

Exhibit No.:  
Issue: Class Cost of Service Study  
Witness: Craig E Brown  
Type of Exhibit: Rebuttal Testimony  
Sponsoring Party: Evergy Missouri Metro / West  
Case No.: ER-2022-0129 / 0130  
Date Testimony Prepared: July 13, 2022

**MISSOURI PUBLIC SERVICE COMMISSION**

**CASE NO.: ER-2022-0129 / 0130**

**REBUTTAL TESTIMONY**

**OF**

**CRAIG E. BROWN**

**ON BEHALF OF**

**EVERGY MISSOURI METRO and EVERGY MISSOURI WEST**

**Kansas City, Missouri  
July 2022**

**REBUTTAL TESTIMONY**

**OF**

**CRAIG E. BROWN**

**Case No. ER-2022-0129 / 0130**

1 **Q: Please state your name and business address.**

2 A: My name is Craig E. Brown. My business address is 9400 Ward Parkway, Kansas City,  
3 Missouri 64114.

4 **Q: By whom and in what capacity are you employed?**

5 A: I am employed by 1898 & Co., a division of Burns & McDonnell Engineering Company,  
6 Inc. (hereinafter called "1898 & Co."), as a Project Manager in the Financial Analysis and  
7 Rate Design department. 1898 & Co. is a business, technology and security solutions  
8 consulting firm serving multiple industries, including the electric power industry. As a part  
9 of Burns & McDonnell ("BMcD"), 1898 & Co. draws on over 120 years of experience.

10 **Q: What is your professional experience?**

11 A: For the past 18 years, I have worked as a consultant, project manager, expert witness, and  
12 analyst on utility financial, rate, and regulatory projects. After joining Burns & McDonnell  
13 in 2019 I have focused primarily of cost of service, rate, and regulatory consulting for  
14 electric utilities. Prior to joining Burns & McDonnell, I worked for 15 years in the Rate  
15 and Regulatory practice at Black & Veatch Management Consulting, where I was a  
16 Principal Consultant and Rate and Regulatory Team Lead consulting on projects for  
17 electric, gas, water, and wastewater utilities. Prior to joining Black & Veatch in 2004 I was  
18 employed as an accountant and small business consultant at independent firms in Overland  
19 Park, Kansas and Phoenix, Arizona.

1 As a Project Manager for the Financial Analysis and Rate Design department of 1898 &  
2 Co., I lead consulting projects for investor-owned, municipal, and cooperative utilities  
3 across the country. In addition to ratemaking issues, I lead projects in the areas of  
4 depreciation and valuation, financial and load forecasting, and cost-benefit business case  
5 analysis. My resume is attached as Exhibit CEB-1.

6 **Q: Have you previously testified in a proceeding at the Missouri Public Service**  
7 **Commission (“MPSC” or “Commission”) or before any other utility regulatory**  
8 **agency?**

9 A: I have not testified in a proceeding at the Missouri Public Service Commission; however,  
10 I have previously filed testimony and/or appeared as an expert witness before the Federal  
11 Energy Regulatory Commission (FERC), the Public Service Commission of Maryland, the  
12 Public Utilities Commission of Minnesota, and the Kansas City Board of Public Utilities.  
13 The majority of my experience leading electric cost of service and rate related studies has  
14 been for electric cooperative and municipal utilities that have not required testimony or  
15 appearing as an expert witness. I have made numerous presentations and supported cost  
16 of service, rate design, and other regulatory studies to Utility Boards and Commissions  
17 and/or City Councils in Kansas, Missouri, Nebraska, Delaware, Florida, Kentucky,  
18 Maryland, Nevada, New York, North Carolina, Texas, Virginia, and Washington.

19 **Q: On whose behalf are you testifying?**

20 A: I am testifying on behalf of Evergy Metro, Inc. d/b/a Evergy Missouri Metro (“Evergy  
21 Missouri Metro”) and Evergy Missouri West, Inc. d/b/a Evergy Missouri West (“Evergy  
22 Missouri West”) (collectively, the “Company”).

1 **Q: What is the purpose of your rebuttal testimony?**

2 A: The purpose of my rebuttal testimony is to respond to topics related to the Company's  
3 Class Cost of Service ("CCOS") studies and issues raised by Midwest Energy Consumers  
4 Group ("MECG") witness Maini and Staff witness Lange.

5 **Q: Please summarize the issues raised by MECG witness Maini that you will address in**  
6 **your rebuttal testimony.**

7 A: I will address Ms. Maini's use of a production and transmission demand allocators based  
8 on Average and Excess Demand – Four Non-coincident Peak ("A&E 4NCP") and not the  
9 Company's allocator of Average and Excess Demand – Four Coincident Peak ("A&E  
10 4CP").

11 **Q: Please describe the Company's A&E 4CP allocator and the rationale for its use in this**  
12 **proceeding.**

13 A: While there appears to be general consensus, both in this case and other recent cases before  
14 the Commission that Average and Excess demand is the appropriate capacity allocator for  
15 regulated utilities in the state, I will focus on the 4CP versus 4NCP decision. The primary  
16 consideration is related to cost causation for production and transmission plant. It is well  
17 established that the company is a summer peaking utility, and its production and  
18 transmission investment decisions are primarily driven by the need to provide peak  
19 capacity in the four summer months (June – September). The appropriate sizing of this  
20 investment is based on the coincident peak demands of the customer classes. If Evergy  
21 sized its generation fleet based on the non-coincident peak needs of each customer class, it  
22 might oversize its generation fleet and transmission facilities. Basing investment decisions  
23 on the class CP results in a more efficient use of capital and lower overall costs for Evergy

1 customers. As such, I apply the same rationale for the excess portion of the A&E allocator  
2 as Evergy uses in its investment decisions and recommend 4CP as a basis for the excess  
3 portion of Evergy's A&E allocation factor.

4 **Q: What is Ms. Maini's rationale for using A&E 4NCP?**

5 A: While she acknowledges that the results using either method are generally consistent, she  
6 states that "the method prescribed in the NARUC manual for the A&E method, however,  
7 appears to encourage the use of non-coincident peak demands (NCP) and is also a more  
8 common approach used by other Missouri utilities."

9 **Q: Is the A&E 4NCP allocation method as proposed by Ms. Maini included in the 1992**  
10 **NARUC Cost Allocation Manual?**

11 A: No, it is not. The example presented in the Manual uses 1NCP. 4NCP is not mentioned.

12 **Q: Does this reduce the validity of Ms. Maini's proposed allocation method for**  
13 **production and transmission capacity?**

14 A: No, it does not. Both the Company and Ms. Maini have proposed a hybrid of the guidelines  
15 presented in the Manual. Both methods could be acceptable allocations approaches. The  
16 question is which version is more appropriate for the Evergy production and transmission  
17 systems.

18 **Q: What does the NARUC manual state as the rationale that NCP is preferential to CP**  
19 **when calculating Average and Excess Demand allocations?**

20 A: It states on page 50 that using a CP allocation factor with A&E will result in allocation  
21 factors that are identical to those derived with a direct CP allocation. As seen in the  
22 comparison in Table 1 below, while similar, the allocation factors using A&E 4CP and the  
23 4CP allocations are different.

**Table 1: Comparison of Production Allocation Factors**

Allocation	Res	SGS	MGS	LGS	LPS	SL	CCN	Total
A&E 4CP	45.98%	7.14%	14.17%	19.59%	12.59%	0.52%	0.01%	100.00%
A&E 4NCP Maini	44.39%	6.88%	14.24%	20.19%	13.09%	1.20%	0.01%	100.00%
A&E 4NCP Lange	44.92%	6.89%	14.24%	20.00%	12.74%	1.21%	0.01%	100.00%
4CP	44.94%	7.13%	14.26%	20.19%	13.48%	0.00%	0.01%	100.00%

**Q: What conclusions can you draw from the above Table 1.**

A: First, this demonstrates that use of a CP method for the excess portion with A&E does not produce a result that is identical to the direct CP method. Therefore, the rationale against its use that is purported in the NARUC manual is flawed. Second, it is notable that all three of the A&E allocations presented are quite similar to the 4CP allocation. In fact, for many classes, the A&E 4NCP method is closer to the 4CP allocation than the A&E 4CP method.

**Q: Are either the A&E 4CP or A&E 4NCP methods inherently wrong for use in Evergy’s rate case?**

A: No. I agree with Ms. Maini’s statement on page 20 of her testimony: “While the general approach is included in the NARUC manual, the manual appears to leave some discretion to the analyst regarding the specifics of application.”

**Q: Why is the proposed A&E 4CP method proposed by the Company a superior method in this rate case?**

A: The A&E 4CP method is superior to A&E 4NCP because it is more reflective of how the Company plans its investment in production and transmission plant. That is, the Company bases these decisions on the CP requirements of the system, not the NCP requirements. Further, it is the four summer months from June through September that are the primary factors, and therefore the primary cost causative factors for the Company’s production and transmission investments are Average and Excess Demand with a 4CP excess component.

1 **Q: Is there any precedent for using the A&E 4CP method?**

2 A: Yes, there is. First and foremost, A&E 4CP was used in the company's most recent rate  
3 case before the Commission in 2018 (Case No. ER-2018-0145 and ER-2018-0146). A&E  
4 4CP is also the accepted allocation method for what is now Evergy's Kansas Central  
5 jurisdiction. A&E 4CP is the accepted allocation method for production capacity costs  
6 resulting from Westar Energy's most recent rate case before the Kansas Corporation  
7 Commission (Docket No. 18-WSEE-328-RTS).

8 **Q: Please summarize the issues raised by Staff Witness Lange that you will address in**  
9 **your rebuttal testimony.**

10 A: I will address two issues raised by Ms. Lange:

- 11 1. The underlying cost causation of newer components of revenue requirement that  
12 are not explicitly considered in the 1992 NARUC Cost Allocation Manual, and
- 13 2. Ms. Lange's use of a production demand allocator based on A&E 4NCP and not  
14 the Company's allocator of A&E 4CP.

15 **Q: Please describe the first issue raised by Ms. Lange.**

16 A: On page 30 of her direct testimony, Ms. Lange has the following Q&A:

17 *Q: What is the underlying causation of newer components of revenue*  
18 *requirement, such as Plant in Service Accounting deferrals, or generation*  
19 *deployed to meet environmental goals or achieve profits in the SPP*  
20 *integrated marketplace?*

21 *A: These revenue requirement components do not appear to have been a*  
22 *consideration in the 1992 NARUC Cost Allocation Manual. As a kWh of*  
23 *energy is the basic unit of the service an electric utility provides, these costs*  
24 *and expenses are best allocated on the basis of energy sales.*

25 Ms. Lange appears to imply that any revenue requirements that are not explicitly defined  
26 or considered in the 1992 NARUC Cost Allocation Manual should be allocated on the basis

1 of energy sales and not the principles of cost causation that underly the cost of service  
2 concepts presented in the manual.

3 **Q: Is this an appropriate rationale to allocate costs in a class cost of service study?**

4 A: No, it is not. To choose kWh of energy as the appropriate allocation basis simply because  
5 it “is the basic unit of the service an electric utility provides” completely undermines the  
6 entire purpose of developing a cost of service study based on cost causation principles.

7 **Q: Why is cost causation important?**

8 A: Cost causation is the key element to selecting an allocation factor. This has been the  
9 standard by which an allocation method is evaluated, and it continues to be the gold  
10 standard for assessing cost allocation. The principle of cost causation is also relevant for  
11 analysis within classes of customers where each customer should, on average, have rate  
12 revenues that match the cost of service for that customer.

13 **Q: Is there a better approach to cost allocation for new costs that have not been explicitly  
14 considered in the 1992 NARUC Cost Allocation Manual?**

15 A: Yes. The NARUC Manual presents a process for cost allocation and the concept of cost  
16 causation is the primary factor. When a cost analyst identifies a cost, or category of costs,  
17 that are not well defined in the Manual, the analyst should apply the principles described  
18 in the Manual to make a rational decision on what cost causation principles apply to the  
19 cost. First the analyst should identify if the cost can be assigned using an external allocator  
20 with a function of production, transmission, distribution, or customer and further, if that  
21 function can be classified as being caused by energy, demand, or customer. If an external  
22 allocation factor cannot be identified with confidence, application of an internal allocation  
23 factor will likely be necessary.



1 **Q: Do cost causation principles still apply when selecting an internal allocation factor?**

2 A: Yes. Ms. Lange uses Plant in Service Accounting deferrals as an example of costs that  
3 were not previously considered and should be allocated on a basis of energy. Evergy's  
4 investment in plant, whether for production, transmission, distribution, or general plant, is  
5 never based on the amount of kWh throughput on its system or eventual energy sales to  
6 customers. As such, energy should not be used to allocate plant in service accounting  
7 deferrals. The nature of the cost should dictate the allocation method. In the case of plant  
8 in service accounting deferrals, the internal allocation factor based on total plant in service  
9 is the logical choice.

10 **Q: How should the Commission address costs that were not explicitly considered in the**  
11 **1992 NARUC Cost Allocation Manual?**

12 A: The Commission should apply the same principles of cost causation described in the 1992  
13 NARUC Cost Allocation Manual to rationally evaluate new costs and develop an  
14 appropriate allocation based on cost causation principles.

15 **Q: Please describe the second issue raised by Ms. Lange in her direct testimony that you**  
16 **will address.**

17 A: I will address Ms. Lange's choice of production capacity allocator. In her testimony on  
18 page 35 she states "...I used an Average and Excess allocator. However, I used an A&E  
19 4CP allocator consistent with the 1992 NARUC Cost Allocation Manual, which differs  
20 from the A&E 4NCP allocator developed by the Company." I understand that there is a  
21 typographical error in the above sentence and Ms. Lange intended to state, "I used an A&E  
22 4NCP allocator consistent with the 1992 NARUC Cost Allocation Manual, which differs

1 from the A&E 4CP allocator developed by the Company.” In reviewing Ms. Lange’s  
2 supporting workpapers, she has applied an A&E 4NCP allocator for production capacity.

3 **Q: Do any of your arguments supporting the use of A&E 4CP related to Ms. Maini’s**  
4 **testimony differ for your response to Ms. Lange’s testimony.**

5 A: No, they do not. I continue to support the use of the A&E 4CP method as the best choice  
6 for the Company to allocate production and transmission capacity costs.

7 **Q: Are there any differences between the A&E 4NCP proposed by Ms. Lange and the**  
8 **A&E 4NCP proposed by Ms. Maini?**

9 A: Yes, there are. While both versions use the same 4NCP class values to determine the  
10 excess portion of the allocator, they use different values for the system load factor. Ms.  
11 Maini uses the sum of class 4NCP values in the calculation of system load factor (1,007  
12 MW / 1,791 MW = 56.2%) whereas Ms. Lange uses the Evergy Metro system peak  
13 (1CP) for the system load factor (1,007 MW / 1,859 MW = 54.2%). This results in Ms.  
14 Maini’s method allocating slightly more on the basis of average demand than Ms. Lange.

15 **Q: Which method is correct?**

16 A: Neither are inherently wrong and, as demonstrated in Table 1 in my rebuttal testimony,  
17 the results using either method are very close. However, as both witnesses purport to  
18 apply the method prescribed in the 1992 NARUC Cost Allocation Manual, I would say  
19 Ms. Lange’s version is truer to the Manual. As described in the Notes section of Table 4-  
20 10A of page 50 of the Manual, the example determines the system load factor using the  
21 1CP system peak.

1 **Q: Please summarize your testimony?**

2 A: (1) The Commission should use a class cost of service study that allocates production and  
3 transmission capacity costs based on the Average and Excess Demand – 4 Coincident Peak  
4 (A&E 4CP) method as proposed by the Company.

5 (2) When faced with new components of revenue requirements that are not explicitly  
6 defined with an allocation method in the 1992 NARUC Cost Allocation Manual, the  
7 Commission should rely on a class cost of service that attempts to use a rational approach  
8 to developing an allocation factor that is rooted in the cost causation principles presented  
9 in the Manual.

10 **Q: Does that conclude your testimony?**

11 A: Yes, it does.

**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI**

In the Matter of Evergy Metro, Inc. d/b/a Evergy )  
Missouri Metro's Request for Authority to ) Case No. ER-2022-0129  
Implement A General Rate Increase for Electric )  
Service )

In the Matter of Evergy Missouri West, Inc. d/b/a )  
Evergy Missouri West's Request for Authority to ) Case No. ER-2022-0130  
Implement A General Rate Increase for Electric )  
Service )

**AFFIDAVIT OF CRAIG E. BROWN**

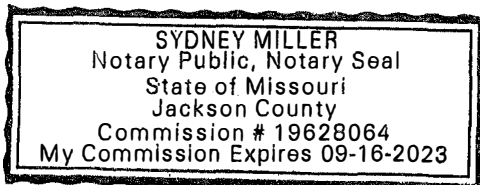
**STATE OF MISSOURI** )  
 ) ss  
**COUNTY OF JACKSON** )

Craig E. Brown, being first duly sworn on his oath, states:

1. My name is Craig E. Brown. I work in Kansas City, Missouri, and I am employed by 1898 & Co., a division of Burns & McDonnell Engineering Company as Project Manager in the Financial Analysis and Rate Design department.

2. Attached hereto and made a part hereof for all purposes is my Rebuttal Testimony on behalf of Evergy Missouri Metro and Evergy Missouri West consisting of ten (10) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.

3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.



Craig E. Brown  
Craig E. Brown

Subscribed and sworn before me this 15 day of July 2022.

Sydney Miller  
Notary Public

My commission expires: 09-16-2023



# Craig Brown, MBA

## Project Manager

Craig is an experienced consultant, with a focus in retail and wholesale utility cost of service and rate design, economic analysis and business case development, forecasting, depreciation and valuation consulting. Craig has project experience and expertise in the areas of revenue requirements, cost of service, rate design, developing net metering policies, resource planning, financial and load forecasting, capital program planning, bond financing support, depreciation, valuation, and common cost and indirect capital overhead cost allocation.

## PROJECT EXPERIENCE

### Education

Masters, Business Administration, Finance,  
Bachelors, Hotel & Restaurant  
Management

### Experience

- **3 years** with 1898 & Co.
- **22 years** of experience

Visit my [LinkedIn](#) profile.



### Cost of Service and Strategic Rate Restructuring / JEA

**Jacksonville, Florida / September 2021 - May 2022**

**Project Manager / Lead Consultant** 1898 & Co. is currently engaged on a Comprehensive Cost of Service and Strategic Rate Restructuring Study. The Study began with a review JEA's existing Cost of Service (COS) Model to determine if it was acceptable for use in 1898 & Co.'s COS study. It was determined that JEA's model was a good start, but the 1898 & Co. team identified a number of improvements to make the model more dynamic and user friendly. We conducted a fully unbundled COS study to allocate JEA's test year revenue requirement to each rate class based on a 2021 Load Research study and updated special studies to functionalize, classify, and allocate costs.

The results of the COS Study, including identification of class revenue inequalities and unit costs of service were used to guide a comprehensive overhaul of JEA's electric rates. The 1898 & Co. team guided JEA through a line by line review of its existing rate tariff and identified numerous areas for improvement. 1898 & Co. and JEA are currently collaborating on strategic roadmap for rate design changes including:

- Working towards cost-based Basic Monthly Charges
- Update of time-of-use (TOU) periods and seasons for new TOU rates
- Review of applicability and rates for Interruptible and Curtailable Service
- Developing a real-time-pricing (RTP) rate
- Updating policies for Standby Service
- Update of charges and discounts for primary versus secondary service
- Review of existing discount programs
- Introduce revenue unbundling rate concepts

### Beaches Energy Cost of Service Study / Florida Municipal Power Agency

**Jacksonville Beach, Florida / March 2020 - June 2021**

**Project Manager / Lead Consultant** 1898 & Co. teamed with the Florida Municipal Power Agency (FMPA) to conduct a strategic capital planning forecast and cost of service (COS) study for Beaches Energy Services (Beaches). We developed a comprehensive financial forecasting model to evaluate the impact on revenue

requirements of five strategic initiatives: substation fortification, staffing expansion, technology, resiliency/storm hardening, and succession planning. Each scenario was model in five and 10 year forecasts to evaluate the impact on rates and key financial metrics. 1898 & Co. worked through multiple rate adjustment scenarios with Beaches to identify an optimal path forward to limit rate increase while still executing its strategic capital plan. An unbundled COS study was completed to evaluate the equitability of Beaches current rate classes. The study also provided unit costs of service to be used in a future rate adjustment to reach more cost-based rates. Craig teamed with the Florida Municipal Power Agency (FMPA) to conduct a strategic capital planning forecast and cost of service study. We developed a comprehensive financial forecasting model to evaluate the impact on revenue requirements of five strategic initiatives: substation fortification, staffing expansion, technology, resiliency/storm hardening, and succession planning. Each scenario was model in 5 and 10 year forecasts to evaluate the impact on rates and key financial metrics.

### Cost of Service Studies / Evergy

**Kansas City, Missouri / June 2021 – January 2022**

**Project Manager and Lead Consultant** 1898 & Co. prepared the cost of service studies for both of Evergy's Missouri jurisdictions, Evergy Missouri Metro and Evergy Missouri West, for its 2022 rate case before the Missouri Public Service Commission. We conducted two fully unbundled, embedded cost of service studies that were filed with the rate case and supported by company witnesses. Each rate class was subdivided into primary and secondary service as appropriate. The studies used the Average and Excess demand method for allocating generation and transmission costs and used the minimum system method for allocating distribution demand and customer related costs. Unit costs resulting from the studies were used to support rate design proposals. If requested by Evergy during the rate case process, Craig Brown will be providing rebuttal testimony to support the studies. 1898 & Co. has also been engaged by Evergy to conduct cost of service studies for its two Kansas jurisdictions in 2022.

### Strategic Rate Design / Frankfort Plant Board

**Frankfort, Kentucky / November 2021 – March 2022**

**Project Manager and Lead Consultant** 1898 & Co. conducted a strategic review of rate design concepts for the Frankfort Plant Board (FPB). The study included an overall review of FPB's rate class structure and one of the

recommendations resulting from the study is the creation of a new General Service Demand rate class to bridge the gap between the existing General Service and Large Power classes. Additional areas covered in the study included:

- Provided guidance on the appropriate method and discount for service primary metered customers
- Rate design and cost basis for public EV charging stations
- Rate design for residential home EV charging
- Recommendation to transition from net metering to net billing and development of a Value of Solar avoided cost rate
- Rate design for retail LED security and area lighting
- Development of a Green Tariff and REC purchasing program
- Review of municipal rates

### Comprehensive Electric Rate Study / Town of Apex, North Carolina

**Apex, North Carolina / January 2021 – March 2022**

**Project Manager and Lead Consultant** 1898 & Co. conducted a comprehensive electric rate study for the Town's electric department. We prepared a 5-year financial forecast included a phased rate adjustment plan to meet the Town's key financial metrics including increasing its operating reserve cash balance over the forecast period. An unbundled cost of service study was prepared which indicated the need for inter-class rate adjustments in rate design. Rate design for each rate class was prepared with an emphasis of increasing recovery of fixed costs through fixed charges. In addition, 1898 & Co. proposed transitioning from the Town's existing net metering policy to a net billing approach with a Value of Solar tariff for compensation of excess customer generation.

### Cost of Service and Rate Design / Valley Electric Association

**Pahrump, Nevada / May 2020 - Aug 2020**

**Project Manager and Lead Consultant** 1898 & Co. conducted a cost of service study for VEA's retail electric service. The project required reconciliation of VEA's three operating companies (transmission, retail distribution, and broadband). Craig led a cost of service study for VEA's electric transmission and distributions systems. The study utilized 1898 & Co.'s Cooperative Cost of Service Model to functionalize, classify, and allocate costs to VEA's principal rate classes.

## On Call Consulting / Greenville Utilities Commission

Greenville, North Carolina / Jan 2021 - Ongoing

**Project Manager and Lead Consultant** Craig provides ongoing rate consulting services for GUC on an as needed basis. Recent projects include developing a transmission level electric rate based on coincident peak (CP) demand, support for a revised line extension policy including evaluation tools, and updated backstand rates for customers with QF cogeneration facilities. Prior to joining Burns & McDonnell, Craig had worked regularly with GUC over multiple engagements beginning in 2014 with a detailed analysis to evaluate the potential sale of its power agency's (NCEMPA) generation assets to Duke Energy Progress (DEP). Craig led comprehensive cost of service and rate studies in 2015 and 2019, including the following components:

- weather normalized load forecasts
- 20-year financial forecasts
- unbundled cost of service
- transmission cost of service
- detailed rate design including the development of a Purchased Power Adjustment (PPA) rider
- net metering policy and rate design
- review of other fees and charges

## Network Backbone and LTE Broadband Wireless / Evergy, Inc.

Kansas City, Missouri / 2020

**Lead Consultant** Burns & McDonnell and 1898 & Co. completed a wireless broadband LTE network total cost of ownership analysis, a comprehensive fiber and microwave backbone DWDM / MPLS analysis, an LTE staffing and resource assessment, a rural broadband study and a comprehensive assessment of technical specifications for LTE end-devices and sensors. An accommodating capital spend plan for the LTE wireless and network backbone enhancements and build-out was also developed based on the assessment. Craig led the development of a wireless broadband Private LTE network total cost of ownership (TCO) analysis and cost-benefit model. The TCO model developed a 20-year evaluation of the infrastructure, core network, spectrum, and device costs to support a private LTE network for Evergy. Benefits of the program that were considered included O&M cost savings, avoided capital costs, and subjective benefits. Ten use cases were evaluated, and the business case resulted in a 20-year net benefit NPV. The overall project included a comprehensive fiber and microwave backbone DWDM / MPLS analysis, an LTE staffing and resource assessment, a rural broadband

study and a comprehensive assessment of technical specifications for LTE end-devices and sensors.

## Grid Enhance Wireless Fan | Oklahoma Gas and Electric Company

Oklahoma City, OK / 2021

**Task Manager and Lead Financial Consultant.** Craig led the development of a wireless broadband Private LTE network total cost of ownership (TCO) analysis and cost-benefit model. The TCO model developed a 20-year evaluation of the infrastructure, core network, spectrum, and device costs to support a private LTE network for LCRA. Benefits of the program that were considered included O&M cost savings, avoided capital costs, productivity improvements related to mobile workforce, and subjective benefits. Sixteen use cases were evaluated and the business case resulted in a 20-year net benefit NPV.

## Public Power Market Evaluation / Florida Municipal Power Agency

Orlando, Florida / 2019

**Project Manager / Lead Consultant** Craig led a team of consultants in the development of a financial and market analysis to evaluate alternative business case scenarios for JEA. Support included collaborating with the client throughout the course of the project including the development of utility scenarios, evaluation of competitiveness and determination of key impacts to stakeholders across various scenarios. Project tasks included generation evaluation, economic dispatch using PROMOD, and development of a financial model to determine impacts to electric rates.

## Testimony Experience

Utility Company	Regulatory Agency	Docket No.	Client Represented	Subject
CenterPoint Energy Resources Corp	Public Utilities Commission of Minnesota	G-008/GR-17-285	CenterPoint Energy Minnesota Gas	Weather Normals
Old Dominion Electric Cooperative	Federal Energy Regulatory Commission	ER17-240-000	Old Dominion Electric Cooperative	Depreciation Rates
Kansas City Board of Public Utilities	Kansas City Board of Public Utilities	2016	Kansas City Board of Public Utilities	Electric Revenue Requirements
CenterPoint Energy Resources Corp	Public Utilities Commission of Minnesota	G-008/GR-15-424	CenterPoint Energy Minnesota Gas	Weather Normals
Southern Maryland Electric Cooperative, Inc.	Public Service Commission of Maryland	Case No. 9294	Southern Maryland Electric Cooperative, Inc.	AMI Business Case - Cost Benefit Analysis
Southern Maryland Electric Cooperative, Inc.	Public Service Commission of Maryland	Case No. 9275	Southern Maryland Electric Cooperative, Inc.	Depreciation Rates
Kansas City Board of Public Utilities	Kansas City Board of Public Utilities	2010	Kansas City Board of Public Utilities	Electric Revenue Requirements, Environmental Surcharge, Rate Design