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SoCalGas Comments-Natural Gas Sector Climate Resilience Webinar

Additional submitted attachment is included below.

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Subject: Comments on the Forthcoming Solicitation Regarding Natural Gas Sector Climate Resilience Webinar, Docket #19-ERDD-01

Southern California Gas Company (SoCalGas) appreciates the opportunity to comment on the California Energy Commission's (CEC) Forthcoming Solicitation Regarding Natural Gas Sector Climate Resilience Webinar held on May 22, 2019. SoCalGas is pleased that the CEC is anticipating the release of a Grant Funding Opportunity (GFO) to support up to $1.5 million of research to foster natural gas sector resilience. SoCalGas supports research efforts that closely examine resiliency and possible vulnerabilities of the natural gas transmission and distribution system, as it will continue to play an integral role in providing safe, reliable, and affordable energy to Californians well into the future.

SoCalGas recommends future GFOs fund the following to promote natural gas sector resilience:

1. Research pipeline-specific stresses associated with the effects of horizontal subsidence;
2. Develop methodologies to evaluate changing risks of interdependent events;
3. Research to improve understanding of anticipated floods, droughts, and atmospheric rivers;
4. Develop metrics to assess and track progress in natural gas system resilience; and
5. Investigate further how natural gas infrastructure supports local and regional energy resiliency.

1. Research Pipeline-Specific Stresses Associated with the Effects of Horizontal Subsidence

Land subsidence in California has two primary causes: aquifer compaction due to excessive groundwater pumping, and decomposition of wetland soils exposed to air after wetland

conversion to farmland.[1] Aquifer compaction caused by excessive groundwater extraction is the single largest cause of subsidence in California, and the 5,200 mi^2 affected by subsidence in the San Joaquin Valley.[2] As periods of drought continue to occur, more groundwater will be extracted to meet demand, causing aquifers to compact and land to subside. As a result, more research is needed on the short- and long-term direct impacts land subsidence has on existing natural gas pipelines and indirect impacts climate change have on land subsidence.

For several years, SoCalGas has been assessing its pipelines to observe the stress-effects of subsidence. The Pipeline Research Council International showed that vertical subsidence appears to have minimal to no effect on natural gas transmission pipelines.[3] This is because during vertical subsidence, a natural gas pipeline will typically subside uniformly by the same depth, causing minimal to no effect. However, additional research is needed to assess the effects of horizontal subsidence on natural gas transmission pipelines. During horizontal subsidence, compression forces along the pipe may cause it to become overstressed and to buckle. SoCalGas believes this gap in research is a high priority.

2. Develop Methodologies to Evaluate Changing Risks of Interdependent Events

The effects of compounding and cascading events resulting from climate-driven natural disasters may be severe. For example, devastating wildfires in the Fall and Winter of 2017 in Montecito, California followed by intense rainfall in January 2018 caused "California's deadliest debris flow on record."[4] SoCalGas strongly supports the develop of methodologies to evaluate the changing risks of interdependent events.

There are existing hydrology and hydraulic models that estimate the flow and the depth of scour a flood may cause. However, models are needed that include prediction of the rocks and boulders that may be transported with a debris flow, resulting in additional scour and increasing the threat of exposure and damage to natural gas pipelines. SoCalGas believes this gap in research is another high priority.

The United States Geological Survey (USGS) prepared a draft manuscript that summarizes its and the California Geological Survey's observations in the Montecito inundation area and characterizes various aspects of the debris flows to validate/update input parameters for developing improved debris flow modeling in the built environment. The preparation of this new model is still in the preliminary stages. In addition, the University of Connecticut (UConn) is developing post-fire debris flow risk maps that can be used to identify vulnerable

[1] United States Geological Survey. Land Subsidence in California. Available at: https://ca.water.usgs.gov/land_subsidence/

[2] United States Geologic Survey. Land Subsidence: Cause & Effect. Available at: https://ca.water.usgs.gov/land_subsidence/california-subsidence-cause-effect.html

[3] C-CORE D.G. Honegger Consulting SSD, Inc. (2009). *Guideline for constructing natural gas and liquid hydrocarbon pipeline through areas prone to landslide and subsidence hazards.* Pipeline Research Council International, Inc. (PRCI).

[4] CEC. Natural Gas Sector Climate Resilience Workshop Presentation. May 22, 2019. Available at: https://www.energy.ca.gov/research/notices/2019-05-22_webinar/presentations/2019-05-22_Presentation_Webinar.pdf

infrastructure and opportunities for mitigation planning. SoCalGas believes research funds from the CEC can expand and support the work USGS and UConn are undertaking to model debris flow events and post-fire debris flow risk maps.

3. Research to Improve Our Understanding of Anticipated Floods, Droughts, and Atmospheric Rivers

With increased changes in climate behavior, the reliance of historical data is becoming less relevant. As such, there is a gap in research on what data to use for climate projections of extreme precipitation-related events that can lead to landslides, mudslides, debris flows, and/or subsidence-related stresses.

This research will support efforts in the California Public Utilities (CPUC) Climate Adaptation Order Instituting Rulemaking (OIR) (R.18-04-019) including Workshop #2 "Climate Data Sources, Models, And Tools," which took place on January 8 and February 4, 2019 and discussed what data sources, models, and tools to use for climate projections.

4. Develop Metrics to Assess and Track Progress in Natural Gas System Resilience

Another priority research topic is to develop metrics to assess and track progress in natural gas system resilience. One way this can be done is by using the adaptation pathways assessment with an economic model. Further, this analysis can look at how triggers and signposts link to adaptation pathways. This would include supporting research areas that: (a) identify what climate-related scenarios are most important for stress-testing the resilience of the natural gas system; (b) develop methods for integrating resilience investments into enhanced cost-benefit analyses that incorporate deep uncertainty; and (c) develop case studies to pilot test methods.

5. Investigate Further How Natural Gas Infrastructure Supports Local and Regional Energy Resiliency

The CEC released research in 2018 that found natural gas assets and service disruptions to be far less vulnerable compared to electric infrastructure to widespread service disruptions caused by wildfires, extreme heat, sea-level rise, flooding, and other extreme climate-driven events.[5] Additionally, SoCalGas commissioned consulting firm ICF International, Inc. (ICF) to investigate natural disasters throughout the country, including hurricanes, storms, wildfires, and mudslides, and develop case studies documenting the lessons learned from the impacts to utility and transportation infrastructure.[6] The case studies highlight concerns with an over-reliance on a single energy source and demonstrate that utilizing a diverse energy delivery system contributes to greater reliability and community resilience and enhances public safety. ICF also found that

[5] CEC. Regional Workshop held on January 24, 2019. Potential Impacts and Adaptation Options for Electricity and Natural Gas Systems from Climate Vulnerability in San Diego Area. Presentation available at: http://www.climateassessment.ca.gov/events/docs/20190124-Slides_ICF.pdf

[6] SoCalGas Study Offers Lessons in Resiliency Planning to Help Communities and Utilities Prepare for Disasters. Available at: https://www.sempra.com/newsroom/press-releases/socalgas-study-offers-lessonsresiliency-planning-help-communities-and

natural gas infrastructure and services were considerably more resilient to recent natural disasters, such as hurricanes and wildfires, compared to the electric system.

SoCalGas requests that the CEC further investigate how natural gas infrastructure can support and enhance local and regional energy resiliency. In addition, SoCalGas recommends the following research questions/subjects:

Question: How can the use of natural gas infrastructure to transport natural gas, renewable natural gas (RNG), and hydrogen support and increase community resiliency?

This research should include investigating how communities with energy system redundancy—i.e., connections to both gas and electric power—are able to endure climate change-driven disasters compared to communities that are only connected to the electric grid and also analyze how the use of renewable gaseous energy sources—such as RNG and hydrogen—can both reduce energy and waste system emissions while also contribute to local and regional energy resiliency.

Question: Which natural gas infrastructure investments should be prioritized to allow for the greatest benefits to energy system resiliency overall?

This research should include assessing energy system vulnerability for fringe communities (e.g., communities in wildfire-risk areas, flood zones, or sea level-rise areas), vulnerable communities (e.g., senior populations and low-income communities), and sensitive/critical operations (i.e., data centers, hospitals, and cooling centers).

Question: How does the resiliency of the natural gas system support continued operation of other energy and utility systems and/or critical services (e.g., water supply, telecommunications, and emergency responders)?

This research should include examining the interconnections of the natural gas system with critical resources such as electric generation, water pumping, and vehicle fueling and assess the benefits including emergency response, public health, and economic benefits of energy system diversity during climate change-driven events.

Additional Important Questions/Subjects for Research

1. Which communities (e.g., high-fire risk communities) would benefit most from installing microgrids based on natural gas or hydrogen fuel cells, combined heat and power systems, and/or backup natural gas generators?

2. What is the potential for aligning dead tree removal strategies (woody biomass) with thermal conversion to RNG technologies? And where should they be piloted?

3. How much fuel should be stored on-site in compressed natural gas (CNG) bottles or liquified natural gas (LNG) to prepare for potential service isolations?

4. Considering that isolating and restoring natural gas services that are shut-off but not damaged due to a climate event are time-consuming and a costly part of recovery in addition to the impacts of costs and quality of life to customers that experience an outage to their home or business,
    i. What is the optimal number and location of distribution system isolation valves to isolate high-risk communities during a climate event and reduce the number of customers impacted?
    ii. What technology options exist or could be deployed to increase effectiveness and reduce adverse customer impacts (e.g., automatic functions)?
    iii. When should they be or not be activated to best balance disruption of services and safety risk to customers?

5. What other benefits relating to improved air quality and reduced GHG emissions can be realized using CNG, RNG, and hydrogen as low-carbon fuel sources for energy resiliency?

6. How can Power-to-Gas technology further support the resiliency of energy systems?[7]

7. What is the importance of and opportunities for strategically-located natural gas storage to increase the resiliency of the energy system?[5]

Conclusion

SoCalGas thanks the CEC for providing the opportunity to comment on the topics raised in the Forthcoming Solicitation Regarding Natural Gas Sector Climate Resilience Webinar and looks forward to working with the CEC and other parties on the critical role natural gas infrastructure plays and will continue to play in supporting energy system reliability in California.

[7] Hydrogen produced from an electrolyzer is being used to power a fuel cell that supports operations of a winery in northern California. More power-to-gas projects that strengthen the resiliency of communities needs to be supported. For more information see Danigelis, Alyssa. Environmental Leader. February 26, 2018. *Stone Edge Farm Winery Looks To a Hydrogen-Powered Future*. Available at: https://www.environmentalleader.com/2018/02/self-sustaining-microgrid/

[5] Sandia National Laboratories conducted a study in 2013 titled, "Natural Gas Network Resiliency to a 'Shakeout Scenario' Earthquake." The study found that under a magnitude 7.8 earthquake on the southernmost 200 miles of the San Andreas Fault, it is likely that Southern California would have severely limited ability to transport natural gas from the Arizona border into Southern California. The impacts of this limitation could involve greatly reducing the supply of natural gas to the Los Angeles Basin (by 40-50%) and should also be researched. The study is available at: https://prod-ng.sandia.gov/techlib-noauth/access-control.cgi/2013/134938.pdf

Sincerely,

/s/ Tim Carmichael

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