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Economic Development Rider
Witness: Jane Epperson
Sponsoring Party: Missouri Department of Economic
Development – Division of Energy
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MISSOURI PUBLIC SERVICE COMMISSION

SPIRE MISSOURI INC.

CASE NO. GR-2017-0215

AND

CASE NO. GR-2017-0216

DIRECT TESTIMONY

OF

JANE EPPERSON

ON

BEHALF OF

MISSOURI DEPARTMENT OF ECONOMIC DEVELOPMENT

DIVISION OF ENERGY

Jefferson City, Missouri

September 8, 2017

(Revenue Requirement)

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1 **I. INTRODUCTION AND PURPOSE OF TESTIMONY**

2 **Q. Please state your name and business address.**

3 A. My name is Jane Epperson. My business address is 301 West High Street, Suite 720,
4 PO Box 1766, Jefferson City, Missouri 65102.

5 **Q. On whose behalf are you testifying?**

6 A. I am testifying on behalf of the Missouri Department of Economic Development –
7 Division of Energy (“DE”).

8 **Q. Please describe your educational background and employment experience.**

9 A. I received my Masters of Science in Geology from the University of Missouri –
10 Columbia and my Bachelor of Arts degree in Geology from Stephens College, Columbia,
11 Missouri. I began work with DE in 2014 as an Energy Policy Analyst. In that capacity I
12 have filed testimony in prior rate cases (ER-2014-0370, ER-2014-0351, ER-2014-0258,
13 ER-2016-0179), participated in Missouri Energy Efficiency Investment Act (“MEEIA”)
14 rule revision dockets and various electric and natural gas collaboratives on docketed
15 issues, contributed to the development of the Missouri Comprehensive State Energy Plan
16 (“CSEP”), and am currently project manager for the development of a statewide
17 Technical Reference Manual. Prior to working with DE, I was employed by the Missouri
18 Department of Conservation as Supervisor of the Policy Coordination Unit, which was
19 responsible for statewide and regional planning, statewide compliance with
20 environmental and cultural resource laws, Missouri, Mississippi, White River basin
21 interstate coordination, and human dimensions research. Prior to working with the

1 Missouri Department of Conservation, I was employed as a Hydrologist III with the
2 Missouri Department of Natural Resources – Director’s Office, focusing on interstate
3 water policy and management issues.

4 **Q. What information did you review in preparing this testimony?**

5 A. In preparation of this testimony, I reviewed Direct Testimony and tariffs filed by Laclede
6 Gas Company and Missouri Gas Energy (collectively referred to as “Spire”) specific to
7 the proposed Economic Development Rider (“EDR”) and Special Contracts in this case;
8 data requests and responses issued in this case; portions of testimony from Union Electric
9 Company d/b/a Ameren Missouri’s (“Ameren Missouri”) recent rate case, ER-2016-
10 0179; portions of Ameren Missouri’s and Kansas City Power & Light Company’s
11 (“KCP&L”) MEEIA tariffs on file with the Missouri Public Service (“Commission”);
12 natural gas and electric utility EDR and Economic Redevelopment Rider (“ERR”) tariffs
13 on file with the Commission; reports and publications about combined heat and power
14 (“CHP”) technology; and information on CHP, EDR and ERR initiatives offered in other
15 states.

16 **Q. What is the purpose of your testimony?**

17 A. Section I of my testimony provides an introduction and summary, as well as, information
18 on specific recommendations contained in the CSEP relevant to topics addressed in this
19 case.

20 Sections II and III of my testimony describe the potential benefits of CHP technology in
21 meeting the goal of ensuring ongoing operation of critical infrastructure during grid

1 outages due to natural disasters, cyber or physical attacks, while also promoting more
2 efficient use of energy resulting from the use of waste heat. Section III of my testimony
3 also provides information about DE's ongoing activities engaging at the state and
4 national levels in efforts to identify and plan for continued operation of facilities critical
5 to local communities, the state, and nation in the event of natural disaster, physical or
6 cyberattack.

7 Other states have programs that address CHP deployment,¹ and DE supports the creation
8 of such programs in Missouri as well. Section IV of this testimony describes DE's
9 current activity relating to advancing CHP's role in serving critical infrastructure. DE
10 has partnered with Spire in planning for two CHP summits, one in St. Louis and one
11 planned in Kansas City, that will bring together institutional providers of critical services,
12 CHP engineers, security and energy assurance planners and policy makers, to consider
13 how best to leverage CHP to enable continued operation during grid outages. DE also
14 recommends that the Commission authorize Spire to initiate a pilot program through
15 which it would work with a limited number of critical service providers to install CHP to
16 support critical loads. Additional details of the summit and pilot program
17 recommendations are provided in this testimony.

18 In Section V, I briefly discuss the availability of EDRs and Special Contract rates. My
19 Rebuttal Testimony will include additional details designed to enhance Spire's EDR and
20 Special Contract proposals.

¹ See U.S. Environmental Protection Agency, 2017, "dCHPP (CHP Policies and Incentives Database)," <https://www.epa.gov/chp/dchpp-chp-policies-and-incentives-database>.

1 **Q. What key recommendations in the CSEP are related to your testimony?**

2 A. The CSEP² includes recommendations related to: public-private partnerships to
3 implement energy conservation measures (including CHP); eliminating barriers to on-site
4 customer generation; identifying cost-effective energy efficiency, demand response, and
5 on-site generation opportunities for large customers; encouraging utilities to support
6 technologies that enhance the distribution grid.

7 **II. COMBINED HEAT AND POWER**

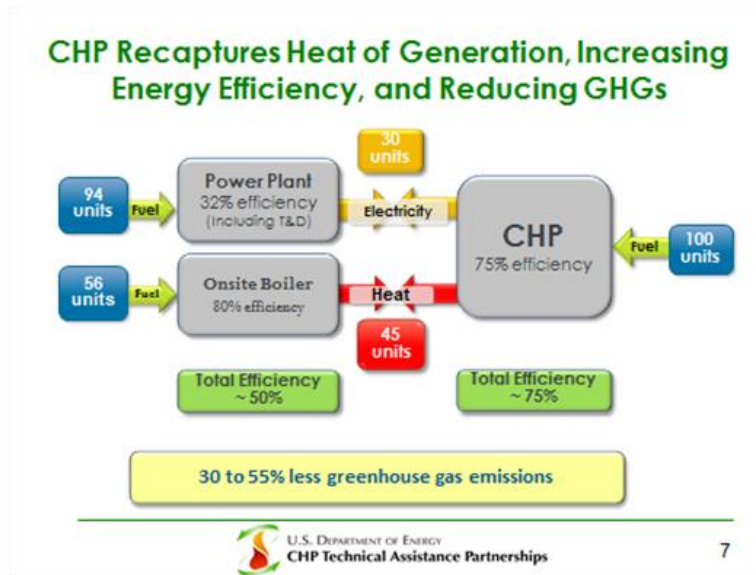
8 **Q. What is CHP?**

9 A. CHP refers to an array of proven technologies that concurrently generate electricity and
10 useful thermal energy from the same fuel source (conventional or renewable). A simple
11 illustration of a separate heat and power system is a typical commercial or industrial
12 building that purchases electricity generated by a utility; but has a boiler in the basement
13 that makes hot water to heat the building. Thus, two sources of fuel are needed to meet
14 the building's electric and thermal energy needs. CHP systems utilize one fuel to make
15 both electric and thermal energy. This is accomplished by recovering the otherwise
16 wasted heat from the electric generation process and using it to provide the thermal load
17 of the building. Combined heat and power results in a total system efficiency around 75
18 percent, compared with separate heat and power at around 50 percent (see Figure 1).

² Missouri Department of Economic Development – Division of Energy, 2015, *Missouri Comprehensive State Energy Plan*, <https://energy.mo.gov/energy/docs/MCSEP.pdf>.

1 **Figure 1: Energy Efficiency Comparison of CHP versus Separate Heat and Power**

2 **Production.³**



3 **Q. What CHP facilities exist in Missouri?**

4 **A.** Table 1 below shows the CHP installations in Missouri and illustrates that CHP
 5 technology is found proven and diverse in applications; including schools, colleges,
 6 universities, hospitals, government facilities, agriculture, chemicals, and hotels.

³ U.S. Department of Energy, Midwest CHP Technical Assistance Partnerships, 2017, “CHP, The Concept – Combined Heat and Power and Waste Heat to Power for Industrial, Institutional, and Commercial Facilities,” Presentation, June 27, Toledo, Ohio, http://www.midwestchptap.org/events/20170627/5_Cuttica_CHP_the_Concept_6-27-17.pdf, slide 7,

Table 1: Combined Heat and Power Installations in Missouri.⁴

City	Facility Name	Application	Op Year	Prime Mover **	Capacity (KW)	Fuel Class-Primary Fuel
Butler	Butler	District Energy	1946	ERENG	13,100	OIL - Distillate Fue
Cape Girardeau	Southeast Missouri State University	Colleges/Univ.	1972	B/ST	6,250	COAL - Coal
Columbia	University of Missouri Power Plant	Colleges/Univ.	1961	B/ST	99,500	BIOMASS - Biomass
Columbia	Columbia Landfill	Solid Waste Facilities	2008	ERENG	3,000	BIOMASS - LFG
Florissant	Service Merchandise Company, Inc.	General Merch. Stores	1985	ERENG	60	NG - Natural Gas
Hannibal	Clemmons Hotel	Hotels	1990	ERENG	150	NG - Natural Gas
Jefferson City	Jefferson City Correction Center	Justice/Public Order	2009	ERENG	3,200	BIOMASS - LFG
Kansas City	Bolling GSA Office	General Gov't	2000	BPST	100	WAST - Steam
Kansas City	Veolia Energy Kansas City	District Energy	2012	B/ST	5,000	BIOMASS - Biomass
Kansas City	Trigen-Kansas City Energy Corporation	District Energy	1990	B/ST	6,000	COAL - Coal
Ladonia	POET Biorefining - Missouri Ethanol	Chemicals	2007	CT	13,000	NG - Natural Gas
Lewistown	Lewistown School District	Schools	2003	MT	60	NG - Natural Gas
Louisiana	Hercules, Inc.	Chemicals	1942	B/ST	15,000	COAL - Coal
Macon	Northest Missouri Grain	Chemicals	2003	CT	10,000	NG - Natural Gas
Mountain View	Smith Flooring, Inc.	Wood Products	1989	B/ST	500	WOOD - Wood
Neosho	La-Z-Boy Chair Company	Furniture	1984	B/ST	750	WOOD - Wood
North Kansas City	North Kansas City	Agriculture	1987	CC	4,000	NG - Natural Gas
St. Louis	Missouri State Hospital	Hospitals/Healthcare	1977	B/ST	5,000	COAL - Coal
St. Louis	Anheuser-Busch	Food Processing	1939	B/ST	26,100	COAL - Coal
St. Louis	Ashley Plant	District Energy	2000	CT	15,000	NG - Natural Gas
St. Louis	Southwestern Bell Telephone	Communcations	1992	ERENG	6,000	OIL - Distillate Fue
St. Louis	Brandonview Building	Office Building	1969	ERENG	4,300	NG - Natural Gas
	Agriculture Facility	Agriculture	2014	ERENG	800	BIOMASS - Digester G

**B/ST=Boiler/Steam Turbine; CC=Combined Cycle; CT=Combustion Turbine; MT=Microturbine; ERENG=Reciprocating Engine; BPST=Backpressure Steam Turbine.

As Table 2 shows, compared to other Midwestern states with cost of service regulation, Missouri ranks the lowest in terms of percent of total installed generating capacity from CHP.

Table 2: Total Electric Generating Capacity versus State CHP Capacity.⁵

Regulated State	Total Electric Capacity	State CHP Capacity (MW)	CHP as % of Total Capacity (MW)	Number of CHP Installations
Iowa	15,757	630	4	35
Indiana	30,928	2,266	7.3	38
Minnesota	16,608	918	5.5	55
Wisconsin	19,050	1,570	8.2	94
Missouri	23,499	236	1	21

⁴ Modified from U.S. Department of Energy, 2016, *U.S. DOE Combined Heat and Power Installation Database*, "Combined Heat and Power Installations in Missouri," <https://doe.icfwebservices.com/chpdb/state/MO>.

⁵ U.S. Department of Energy Midwest CHP Technical Assistance Partnership, John J. Cuttica, Clifford P. Haefke, 2012.

1 Table 3 provides the technical detail that underscores the strengths of CHP technology
2 and shows that CHP is not an untested technology. Note the performance parameters that
3 quantify the benefits of high efficiency (55 to 80 percent), range of capacity (.005 to
4 several hundred MW), high availability (72 to 99 percent), fuel diversity, and lower
5 emissions of air pollutants.

1 **Table 3: Comparison of CHP Technology Sizing, Cost, and Performance**
2 **Parameters.⁶**

Technology	Recip. Engine	Steam Turbine	Gas Turbine	Microturbine	Fuel Cell
Electric efficiency (HHV)	27-41%	5-40+%	24-36%	22-28%	30-63%
Overall CHP efficiency (HHV)	77-80%	near 80%	66-71%	63-70%	55-80%
Effective electrical efficiency	75-80%	75-77%	50-62%	49-57%	55-80%
Typical capacity (MWe)	.005-10	0.5-several hundred MW	0.5-300	0.03-1.0	200-2.8 commercial CHP
Typical power to heat ratio	0.5-1.2	0.07-0.1	0.6-1.1	0.5-0.7	2-Jan
Part-load	ok	ok	poor	ok	good
CHP Installed costs (\$/kWe)	1,500-2,900	\$670-1,100	1,200-3,300 (5-40 MW)	2,500-4,300	5,000-6,500
Non-fuel O&M costs (\$/kWhe)	0.009-0.025	0.006 to 0.01	0.009-0.013	0.009-.013	0.032-0.038
Availability	96-98%	72-99%	93-96%	98-99%	>95%
Hours to overhauls	30,000-60,000	>50,000	25,000-50,000	40,000-80,000	32,000-64,000
Start-up time	10 sec	1 hr - 1 day	10 min - 1 hr	60 sec	3 hrs - 2 days
Fuel pressure (psig)	Jan-75	n/a	100-500 (compressor)	50-140 (compressor)	0.5-45
Fuels	natural gas, biogas, LPG, sour gas, industrial waste	all	natural gas, synthetic gas, landfill gas, and fuel oils	natural gas, sour gas, liquid fuels	hydrogen, natural gas, propane, methanol
Uses for thermal output	space heating, hot water, cooling, LP steam	process steam, district heating, hot water, chilled water	heat, hot water, LP-HP steam	hot water, chiller, heating	hot water, LP-HP
Power Density	35-50	>100	20-500	May-70	20-May
NOx (lb/MMBtu) (not including SCR)	0.013 rich burn 3-way cat. 0.17 lean burn	Gas 0.1-.2 Wood 0.2-.5 Coal 0.3-1.2	0.036-0.05	0.015-0.036	0.0025-.0040

⁶ U.S. Environmental Protection Agency Combined Heat and Power Partnership, 2015, *Catalog of CHP Technologies*, https://www.epa.gov/sites/production/files/2015-07/documents/catalog_of_chp_technologies_section_1_introduction.pdf, page 1-6.

1 **III. ENERGY RELIABILITY AND RESILIENCY THROUGH CHP**

2 **Q. Why is CHP a key technology to improve energy resiliency and recovery?**

3 A. CHP is a proven technology, as demonstrated by entities with CHP systems in place
4 during Hurricane Sandy. According to the U.S. Environmental Protection Agency and
5 U.S. Department of Energy (“USDOE”):

6 During and after Hurricane Sandy, combined heat and power ... enabled a
7 number of critical infrastructures and other facilities to continue their operations
8 when the electric grid went down. Time and again, CHP has proved its value as
9 an alternative source of power and thermal energy (heating and cooling) during
10 emergencies, and demonstrated how it can be a sound choice in making energy
11 infrastructure more resilient in the face of extreme weather events. (Footnotes
12 omitted)⁷

13 Examples of successful CHP utilization are not limited to Hurricane Sandy.⁸

14 **Q. How could CHP improve resiliency and recovery at the community level?**

15 A. To serve at the community level, CHP systems can be configured as part of a microgrid,
16 which is, “... a group of interconnected loads and distributed energy resources within
17 clearly defined electrical boundaries that act as a single controllable entity with respect to

⁷ U.S. Environmental Protection Agency and U.S. Department of Energy, 2013, “Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings,” https://www.epa.gov/sites/production/files/2015-07/documents/guide_to_using_combined_heat_and_power_for_enhancing_reliability_and_resiliency_in_buildings.pdf, page 2.

⁸ Environmental and Energy Study Institute, 2013, “Energy Efficient Infrastructure for More Resilient Local Economies: The Role of District Energy, CHP, and Microgrids,” <http://www.eesi.org/briefings/view/energy-efficient-infrastructure-for-more-resilient-local-economies-the-role>.

1 the grid.”⁹ Microgrids typically consist of multiple generating assets (for example, CHP
2 and solar), energy storage, and an automated control system that enables the microgrid to
3 function with and without connection to the grid (often referred to as islanding).¹⁰ CHP
4 configured as the heart of a microgrid that serves multiple facilities and/or customers can
5 mitigate the short- and long-term impact of emergencies; for example by sustaining not
6 only fire, police, and/or other emergency response facilities, but also a grocery store, a
7 gas station, and a multi-family residential building so that residents (particularly
8 vulnerable populations) can shelter-in-place during an emergency (preserving life by
9 avoiding danger and stress to relocate).

10 **Q. Has DE been actively engaged in other efforts to identify critical infrastructure and**
11 **improve resiliency?**

12 **A.** Yes. DE is one of 24 states, communities, utilities, and others participating in a two-year,
13 USDOE-sponsored CHP for Resiliency Accelerator (“Accelerator”). The purpose of the
14 Accelerator is to expand the consideration and implementation of CHP and other forms
15 of distributed generation for critical infrastructure. Table 4 provides a list of official
16 partners in the CHP for Resiliency Accelerator. USDOE is providing informational
17 resources to assist the partners in developing CHP goals and identifying opportunities and
18 next steps toward meeting those goals.

⁹ Sandia National Laboratories, 2014, *The Advanced Microgrid: Integration and Interoperability*,
https://energy.gov/sites/prod/files/2014/12/f19/AdvancedMicrogrid_Integration-Interoperability_March2014.pdf.

¹⁰ Baier, Martin, Bhavaraju, Vijay, Murch, William, and Sercan Tleke, 2017, “Making Microgrids Work: Practical and technical considerations to advance power resiliency.”
<http://www.eaton.com/ecm/groups/public/@pub/@electrical/documents/content/wp027009en.pdf>.

1 **Table 4: USDOE CHP for Resiliency Accelerator Partners.**

Communities	States	Utilities	Ambassadors
Boston, MA	Commonwealth of Massachusetts	Bath Electric Gas Water	Edison Electric (EEI)
Hoboken, NJ	Maryland Department of Commerce	National Grid	International District Energy Association (IDEA)
Miami-Dade County, FL	NYSERDA	Long Island Power Authority	Health Care Without Harm
Montgomery County, MD	Pennsylvania Public Utility Commission	PSEG Long Island	
New York, NY	State of Missouri	Tennessee Valey Authority	
Pittsburgh, PA	State of Utah	United Illuminating	
Thermal Energy Corporation (TX Medical Center - Houston)		Nicor Gas	
Woodbridge, CT Partnership			

2 Another initiative was developed as part of the Stipulation and Agreement in File No.
3 EM-2016-0213.¹¹ The Empire District Electric Company (“Empire”) is assisting DE and
4 the USDOE Midwest CHP Technical Assistance Partnership (“CHP TAP”) in completing
5 an outreach effort for screening potential CHP customers within The Empire District Gas
6 Company’s service territory in Missouri. A screening tool provided by the CHP TAP is a
7 survey to help determine if CHP is a good fit for the customers from a financial and
8 technical perspective. Target sectors include public, commercial, institutional, and
9 industrial facilities with consistent gas consumption throughout the year, indicative of
10 consistent thermal load requirements. Customers that may generally fit this profile

¹¹ Missouri Public Service Commission Case No. EM-2016-0213, *In the Matter of the Empire District Electric Company, Liberty Utilities (Central) Co. and Liberty Sub Corp, Concerning an Agreement and Plan of Merger and Certain Related Transactions*, Amended Stipulation and Agreement as to Division of Energy and Renew Missouri, August 23, 2016, pages 2-4.

1 include hospitals, large residential facilities such as; nursing homes, correctional
2 facilities, universities, and food processing facilities. Those surveyed customers with
3 favorable evaluations will be encouraged to take the next step of allowing the CHP TAP
4 to perform a complimentary, more detailed CHP feasibility study.

5 As a result of the same stipulation, Empire also agreed to consider a microgrid
6 interconnection strategy consistent with the recommendations contained within the
7 *Missouri Microgrid Interconnection Requirements*, prepared by the Missouri University
8 of Science and Technology Microgrid Industrial Consortium for DE.^{12, 13} This is a
9 significant step toward addressing an impediment to greater CHP utilization – clear,
10 transparent, non-discriminatory, consistent interconnection requirements for connecting
11 to utilities.

12 **IV. INITIATIVES TO SECURE CRITICAL INFRASTRUCTURE**

13 **Q. Please describe the recent collaboration between Spire and DE to host a CHP 14 Summit.**

15 A. Spire and DE are partnering to host the CHP Summit for Critical Infrastructure
16 Resiliency (“Summit”) in the Spring of 2018. The purpose of the Summit is to increase
17 awareness of the applicability of CHP technologies in the institutional sector.
18 Specifically, the Summit will inform potential CHP candidates within the critical
19 infrastructure sector of the mechanics, economics, and benefits of CHP technology. We

¹² *Ibid*, page 4.

¹³ See Rolufs, Angela B., 2016, *Missouri Microgrid Interconnection Requirements*,
<https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936016677>.

1 have committed to holding the Summit on April 10, 2018, at the St. Charles Convention
2 Center and envision a similar summit in Kansas City in the Fall of 2018.

3 **Q. Under what circumstances should infrastructure be considered critical?**

4 A. Critical infrastructure is that infrastructure which, if incapacitated, would have a
5 substantial negative impact on public health and safety or economic security, including
6 hospitals, nursing homes, public water and wastewater treatment facilities, government
7 facilities (military, correctional, police, and fire), emergency shelters (schools,
8 universities, or community centers) and data centers.^{14, 15}

9 **Q. What attributes are essential in meeting the energy needs of critical infrastructure?**

10 A. Critical infrastructure requires a higher level of reliability (ideally 100 percent) and
11 resiliency. Reliability is characterized by the frequency and duration of outages. While
12 some customers may be willing and/or able to tolerate fairly numerous, short outages that
13 do not compromise their heating, cooling, and food refrigeration functions, critical
14 facility customers may not have similar flexibility. Critical facility customers are less
15 willing and/or able to tolerate outages that may result in compromised medical and/or
16 emergency support functions.

17 Resiliency is the relative ability of a facility to recover to partial or full function after an
18 interruption in energy service. New hospitals, for example, are required under Missouri
19 regulations to have standby emergency generators so that full voltage and frequency is

¹⁴ U.S. Department of Homeland Security, Federal Emergency Management Agency, 2017, *Critical Facility*,
“Definition/Description,” <http://www.fema.gov/national-flood-insurance-program-2/critical-facility>.

¹⁵ USA Patriot Act of 2001, Public Law 107-56, Section 1016 (e), <https://www.gpo.gov/fdsys/pkg/PLAW-107publ56/pdf/PLAW-107publ56.pdf>.

1 available and supplying power to emergency loads within 10 seconds after normal power
2 is interrupted.¹⁶ The challenges associated with standby emergency generators, which
3 are typically diesel-fueled reciprocating engines, include: a) difficulty in maintaining
4 more than a few days of on-site fuel storage; b) fuel delivery that is subject to weather
5 and transportation vulnerabilities; and c) the need to be regularly maintained, fuel
6 instability (diesel goes bad over time). CHP is an alternative, high-efficiency, low-
7 emissions technology that can provide continual on-site power generation to reliably
8 serve part or all the energy and thermal load of a facility in coordination with, or
9 independently of, the utility grid.

10 **Q. What threats to energy reliability have been identified for Missouri?**

11 A. The “State of Missouri Energy Sector Risk Profile,”¹⁷ produced by the USDOE, Office of
12 Electricity Delivery & Energy Reliability, highlights natural and manmade hazards to the
13 electric, natural gas, and petroleum infrastructures. The leading event affecting electric
14 transmission outages in Missouri from 1992 to 2009 was “natural force” (i.e.,
15 thunderstorms, winter storms, high wind, and ice). The average duration of electric
16 outages between 2008 and 2013 was 45 hours per year. Thunderstorms and lightning
17 caused the greatest overall property loss from 1996 to 2014, at \$58.9 million per year.
18 Flooding was the second most costly cause of property damage at \$48.8 million per year.

¹⁶ 19 CSR 30-20.030 (26) (E) (3).

¹⁷ U.S. Department of Energy, Office of Electricity Delivery & Energy Reliability, 2016, “State of Missouri Energy Sector Risk Profile,”
https://energy.gov/sites/prod/files/2016/09/f33/MO_Energy%20Sector%20Risk%20Profile_2.pdf.

1 Since natural gas transmission and distribution is via underground pipeline, it is less
2 vulnerable to the natural forces that result in costly electric outages. The leading events
3 affecting natural gas transmission (at an average of one incident per 3.4 years) and
4 distribution pipelines (at an average of 1.23 incidents per year) in Missouri from 1986 to
5 2014 were “outside forces,” which are pipeline failures due to vehicular accident,
6 sabotage, or vandalism. The average annual loss due to natural gas from outside forces
7 was \$1.5 million, which is 2.5 percent of the losses due to thunderstorms and lightning
8 from electricity outage. I should note that the electricity data reflects an 18-year period
9 that excludes the great flood of 1993, while the natural gas data reflects a 28-year period
10 of time.

11 **Q. Why focus on critical infrastructure for improved energy resiliency and recovery**
12 **from emergencies?**

13 A. Infrastructure that, by definition, affects public health and safety or economic security is
14 an appropriate priority to focus efforts to improve energy resiliency and recovery.

15 **Q. Who will benefit from improved reliability and resiliency of critical infrastructure?**

16 A. Increased reliability of critical infrastructure will enable continued access to critical
17 services when they are needed most (such as during a natural disaster or act of terrorism).
18 Continuity of these services is paramount to lessening the impacts of the events
19 underlying supply disruptions and will aid in emergency response before, during and
20 after disruptive incidents. This enhanced response capability will alleviate strains on the
21 economy due to energy supply disruptions and support faster post-disaster economic

1 recovery. Economic development will also occur as a result of the design and
2 construction of resilient infrastructure.

3 **Q. Do you propose that Spire be authorized to initiate a pilot program to assist**
4 **institutional or business customers with deploying CHP to serve critical loads?**

5 A. Yes. A pilot can contribute to developing a reproducible framework to serve customers
6 who need the increased reliability and resiliency that a tailored CHP system can provide.
7 DE anticipates that such an initiative will benefit the public by enabling institutional and
8 business customers interested in CHP to consider it as an option for serving critical loads.

9 **Q. Please describe the proposed CHP pilot program.**

10 A. Spire and DE have already been considering customers that are located in the Spire
11 service area and may have an interest in CHP as a means of serving critical loads.
12 Authorizing Spire to offer a CHP pilot program can help to address obstacles that these
13 customers may face in deploying CHP.

14 DE recommends the following guidelines to support and enable Spire to work
15 cooperatively to co-deliver a CHP pilot program:

- 16 • Establish a definition of critical infrastructure that encompasses the range of CHP
17 applications, from individual facilities (e.g., hospitals) to communities (e.g.,
18 hospital plus water and wastewater treatment facility, shelter, and grocery store)).
- 19 • In the report and order in this case, the Commission should authorize Spire to
20 investigate and develop a proposed CHP pilot program to serve critical

1 infrastructure, with a total program budget not to exceed \$5.1 million¹⁸ for 10
2 projects and with each specific project proposed to be included in the program
3 filed with the Commission for its approval within 60 days.

- 4 • The Commission should allow Spire to track, and in the future seek recovery of,
5 the cost of participating in the pilot program. Such costs might include offsetting
6 up to \$10,000 of the cost of a project's feasibility study following a positive initial
7 screening conducted by CHP TAP identifying a customer as a good candidate for
8 CHP, the cost of any contribution by Spire to a project's installed cost (up to the
9 lesser of \$500,000 or 30 percent of a project's installed cost), and any buy-down
10 on the rate of interest offered for financing of a project.
- 11 • The Commission should allow Spire to extend the cost recovery periods (up to 15
12 years) for customer repayments on the customer portion of the cost of natural gas
13 line extensions and other natural gas facilities necessary to develop a CHP
14 system.
- 15 • The Commission should allow Spire to offer on-bill financing to assist potential
16 CHP customers in funding the necessary capital improvements needed for CHP
17 installation.

¹⁸ This amount is based on figures provided by Cifford Paul Haefke of CHP TAP in an email, assuming 10 projects at up to \$10,000 per project towards a feasibility study and up to \$500,000 per project to offset a portion of the project's installed costs. The calculation does not include any costs related to the buy-down of interest rates for customer financing, but such costs would be included under the \$5.1 million cap.

- 1 • Spire should use a societal cost test to evaluate the potential benefits of critical
2 infrastructure projects. Spire currently uses a societal cost test in evaluating
3 custom rebates under its Commercial and Industrial Rebate Programs.¹⁹
- 4 • For projects jointly offered with electric utilities offering MEEIA programs, the
5 Commission should direct that the costs and benefits of CHP be symmetrically
6 valued by developing a transparent and reproducible formula to reasonably
7 allocate and assign the value of energy savings and project costs between natural
8 gas and electric companies and customers.
- 9 • The Commission should allow a potential CHP pilot program customer to
10 participate in otherwise-applicable EDRs or Special Contract service rates.

11 **V. ECONOMIC DEVELOPMENT AND SPECIAL CONTRACT RIDERS**

12 **Q. Does DE support the availability of EDRs and Special Contract rates in Spire's**
13 **service areas?**

- 14 A. Yes. DE supports the availability of EDRs and Special Contract rates that provide
15 benefits to communities, the state, and utility ratepayers. Energy costs can constitute a
16 significant cost of doing business, especially for manufacturing processes, and can be a
17 key factor in determining at what location, and at what scale a business might operate.
18 DE supports allowing Spire and other investor-owned utilities reasonable flexibility in

¹⁹ Missouri Public Service Commission Tariff No. JG-2011-0384, Laclede Gas Company, *Standard Rules and Regulations*, Conservation and Energy Efficiency Programs – Commercial and Industrial (C/I) Rebate Program, February 26, 2011, Sheet No. R-46, and Missouri Public Service Commission Tariff No. YG-2014-0428 (most recently approved filing), Laclede Gas Company d/b/a Missouri Gas Energy, *Schedule of Rates and Charges and General Terms and Conditions for Gas Service*, Promotional Practices – PP: Commercial and Natural Gas Energy Efficiency Initiatives, May 1, 2014, Sheet No. 103; both sets of tariffs have been adopted by Spire Missouri Inc. d/b/a Spire.

1 responding to economic development and retention opportunities. In addition to
2 employment and other economic benefits, such tariffs, when properly structured, can
3 promote better use of existing infrastructure, allowing fixed costs to be spread over
4 greater sales volumes and lowering the otherwise applicable rates paid by other
5 customers.

6 **Q. What elements should be included in EDRs and Special Contract rates to assure**
7 **benefits to other customers, communities, and the state?**

8 A. These types of rates should be flexible. Volumetric rates under these tariffs should be set
9 at no less than the marginal cost of serving particular customers – i.e., the commodity
10 cost of natural gas and any other variable costs. Other incremental costs of serving
11 particular customers (e.g., line extensions) should be recovered through these rates over a
12 reasonable period of time. Service under EDRs and Special Contract rates should
13 reasonably be tied to the receipt of other state or local incentives. The rates should be
14 directed at retaining customers that would otherwise leave the state, attracting new
15 customers from outside of the state, or promoting customer expansion.

16 **Q. Has Spire filed proposals on EDRs and Special Contract rates?**

17 A. Yes. DE is generally supportive of Spire’s proposals, but has recommendations related to
18 tariff conditions and additional enhancements. I will address DE’s recommendations in
19 response to Spire’s proposals in detail in my Rebuttal Testimony.

1 **VI. RECOMMENDATIONS**

2 **Q. In summary, what are DE's specific recommendations?**

3 A. DE recommends the following guidelines to support and enable Spire to deliver a CHP
4 pilot program:

- 5 • Establish a definition of critical infrastructure that encompasses the range of CHP
6 applications from individual facilities (e.g., hospitals) to communities (e.g.,
7 hospital plus water and wastewater treatment facility, shelter, and grocery store).
- 8 • In the report and order in this case, the Commission should authorize Spire to
9 investigate and develop a proposed CHP pilot program to serve critical
10 infrastructure, with a total program budget not to exceed \$5.1 million and with
11 each specific project proposed to be included in the program filed with the
12 Commission for its approval within 60 days.
- 13 • The Commission should allow Spire to track, and in the future seek recovery of,
14 the costs of participating in the pilot program. Such costs might include offsetting
15 a portion of the cost of a project's feasibility study following a positive initial
16 screening conducted by CHP TAP identifying a customer as a good candidate for
17 CHP, the cost of any contribution to a project's installed cost, and any buy-down
18 on the rate of interest offered for financing of a project.
- 19 • The Commission should allow Spire to extend the cost recovery periods to up to
20 15 years for customer repayments on the customer portion of the cost of natural

1 gas line extensions and other natural gas facilities necessary to develop a CHP
2 system.

- 3 • The Commission should allow Spire to offer on-bill financing to assist potential
4 CHP customers in funding the capital improvements needed for CHP installation.
- 5 • Spire should use a societal cost test to evaluate the potential benefits of critical
6 infrastructure projects.
- 7 • For projects jointly offered with electric utilities offering MEEIA programs, the
8 Commission should direct that the costs and benefits of CHP be symmetrically
9 valued by developing a transparent and reproducible formula to reasonably
10 allocate and assign the value of energy savings and project costs between natural
11 gas and electric utilities and customers.
- 12 • The Commission should allow a potential CHP pilot program customer to
13 participate in otherwise-applicable EDRs or Special Contract service rates.

14 **Q. Does this conclude your Direct Revenue Requirement Testimony?**

15 A. Yes.