane Reforming for Hydrogen Electric Fuel Cell Vehicles

Distributed production of hydrogen from natural gas uses small scale steam methane reforming technology. The advantages of distributed hydrogen production is that the production unit can be located at a consumer refueling site, the unit capacity can be tailored to the site's fueling requirements, and this approach eliminates the need for an extensive hydrogen delivery infrastructure. This process may be the most viable for introducing hydrogen as a fuel since it requires less capital investment for the smaller hydrogen volumes needed initially in the transition phase of hydrogen use.

Zero Net Energy (ZNE) Compliant Appliances

California's Long Term Energy Efficiency Strategic Plan calls for all new construction of single family homes to be Zero Energy Homes by 2020 and all commercial buildings to be Zero Energy by 2030. The definition of Zero Energy, as adopted by the California Energy Commission in implementing the new Title-24 Building Energy Standards, highly favors the renewable "PV" solution, which from a governmental regulations perspective helps address both the State's energy efficiency and emissions (GHG) issues.

With the anticipated code changes, there is a real possibility for builders of new residential construction to move toward construction of "all electric" homes in the near future unless the natural gas industry can offer cost competitive options. Research needs to be done to develop high efficiency appliances and equipment as well as natural gas generation technologies (Micro-Combined Heat and Power (CHP), Fuel Cell) and renewable thermal technologies (Solar Thermal) for potential integration into future home design. [5]

SoCalGas is also looking into other technologies and new end uses for natural gas. These include natural gas engine-driven heat pumps for space conditioning, heat pump water heaters, and Natural Gas Vehicle (NGV) Home Refueling Appliances to refuel natural gas vehicles in the home.

[5] Within SoCalGas' service territory, the utility faces the additional challenge of meeting NOx emission standards promulgated by the South Coast Air Quality Management District applicable to forced air furnaces, water heaters, boilers and other industrial equipment. Development of improved engines, fuel cells, boilers and residential appliances that use natural gas, while not sacrificing energy efficiency, is critical for SoCalGas.

Renewable Energy Storage (Power-to-Gas)

Using the natural gas pipeline system for energy storage would allow PV generation to become reliable and dispatchable. The conversion of solar power to natural gas (i.e., first to hydrogen and then to methane) and utility-scale storage in the natural gas network has the potential to make solar power generation a baseload asset by utilizing existing natural gas infrastructure. Power to gas has the potential to assist in the long-term integration of intermittent renewable energy into the electric grid.

8. What information could better inform policy decisions about natural delivery infrastructure?

Lower natural gas prices since the advent of the shale gas revolution have resulted in increasing gas demand from the power sector, which has not been matched with investment in additional infrastructure needed to serve that increased demand. This mismatch between demand and supply has threatened the reliability of both the gas and the electric industries, particularly in the Northeast. The current FERC proposals to address these issues in Docket Number RM14-2-000, *Coordination of the Scheduling Processes of Interstate Natural Gas Pipelines and Public Utilities,* essentially impose new costs on the natural gas industry to provide marginal benefits to regional electric interests. The DOE should examine the regions in which increasing gas demand is not producing sufficient incentives for investment in the gas delivery infrastructure needed to serve that increased demand.

Further, a large component of the Electric Generation (EG) market is supplied under interruptible transportation tariffs. This relates to EG customers who may be curtailed when insufficient capacity exists to serve them, as well as the firm transportation customers, including residential core customers. Increasingly, however, these interruptible EG customers cannot actually be curtailed. The electric transmission systems have become dependent upon the power produced by gas-fired plants, and any interruption could threaten the overall integrity of the electric grid. Most pipeline companies will not expand their pipeline network capacity to serve interruptible customers; the assumption is that those customers will make use of unused capacity when it's available, thereby maximizing the pipeline investment.

Efforts to develop a metric that compares the interruptible demand served by a pipeline (or a utility or region) against the capacity of that pipeline (or utility or region) could help guide policy decisions.

9. What investments, if any, need to be made in natural gas infrastructure to backstop growth in intermittent supplies like wind and solar generation?

The problem with intermittent supplies is that they often stop suddenly, requiring very quick replacement with traditional sources of electricity; in particular, new quick-start flexible ramping gas-fired electric generation. Natural gas infrastructure is generally able to accommodate these quick-start and rapid ramping requirements, particularly on the large diameter transmission pipeline system. However, on smaller diameter, lower pressure

systems, such as those of an LDC, the pressure loss resulting from the quick-start operation can threaten the system integrity of the pipeline network.

Peak-shaving facilities, such as LNG supply, installed near these quick-start plants could help maintain gas system integrity in operation. However, it is no easy task to site an LNG facility in highly-developed and populated areas. SoCalGas and SDG&E have found no other suitable investment in gas infrastructure that can protect the system integrity, and may need to resort to imposing restrictions on operations and curtailment, if necessary, if sufficient infrastructure to backstop growth in intermittent supplies like wind and solar generation cannot be established. Electric companies and planners should consider this when choosing locations to site these peak shaving facilities.

10. Will distributed energy resources at the distribution level increase or decrease the need for fast-ramping natural gas generators?

In order to sufficiently answer this question, a distinction must be made between distributed natural gas generation and intermittent forms of distributed generation such as wind and solar. Intermittent forms of distributed generation will increase the need for fast-ramping natural gas generation while natural gas fueled distributed generation will have little or no impact. As the amount of intermittent resources on the grid increases, there will be an increase in the peaks and valleys which at this time can only be filled by fast ramping natural gas generation.

11. Are gas pipeline compressors stations vulnerable to power outages, and to what degree would gas TS&D systems be affected by a relatively long-term regional power outage?

Under normal conditions, gas pipeline compressor stations are not overly reliant on commercial power. One issue that may arise in the event of long term loss of commercial power would be the permits for the operation of backup generators. Some of the permits limit the annual hours of operation. If additional hours of operation are needed, emergency variance/deviation from the permit may be required. There are also state and local rules restricting the use of unpermitted, portable generators. These rules need to be revisited to avoid unnecessary gas shortages.