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September 14, 2017

The Honorable Greg Walden and Joe Barton  
House Committee on Energy and Commerce  
Subcommittee on Energy and Power  
2125 Rayburn House Office Building  
Washington, D.C. 20515

**Subject:** September 14<sup>th</sup>, 2017 hearing titled “[Powering America: Defining Reliability in a Transforming Electricity Industry.](#)”

### **Introduction**

Spire Inc. (“Spire”) is a holding company with 3,300 employees providing natural gas to 1.7 million customers across Missouri, Alabama and Mississippi. Spire has previously submitted comments to this Committee for the hearing titled [Home Appliance Energy Efficiency Standards Under the Department of Energy– Stakeholder Perspectives](#). Spire’s comments for that prior hearing are listed towards the bottom of the above link as [Document for the Record – Statement for the Record on behalf of Spire Inc.](#) Because many of the issues we addressed then are also pertinent to this hearing (e.g., “deep decarbonization”), we urge the Committee to take notice of them in this hearing’s context.

Spire’s essential messages for this committee are that:

1. Diversity is key to energy reliability and resiliency.
2. Natural gas, as an alternative to electricity at the point-of-use, should not be overlooked for what it presently contributes to energy reliability, resiliency and the economy.
3. These contributions can and should be used to further lower overall consumer costs.

Spire fully supports a diverse “all the above” energy policy that also seeks to safeguard affordability and reliability. So far, however, it seems that at “all the above” is mainly being applied to the diversity of energy sources for electric generation. If diversity of electricity primary energy sources is desirable, so should energy alternatives to electricity be desirable. This would best serve consumer interests. Alternatives to electricity at the point of consumer use, such as natural gas, takes unnecessary strain off the electricity system, thus making it more reliable; especially during weather emergencies.

## How Natural Gas Direct Use Adds Reliability to the Electricity System

The inherently reliable and resilient attributes of natural gas transmission and distribution ((T&D) systems were recently validated by a MIT study titled “[Interdependence of the Electricity Generation System and the Natural Gas System and Implications for Energy Security](#)”<sup>1</sup> as shown by the following excerpt:

*The natural gas network has few single points of failure that can lead to a system-wide propagating failure. There are a large number of wells, storage is relatively widespread, the transmission system can continue to operate at high pressure even with the failure of half of the compressors, **and the distribution network can run unattended and without power**. This is in contrast to the electricity grid, which has, by comparison, few generating points, requires oversight to balance load and demand on a tight timescale, and has a transmission and distribution network that is vulnerable to single point, cascading failures. (emphasis added)*

Another recent report titled [Natural Gas Systems: Reliable & Resilient](#) (from the Natural Gas Council)<sup>2</sup> included similar reliability findings for the natural gas T&D system as shown by the following excerpts:

*This was demonstrated on January 7, 2014 during a “polar vortex” weather event that stretched across large parts of the United States and caused total delivered gas nationwide to reach an all-time record of 137.0 Bcf in a single day. Despite the unprecedented performance levels required, the industry honored all firm fuel supply and transportation contracts.*

*The joint Federal Energy Regulatory Commission (“FERC”)-NERC Southwest Cold Weather Report made similar findings about the reliability of the natural gas system during another weather-related event. In the first week of February 2011, the southwest region of the United States experienced historically cold weather that resulted in significant impacts on the electric system in Texas, New Mexico and Arizona, and natural gas service disruptions in those states as well. During the 2011 Southwest outages, 50,000 retail gas customers experienced curtailments when gas pressure declined on interstate and intrastate pipelines and local distribution systems due to the loss of some production to well freezing at a time of increased gas system demand. In contrast, 4.4 million electric customers were affected over the course of the same event.*

This inherent reliability was just evidenced in late August of this year during Hurricane Harvey. Reports stated that local gas utility distribution systems remained operational as shown by the following excerpts:

- [AGA Updates on Hurricane Harvey](#)  
Excerpt:

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<sup>1</sup> <https://www.serdpc-estcp.org/content/download/19069/208608/file/TR-1173.pdf>

<sup>2</sup> [http://www.ngsa.org/download/analysis\\_studies/NGC-Reliable-Resilient-Nat-Gas-WHITE-PAPER-Final.pdf](http://www.ngsa.org/download/analysis_studies/NGC-Reliable-Resilient-Nat-Gas-WHITE-PAPER-Final.pdf)

1. *Even under all of that water, the gas distribution system in the Houston area continues to operate as designed and continues to serve all customers who can physically take service.*

- [Harvey cleanup efforts for gas utilities may be cheaper than post-Sandy repairs](#)

Thursday, August 31, 2017 9:27 AM ET

Excerpts:

1. *CenterPoint's gas system has continued operating normally despite the storm and flooding, according to company updates.*
2. *Texas Gas Service Co., too, has service territory in southeastern Texas and also has been able to maintain normal service on its system.*

Many gas utility customers depend on natural gas system resiliency during times of weather emergencies as the following article illustrates: [How Waffle House's hurricane response team prepares for disaster](#). Excerpt:

- *“If we have gas for the grills, we can open,” said Warner. “We tailor the menu for what we can cook. Obviously, without electricity we’re not gonna have waffles, but we can bring in water and porta potties. If we don’t have electricity we can bring in generators. We’ve had some cases that before the generator came, we were there with candle light.”*

Natural gas also proved its worth during Harvey as an alternative fuel for vehicles. For more information see: [Natural Gas Infrastructure in Good Shape During Harvey](#).

Of course, natural gas can also fuel generators, if a facility is so equipped. These did:

- [Microgrids pass crucial test for H-E-B during Harvey in Houston](#)
- [CHP Installation Keeps Hospital Running During Hurricane Harvey](#)
- [Backup systems enable H-E-B resiliency amid Harvey](#)

Such was also the case for Hurricane Sandy, at least for those with the foresight to do so. This is well documented in news reports from the areas affected by Sandy.<sup>3</sup>

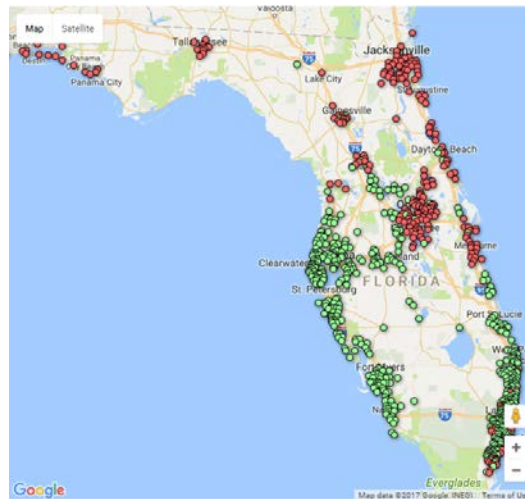
As for the electric grid, equivalent resiliency is not apparent. According the U.S. Chamber of Commerce’s Global Energy Institute coverage titled [Harvey’s Impact on Energy Daily Update](#), at times during the storm between 170,000 and over 300,000 customers were without power.

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- [How CHP Stepped Up When the Power Went Out During Hurricane ...](#)
- [CHP Kept Schools, Hospitals Running Amid Hurricane Sandy ...](#)
- [Enabling Resilient Energy Infrastructure for Critical Facilities](#)
- [Lessons From Where The Lights Stayed On During Sandy - Forbes](#)
- [Hospital Plans Ahead for Power, Serves the Community Through ...](#)
- [Case study: Microgrid at Princeton University | Facilities](#)

Regarding Hurricane Irene, per [the State of Florida's Division of Emergency Management](#), 62.05% of all electric utility accounts (totaling 6,516,564 accounts) were without power (as of 9/11/2017 at 18:01). There have been no reports of natural gas T&D systems damage from Irma. Rather, natural gas-fueled back-up generators and CHP have performed admirably. Among other means, this is evidenced by Florida disaster preparedness organizations. These include MiamiDade.gov's on-line resource that reports [stores with back-up generators](#); most of which remained open. The majority of these stores belong to Publix; a major supermarket chain within Florida and the Southeast. WPTV's website included an [Interactive map](#) showing which Publix stores were open and closed just after Irma. The following graphic is a screen shot of that map taken at 9:10 a.m. on September 12<sup>th</sup>:



The fact that nearly 100 percent of gas T&D systems are buried underground and modern gas distribution systems are quickly migrating to high density polyethylene (HDPE) pipe, makes reliability inherent. Per [TECO Peoples Gas](#), outages are “usually caused by a third-party doing damage.” Electricity lines can also be buried, but at enormous cost and of dubious benefit. Such problems are detailed by the following articles:

- [After Irma, Florida prepares for days — and maybe weeks — without power](#)
- [Should we bury our power lines?](#)

None of this is meant to detract from the heroic efforts of those involved with restoring electric service. Rather, it is intended to illustrate that the potential exists for improved grid resilience via the direct use of natural gas and CHP.

Obviously, hurricanes are not the only weather-related emergencies that can and do significantly impact modern energy delivery systems. On August 23<sup>rd</sup>, the Department of Energy (DOE) released a report titled [Staff Report to the Secretary on Electricity Markets and Reliability](#). The term “polar vortex” was mentioned 21 times. As explained in the next paragraph, this type of weather related emergency is one that would be very unwise to place solely on the electric grid.

Transitioning to an all-electric energy monoculture capable of handling a “polar vortex” via “clean” electric energy may be technically feasible; but it would also be economically

devastating. In the case of Spire’s peak Winter send-out for the St. Louis region, our analyses indicate that it would take about 50,000 MW of new generation to replace natural gas use during such events. Given that Ameren Missouri’s (electric utility with an overlapping service territory) current total generation is 10,200 MW; replacing Spire’s peak natural gas send-out would require about 5 times Ameren’s existing capacity, with huge capital investment relied on only during such short events. On top of that, Ameren’s electric transmission & distribution systems would need to be proportionately increased to handle such capacity additions. These combined costs would need to be recovered by massive electric rate increases. And then on top of that resulting consumer onslaught would come massive consumer costs for replacing their gas appliances with electric alternatives. Assuming such events come to pass, a mass consumer revolt could result.

### **Policies Should Encourage, not Discourage, Economic and Strategic Energy Diversity**

Regardless of the inherent resilience and reliability of natural gas T&D systems relative to electricity, there are many who seek to move away from the direct consumption of natural gas (and propane), or any fuel, and electrify everything from water heaters to automobiles. It is important to recognize that electrification at the site of consumption appears to be the current mission of DOE’s Office of Energy Efficiency and Renewable Energy (EERE). EERE’s website states its mission is [“to create and sustain American leadership in the transition to a global clean energy economy.”](#) However, the term “clean energy” is ill-defined.

The most concise definition Spire could find for “clean energy” is contained within the text of the [“Clean Energy Standard Act of 2012](#) (a.k.a., S. 2146) is defined as:

1. **electricity** generated at a facility placed in service after 1991 using renewable energy, qualified renewable biomass, natural gas, hydropower, nuclear power, or qualified waste-to-energy. (emphasis added)
2. **electricity** generated at a facility placed in service after enactment that uses qualified combined heat and power (CHP), generates electricity with a carbon-intensity lower than 0.82 metric tons per megawatt-hour (the equivalent of new supercritical coal), or as a result of qualified efficiency improvements or capacity additions at existing nuclear or hydropower facilities. (emphasis added)
3. **electricity** generated at a facility that captures and stores its carbon dioxide emissions. (emphasis added)

While the term “CHP” is included in S. 2146, nowhere is the efficient and reliable direct use of natural gas for any other purposes deemed as qualifying as “clean energy.”

On September 12<sup>th</sup>, DOE issued a press release titled [Energy Department Invests Up to \\$50 Million to Improve the Resilience and Security of the Nation’s Critical Energy Infrastructure](#). Spire is concerned with the emphasis that is again being placed upon “clean energy” as shown by the following excerpt (with emphasis added):

*The seven Resilient Distribution Systems projects awarded through DOE’s Grid Modernization Laboratory Consortium (GMLC) will develop and validate innovative approaches to enhance the resilience of distribution systems – including microgrids –*

*with high penetration of **clean distributed energy resources (DER)** and emerging grid technologies at regional scale.*

Many free market advocates have deemed renewables “unreliable” since they are highly variable. While this is debatable, it is much less so during weather emergencies such as Harvey and Irma. What people need is something they can count on during such emergencies through systems fueled by highly concentrated energy that is affordable and capable of being stored in quantities sufficient to get them through it. What best fits the bill are old-fashioned reciprocating engine-driven generators and the fossil fuels that power them. Follow Publix’s lead as recommended by FEMA (Federal Emergency Management Agency) PDF titled [Publix Powers Up When the Power Goes Down; Full Mitigation Best Practice Story](#) per the following excerpt:

*Publix decided to install 500-kilowatt generators at 360 store locations. Each generator has a 1,000-gallon diesel fuel tank, and the majority includes a bi-fuel option using natural gas. With full tanks and the bi-fuel connection, the generators have the capacity to power an entire store, including all needed refrigeration and air conditioning. The generators were designed to operate for a minimum of 72 hours, far exceeding the 23-hour average of the current 65-kilowatt backup generators.*

### **Electrification of Everything is Based on Highly-Flawed Concepts**

The theory driving “clean energy” is “deep decarbonization.” The Institute for Energy Research succinctly explained this theory on July 14<sup>th</sup> in an article titled [‘Deep Decarbonization’ vs. Direct-Use Natural Gas](#). The opening paragraph of the article includes the following excerpt from the [United States Mid-Century Strategy for Deep Decarbonization issued by the White House in 2016](#):

*“With a clean electricity system comes opportunities to reduce fossil fuel usage in these sectors: for example, electric vehicles displace petroleum use and electric heat pumps avoid the use of natural gas and oil for space and water heating in buildings.”*

These electrification goals are still being actively implemented with U.S. taxpayer funding. Mass scale implementation programs to promote end use electrification are largely implemented through DOE’s numerous national labs. One such lab (in conjunction with several others) is DOE’s National Renewable Energy Laboratory (NREL), as evidenced by the following web page: [Electrification Futures Study: A Technical Evaluation of the Impacts of an Electrified U.S. Energy System](#).

More recently, Lawrence Berkeley National Lab (LBNL), issued the following news release titled [‘Berkeley Lab Helps California Get to Zero Net Energy Homes.’](#)<sup>4</sup> Key excerpts follow:

- *California has established ambitious goals to reduce energy consumption in buildings, including a policy goal for all new residential buildings to be zero net energy (ZNE) by 2020. Now the Department of Energy’s Lawrence Berkeley National Laboratory (Berkeley Lab) has launched two projects to help the state meet its ZNE building goals.*

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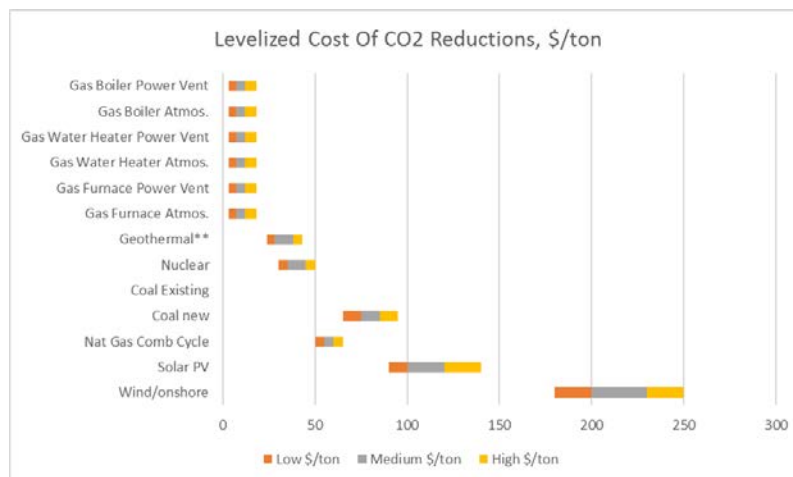
<sup>4</sup> <http://newscenter.lbl.gov/2017/05/25/berkeley-lab-helps-california-get-zero-net-energy-homes/>

- *The DOE's Building America program is also supporting the air quality project, the results of which will inform DOE's Zero Energy Ready Home program.*
- ***If we want to achieve deep carbon reductions then ultimately we want to sharply reduce or eliminate natural gas consumption.*** (emphasis added)

Our economy is dependent on diverse and affordable energy. The direct consumption of natural gas provides major economic benefits as well as environmental benefits and reliability benefits. These include the following:

- Natural gas delivers 38% more consumer energy than electricity.<sup>5</sup>
- Direct use of natural gas delivers about 92% of its initial (source) energy content on average (relative to 32% for electricity).<sup>6</sup>
- Natural gas delivers 38% more energy for 15% of the comparable electric costs.<sup>7</sup>
- Natural gas appliances can significantly reduce carbon emissions relative to electric appliances and do so at much lower costs.

The following chart illustrates the economics of the last bullet point:<sup>8</sup>



Note:

“Coal Existing” represents the baseline power plant from which CO2 reductions and costs are measured and thus do not have associated incremental costs.

By arbitrarily and capriciously setting a goal of 80% carbon reductions, U.S. energy and environmental policies are being co-opted and steered toward the conclusion that carbon reduction potential from the direct use of highly efficient natural is not merely of limited help; it is something from which American society should be weaned. Furthermore, per the extreme objectives of deep decarbonization, only by electrifying everything and generating virtually all electricity from renewables will the necessary carbon reductions be attained.<sup>9</sup>

<sup>5</sup> [EIA Annual Energy Outlook 2017, Energy Consumption in 2015](#)

<sup>6</sup> [American Gas Association 2017 Playbook](#)

<sup>7</sup> [EIA Electric Power Annual Table 2.3, Revenue from Sales of Electricity to Ultimate Customers](#)

<sup>8</sup> [Levelized Cost of Energy: Expanding the Menu to Include Direct Use of Natural Gas](#)

<sup>9</sup> Policy Implications of Deep Decarbonization in the United States is published by Energy and

Deep decarbonization theories are not based upon clear and convincing environmental principles that have been properly subjected to scientific debate. Congress should be highly skeptical of such radical theories and demand to know what the overall economic and environmental cost and benefits are likely to be for American consumers.

## Summary and Conclusions

Increasing the reliability and resilience of the electric grid is important, but so too is increasing the resilience and reliability of all sensible energy systems. Moving away from the direct use of natural gas reduces the overall reliability of America's energy systems, including that of the electric grid. Doing so casts aside a proven performer in natural gas and increases costs to American consumers. The Committee should acknowledge natural gas direct use's contribution to reliability of both the electric grid and overall energy systems and convey that acknowledgement to DOE and the National Labs.

Spire also urges the Committee to schedule one or more follow-up hearings to comprehensively address opportunities and obstacles for achieving a truly "all the above" energy policy that maximizes overall reliability and economic affordability for American consumers. Putting consumers first is not served by leaving out natural gas alternatives at the consumers point-of-use. Should the Committee need more specific information, please contact:

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Sincerely,



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