Exhibit No.: _____
Issue(s): Correction to Empire's Projected Savings/ Uncertainty of Market Prices/ Change in Diversity of Resources
Witness/Type of Exhibit: Mantle/Rebuttal
Sponsoring Party: Public Counsel
Case No.: EO-2018-0092

REBUTTAL TESTIMONY

OF

LENA M. MANTLE

Submitted on Behalf of the Office of the Public Counsel

EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. EO-2018-0092

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Denotes Confidential Information that has been redacted

February 7, 2018

PUBLIC VERSION

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of	)	
The Empire District Electric Company	)	Case No. EO-2018-0092
for Approval of Its Customer Savings Plan	)	

AFFIDAVIT OF LENA M. MANTLE

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Lena M. Mantle, of lawful age and being first duly sworn, deposes and states:

1. My name is Lena M. Mantle. I am a Senior Analyst for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my rebuttal testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Lena M. Mantle
Senior Analyst

Subscribed and sworn to me this 7th day of February 2018.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 23, 2021
Cole County
Commission #13754037

Jerene A. Buckman
Notary Public

My Commission expires August 23, 2021.

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REBUTTAL TESTIMONY

OF

LENA M. MANTLE

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. EO-2018-0092

INTRODUCTION

Q. What is your name?

A. Lena M. Mantle.

Q. Who is your employer, what is your business address, and what is your job title?

A. I am employed by the Office of the Public Counsel ("OPC"). My business address is P.O. Box 2230, Jefferson City, Missouri 65102. I am a Senior Analyst for OPC.

Q. What are your qualifications and experience?

A. In my position as Senior Analyst for the OPC I provide analytic and engineering support in electric, gas, and water cases before the Commission. I have worked for the OPC since August, 2014.

I worked for the Staff of the Missouri Public Service Commission ("Staff") from August 1983 until I retired in December 2012. During the time that I was employed at the Missouri Public Service Commission ("Commission"), I worked as an Economist, Engineer, Engineering Supervisor and Manager of the Energy Department.

Attached as Schedule LMM-R-5 is a brief summary of my experience with OPC and Staff along with a list of the Commission cases in which I filed testimony, Commission rulemakings in which I participated, and Staff reports to which I contributed. I am a Registered Professional Engineer in the State of Missouri.

Q. What is the purpose of your rebuttal testimony?

A. I present to the Commission OPC's recommendations regarding the Empire District Electric Company's ("Empire") requests in this case, provide an overview of the rebuttal testimonies of OPC witnesses Dr. Geoff Marke, John Riley and John Robinett, and I testify to the uncertainties and risks Empire's requests place on its customers.

Q. Briefly, what is Empire requesting in this case?

A. Empire is requesting that the Commission do the following with respect to what Empire calls its "Customer Savings Plan":

a. Predetermine that Empire's decision to invest in 800 MW of wind is prudent;

b. Predetermine that Empire's decision to prematurely retire its Asbury generator is prudent;

c. Authorize Empire to create a regulatory asset that would include recovery of and on the undepreciated balance of the Asbury facility;

d. Approve depreciation rates for Empire's proposed new wind assets, to allow it to begin depreciating them as soon as they are placed in service;

e. Approve the arrangements between Empire and its affiliates in its Customer Savings Plan and, to the extent necessary, grant Empire relief from compliance with the Commission's electric Affiliate Transactions rule 4 CSR 240-20.015; and

f. Issue an order that is effective by June 30, 2018.

Q. What is OPC recommending the Commission do with Empire's requests?

A. OPC is recommending the Commission not grant any of Empire's requests because the actual impact that Empire's "Customer Savings Plan" will have on Empire's Missouri retail customers' rates and the economy of southwest Missouri cannot, with any confidence, be determined due to: 1) the vagueness of Empire's filing; 2) the significant changes in (a) the electric utility industry, (b) Southwest Power Pool

("SPP"), and (c) the economic environment that have occurred since Empire filed this case; and 3) the uncertainties around the future values of many of the inputs into Empire's analysis, and the risk these uncertainties put on Empire's customers. Empire's "Customer Savings Plan" is very complex with many aspects that still need to be determined and clarified. In addition, Empire's analysis to show customer benefits, by necessity, is replete with assumptions and forecasts that are vital to Empire's determination that its plan would actually produce benefits for Empire's customers who, regardless of whether the anticipated benefits occur or not, would pay for the plan.

In addition, if it approves this request, the Commission would be ratifying a radical change in acceptable rationale for why generation resources should be added—from meeting load to "beating the market." OPC believes this case, with input from limited stakeholders, is not the correct forum for making such an important decision.

Q. What are significant features of Empire's "Customer Savings Plan"?

A. Empire's plan is to prematurely retire its coal generation at Asbury and add 800 megawatts ("MW") of wind generation. Empire plans to enter into an agreement with one or more tax equity partners to defray some of the cost of the wind generation. Also as a part of this plan, Empire would recover the undepreciated portion of the cost of Asbury and continue to earn a return on this plant that it would retire.

Q. What is the biggest uncertainty Empire's shareholders and the unknown equity partner(s) face in Empire's plan?

A. If the Commission approves Empire's request, there is very little, if any, uncertainty regarding cost recovery to Empire's shareholders and the equity partner(s). Once the uncertainty regarding the details of the participation of the equity partner(s) is

determined, Empire and its equity partner(s) are assured of the return on and of their investments.

Q. What is the biggest uncertainty facing Empire's Missouri retail customers in Empire's plan?

A. The biggest uncertainty facing the customers is what future SPP market prices will actually be. These customers will only benefit from Empire's plan if the revenues from selling the wind energy from the 800 MW wind farm into the SPP market are greater than the cost. These costs, which would be used for setting Missouri retail rates, include increases in Empire's revenue requirement from the addition of the 800 MW of wind and the continued recovery of the retired Asbury generation.

Q. Briefly, what is the substance of the testimonies of OPC's witnesses?

A. All OPC witnesses provide testimony supporting OPC's recommendation and rationale for that recommendation. However, each looks at a different aspect of Empire's filing.

John S. Riley "follows the money." He provides a description of the costs to Empire's customers and the returns to Empire's shareholders and equity partner stakeholder(s).

Dr. Geoff Marke provides background information to the Commission from Liberty Central's acquisition of Empire (Case No. EM-2016-0213) and Empire's Chapter 22 resource planning filings in Missouri. Dr. Marke discusses changes in the industry and regulatory environment that have occurred since Empire filed this case, and the uncertainty these changes have placed on Empire's analysis.

John A. Robinett testifies about Empire's Asbury facility, including Empire's recent upgrades, Empire's analysis supporting those upgrades, Empire's changing estimates of the cost of upgrades to the Asbury facility needed in 2019, the costs Empire is asking for recovery of and a return on if Empire retires Asbury in 2019, and Empire's estimated cost to retire the Asbury facility.

Q. Briefly, what is the substance of your testimony?

A. First I show how Empire has overstated the benefits of its plan by $102 million by assuming customers would realize savings from annual reductions in revenue requirement.

I then provide an overview of some of the uncertainty and resulting risks that Empire's plan puts on its customers. In particular I discuss some of Empire's modelling assumptions and the market prices that it used when it determined that its plan would generate benefits for its customers. I also discuss how the addition of 800 MW of wind generation reduces the diversity of Empire's generation mix and, thereby, reduces Empire's flexibility to respond to changes in the SPP market.

CORRECTION TO EMPIRE'S PROJECTED SAVINGS

Q. What correction needs to be made to Empire's projected savings?

A. Empire states that its analysis shows that customers would realize a savings of $325 million over 20 years. In reviewing Empire's work papers used to develop this amount of potential savings over 20 years, I noticed that this $325 million includes annual changes in revenue requirement due to the wind additions and the retirement of Asbury. To achieve savings from reductions in revenue requirement, Empire would need to file rate cases every year in the next 20 years. In reality, the customers would not realize annual reductions in revenue requirement. What is more likely to happen is Empire would either only request a change in rates if there is a significant increase in revenue requirement or only come in for a rate increase every four years as required to keep its fuel adjustment clause.

Q. Do you have any estimate of the impact of the timing of rate cases to Empire's projected savings?

A. Yes. Just using a more realistic view of when revenue requirements for Empire's plan would actually be realized by the customers as described above, the savings to

customers would be reduced by approximately one-third or $103 million to a 20-year present value revenue requirement ("PVRR") of $222 million with no meaningful saving flowing to the customers until 2027.

Q. In calculating this reduction in savings to $222 million, did you change any other assumptions in Empire's analysis?

A. No, I did not.

UNCERTAINTY OF MARKET PRICES

Q. Why are the market prices used in analyzing Empire's plan important?

A. In the most simplistic terms, the majority of the benefits of the plan are the revenues Empire receives from the SPP market from the energy generated by the wind turbines. The more wind energy generated and the higher the market prices, the greater the revenue. For Empire's retail customers to receive benefits greater than the costs to those customers, the market prices for this wind generation must generate revenues in excess of these costs. These costs include not only the capital expenses of the wind but also a return to the equity partner for its investment and the foregone SPP market revenues Empire would have received from its Asbury plant.

Q. What market prices did Empire use in its analysis of its plan?

A. There were many hourly prices used in the modelling process. The base annual average hourly price for the SPP Asbury node[1] Empire provided in response to OPC data request 8004 is provided below as a representation of the hourly prices Empire used in its analysis.

[1] McMahon Direct, Attachment JM-2 page 26 of 44, "Market prices for Mid LCOE wind were assumed to be equivalent to Asbury prices developed to mode the SPP IM."

** **

This shows Empire estimated prices to decline a little in 2018, increase in 2019, increase substantially in 2020 (when the wind turbines would be installed), and increase at a fairly constant rate from 2021 through 2036.

Q. Are these reasonable estimates?

A. I do not know. However there are several factors that lead me to be skeptical of these prices including the limited history of mature nodal prices, the limited knowledge of the impact of wind generation on market prices, and the lack of Empire's knowledge of the current and future generation retirements and additions of other SPP members.

Q. How much historical market price information is available?

A. Empire is estimating 20 to 30 years of market prices from a market that is just a little over three years old. The SPP market began operating in March 2014. In its August, 2016, *2015 State of the Market* report, the SPP market monitoring unit recognizes that it takes time for a market to be reliable when it states that the

"second year of the Integrated Market shows significant maturing."[2] In its August 2017, *2016 State of the Market* SPP's market monitoring unit describes the dependability of its market when it states the "third year of the Integrated Marketplace shows a mature and very competitive market."[3]

So, according to SPP's market monitoring unit reports, the SPP market had only been mature for at most 20 months prior to when Empire filed its request. Despite this limited amount of information on the SPP market, Empire witness McMahan testifies that three years of data is enough to provide confidence on market prices for the next 30 years.[4] Apparently the available three years of data, that show declining market prices, are supposed to give confidence that the market prices will more than double in the next 20 years.

Q. What does the most recent SPP State of the Market describe market prices?

A. The most recent annual SPP *State of the Market* report states that the average real-time electricity prices were some of the lowest monthly and annual average electricity prices since the start of the SPP market.[5]

Q. Is there anything else in the SPP State of the Market reports that leads you to be skeptical of the market prices Empire used?

A. Yes. One of the market performance highlights SPP market monitoring unit mentions in its *Quarterly State of the Market Report – Fall 2017*[6] is the growing frequency of negative prices and the potential need for changes in market rules to address them. The special issues section of the report on negative prices[7] opens with the following description:

[2] https://www.spp.org/documents/41597/spp_mmu_state_of_the_market_report_2015.pdf, page 1
[3] https://www.spp.org/documents/53549/spp_mmu_asom_2016.pdf, page 1
[4] McMahon Direct, page 34.
[5] https://www.spp.org/documents/53549/spp_mmu_asom_2016.pdf, page 2
[6] https://www.spp.org/documents/56353/spp_mmu_quarterly_fall_2017_v2.pdf, page 2
[7] Id, page 42

> With the prolific growth of wind generation in the SPP market, the number of intervals with negative prices continues to increase. In October 2017, 17 percent of all market participant intervals in the real-time market had prices below zero . . . On a year-to-year basis, the total percentage of negative price intervals in the real-time market has increased from 2.6 percent in 2015, to 3.5 percent in 2016, and to 7.0 percent in 2017 (through November). (footnote omitted)

These negative prices were prevalent in the overnight, low load hours. The SPP market monitoring unit reports:

> During 2017 the first five hours and last two hours of the day experienced negative prices in over 10 percent of all intervals. The highest level in any hour during prior years was just 10 percent.

The report concludes with the following statement:

> Thus, the growing frequency of negative prices indicates the potential need for changes in market rules to address self-committing of resources in the day-ahead market and the systematic absence of some forecasted variable energy resources in the day-ahead market to improve market efficiency.

Q. In your review of the market prices Empire used in its modeling, were there any hours with negative prices?

A. No, there were not.

Q. Should there be?

A. Definitely. The SPP market monitoring unit attributes these negative market values to the prolific growth of wind generation. The production tax credits ("PTC") for wind generation result in wind being profitable at a negative price. The PTC is $24 per MWh. There is no PTC unless a MWh of wind is generated. Therefore, as long as the market price is above negative $24, the generator profits by selling MWhs of wind-generated electricity into the market.

Q. What are your conclusions after reviewing the SPP State of the Market reports and Empire's forecasted market prices?

A. First of all, there is very little mature market SPP price information upon which to base a forecast. Secondly, the available market information shows only a decline of market prices. While it could be expected that market prices will rise, there is no indication that that rise will begin in 2019 as forecasted by Empire and there is no indication as to how fast market prices will rise, if and when they do. Any estimate of market prices more than two years out, is purely a guess due to the limited amount of historical information to base such a forecast on.

In addition, Empire's forecasted prices do not mimic the current market trend of more hours with negative pricing, which given the likelihood of much more wind generation being added in the SPP footprint will only change if SPP's market rules are changed. If SPP's market rules change, the historical SPP market prices will not reflect that change and, depending on how those rules are changed, those historical SPP market prices may be useless for forecasting SPP market prices.

Q. There are other mature markets in existence. Could those be used to model future SPP market prices?

A. These other markets provide limited information regarding the SPP market. According to the recent Lawrence Berkeley Laboratory and Argonne National Laboratory report *Impact of Variable Renewable Energy on Bulk Power System Assets, Pricing, and Costs*, on the whole, wholesale prices have dropped substantially since 2008 which is a direct conflict to the forecast of market prices Empire used in this analysis.

However caution should be used when comparing other regional transmission organization markets to the SPP. The SPP is unique in that it has more wind generation than any other regional transmission organization. Wind

generation, because it is intermittent generation,[8] impacts the market differently than traditional generation that is available when the customer needs it.

Q. Are the other aspects of the market prices that raises concerns?

A. Yes. As Dr. Marke describes in his testimony, there is a potential for a great amount of wind to be added in the SPP region that Empire did not take into account in its analysis. In addition, Empire's analysis did not include the impact of the early retirement of Asbury and many other traditional generation facilities in the SPP region that have recently been announced.

Q. How could this affect market prices?

A. I do not know. The recent Lawrence Berkeley Laboratory and Argonne National Laboratory report *Impact of Variable Renewable Energy on Bulk Power System Assets, Pricing, and Costs* offers the following implications on growing shares of wind and other variable renewable energy ("VRE") generation on wholesale market prices:[9]

- Temporal patterns in wholesale electricity prices will change, with lower prices when VRE generation is high, and higher prices when VRE generation is low
- Price volatility and unpredictability would be expected to increase, as a consequence of the weather-dependent, variable, and uncertain nature of VRE generation
- Geographic patterns in wholesale electricity prices will change, with lower prices in regions with concentrated VRE deployment and limited transmission capacity

[8] Intermittent generators can only supply energy into the electricity grid when their primary energy source (i.e. wind) is available

[9] https://emp.lbl.gov/sites/default/files/lbnl_anl_impacts_of_variable_renewable_energy_final.pdf, November 2017, page 13

- Wholesale electricity market prices will, especially before capacity equilibration, be lower as a greater share of low (or even negative)-marginal cost generation is deployed
    - The degree of price suppression will depend on the nature of the overall supply curve from other generation sources: a 'flatter' supply curve will yield less price suppression, whereas presence of inflexible generators that use low bids to avoid startup/shutdown costs can increase price suppression
    - The effect is not present to the same extent for vertically integrated utilities that operate in a cost-plus environment and in markets where wholesale purchases are a subset of supply costs
    - The degree of price suppression may also depend on any policy incentives (e.g., the PTC) that impact bidding behavior: incentives that lower bid prices will yield lower overall prices when those bids are on the margin
    - This price suppression effect is not unique to VRE in that any low-marginal-cost resource or a reduction in demand would have a similar directional effect in the short term
    - Price suppression affects electricity customers and generators differently: customer electricity costs tend to be reduced by virtue of lower wholesale prices, but this consumer benefit is offset by reduced revenues earned by generators
- Price suppression may result in earlier retirements of some—and especially inflexible—generation units; moreover, new units will tend to have lower capital costs (and, therefore, can afford higher operating costs) and greater dispatch flexibility than in scenarios with low VRE (Chapter 4 discusses these impacts as well as those in the following bullet in more detail)
- Capacity 'equilibration' along the lines of the previous bullet implies that, as investment and retirement decisions adjust to higher penetrations of VRE over the longer term, the impact of VRE on average wholesale prices will be different and not as sizable as in the short run
    - The VRE impact on pricing variability will remain even in the longer term after capacity equilibration

- But the impact on average wholesale prices will be lower in the longer term as long-term capital investment and retirement decisions are made based on market conditions, especially the retirement of more-inflexible units and the incentive to invest in lower capital-cost (but potentially higher operating-cost) technologies under high VRE scenarios

- There will be a tendency towards greater revenue from [ancillary service] markets, from capacity markets (where they exist), and/or from scarcity events; less revenue may derive from the general energy market

As described in this report, the constantly changing landscape of the generation mix in the SPP footprint will impact SPP market prices in a variety of ways. Each member of SPP makes its own decisions regarding generation additions and retirements based on its views of the market and market prices. These decisions are not made by SPP.

Q. Did Empire look at the impact on market prices with additional wind and less traditional generation?

A. It did a limited analysis at the insistence of OPC. Dr. Marke provides additional details on exactly what was included in this scenario in his testimony and the shortcomings of the scenario modeled by Empire.

Q. What did its analysis show?

A. The results of Empire's analysis are counter-intuitive. Its analysis resulted in a reduction in market price in all hours including the on-peak hours in the summer months when the wind resources do not generate much energy. With less coal, SPP will call on the expensive-to-run natural gas turbines to provide the energy necessary to meet customers' needs, which should result in higher market prices.

Q. Is there any helpful information that can be gleaned from Empire's analysis of SPP with more wind and less coal?

A. Yes. Empire's analysis gives a measure of the impact of a small change in market prices on the revenue that its plan would generate. According to a presentation given to the parties at the January 12, 2018, technical presentation, Empire stated that its more wind, less coal scenario decreased market prices by 5% to 7%. The helpful information is that, with everything else held constant, a 5% to 7% decline in the prices it forecasted would result in 14% less revenue in its plan.

Q. Are there other factors that may impact market prices?

A. Yes. It is likely that the Mountain West Transmission group will join the SPP resulting in the additional wind resources in SPP. The economy of the nation is changing and this could result in an increase in load for SPP members which would change the market prices. Natural gas and coal prices will change which will affect the market prices.

Q. Would you summarize OPC's concerns regarding the market prices used in Empire's analysis?

A. Market prices are key to achieving the benefits Empire estimates will accrue to its customers from its change in its resource plan. There are so many uncertainties regarding market prices that are impossible to predict. Because in Empire's plan customer benefits are all tied to SPP revenues, and the market prices used to estimate those revenues are uncertain, OPC cannot recommend that the Commission provide Empire the relief it requests in this case.

CHANGE IN DIVERSITY OF RESOURCES

Q. What is "diversity of resources"?

A. Diversity of resources refers to both differences in the design of generation facilities and in the energy source they require to generate electricity. Different types of

generation have different characteristics that together can meet a load requirement at least cost. For example, coal generation is capital intensive but is typically inexpensive to run. Because of the cost to start and stop many coal plants, they are often referred to as base load plants since, once they come on line, they generate electricity continuously. These plants are also used to follow load.

There are two basic types of natural gas plants – combined cycle and combustion turbines. Combined cycle plants use a heat recovery steam generator ("HRSG") to recover waste heat from combustion turbines to power a conventional steam turbine. These plants are not as capital intensive, and with the current low price of natural gas, produce electricity at a cost close to or lower than some coal plants. These are typically considered intermediate generation.

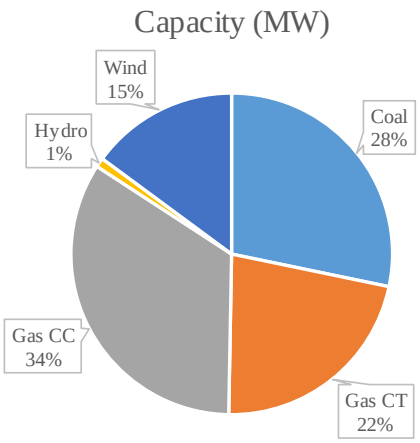
Combustion turbines ("CTs") are inexpensive to build but expensive to run to generate electricity. However, CTs are cost effective to run for short periods of time. Some CTs can also use oil as the fuel to generate electricity.

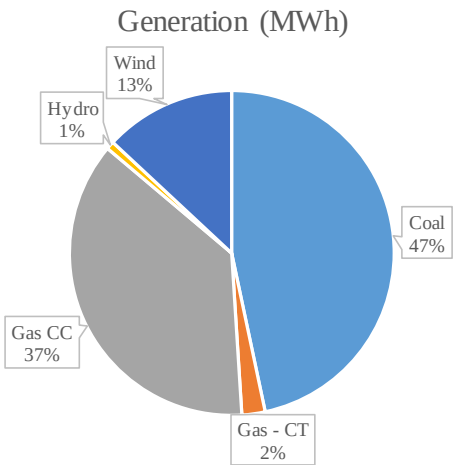
The capital cost of wind generation is dropping. There is no fuel cost with wind generation. Its drawback is that it only generates energy when the wind is blowing. It is not always available when customers need energy. Therefore, until energy storage becomes cost-effective, alternative sources of electricity generation is necessary to ensure reliability.

A diverse set of resources shows the utility is not relying on any one fuel type or technology. Diverse generation technologies and fuel sources protects the customers from volatility and increases in a fuel or regulations regarding how electricity is generated. A utility that is overly dependent upon one fuel source or technology type unnecessarily is placing additional risk on its customers.

Q. Does Empire currently have diverse resources?

A. Yes, it does. The pie chart below shows the capacity and generation of Empire's current resources and the generation of each resource in 2016.

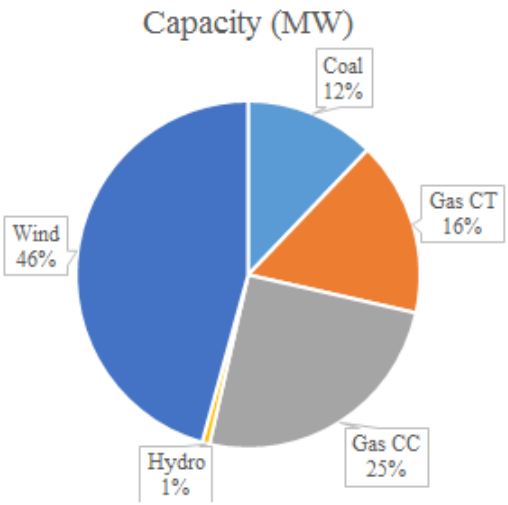


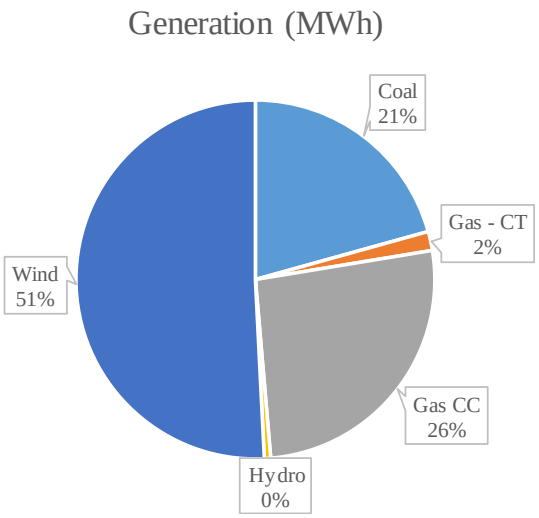


As shown in these pie charts that 28% of Empire's capacity was from coal plants and those coal plants generated 47% of the total energy produced by Empire resources. Empire's natural gas combustion turbines ("CTs"), while making up 22% of Empire's capacity resources, only produced 2% of Empire's total energy generation.

Q. How would this change with Empire's plan?

A. Similar pie charts for Empire's capacity and estimated generation in 2022 with its plan as provided by Empire in response to Staff data request 11 are below:





As these pie charts show, Empire's capacity and generation mix would change dramatically. Wind would make up 46% of Empire's capacity and 51% of the energy it would generate.

However, there is additional information that is important to understand when comparing these pie charts with the previous pie charts of Empire's current resources. The generation pie charts do not show the energy required by Empire's customers. They illustrate energy generated and sold into the SPP market. The table below gives the numerical information used to create these pie charts:

	Capacity (MW)		Generation (MWh)	
	Current	Empire's Plan	Current	Empire's Plan
Coal	484	282	3,123	1,900
Gas CT	377	377	155	157
Gas CC	580	580	2,485	2,410
Hydro	16	16	54	54
Wind	255	1,055	874	4,667
Total	1712	2,310	6,691	9,188

This table shows that Empire's total resource capacity would increase by 35% (approximately 600 MW) and its generation would increase by 37% (approximately 2,500 MWh) while Empire's peak load is forecasted to increase less than 2% between 2016 and 2022.[10]

Q. What does this suggest to you regarding resource diversity risk?

A. If Empire implements its plan, it will be heavily reliant on wind power. Even if the market prices that are forecasted are realized, if Empire is not able to generate the amount of wind energy it estimates, this plan could fail to achieve the benefits touted in Empire's analysis. This could result in a negative "benefit" to Empire's customers. Empire may not see the wind generation shown in the table above if

[10] McMahon direct, page 16:20

after the wind turbines are installed Empire discovers the estimated wind potential for the site was overstated, there may be a few years when the wind is below what is estimated, or the wind turbine generation is limited due to discovery of an endangered species. Putting so much emphasis on one type of resource creates risk for Empire.

Q. Empire's witness Blake Mertens states that even without Asbury, Empire will have a diverse fleet of generation resources that can be dispatched on a non-intermittent basis.[11] Do you agree?

A. No, I do not. Without Asbury, 75% of Empire's capacity will be natural gas combined cycle and combustion turbine plants. If natural gas prices increase or become volatile again, the fuel costs passed through to Empire's retail customers will also increase and their bills will become volatile.

Most market experts state electric market prices are tied to natural gas costs. So if natural gas prices become volatile, Empire's customers, in addition to volatility in fuel costs of its own generation, will be exposed to additional volatility because Empire will be depending on the SPP market to meet its customers' needs.

Q. Mr. Mertens goes on to state that because of its participation in the SPP market, Empire can maintain its historically high reliability standard. If Empire implements its plan will Empire maintain its reliability standard?

A. No. Instead Empire will be relying on the SPP to provide energy to maintain reliability for Empire's customers.

Q. Is this an uncertainty of Empire's plan?

A. Yes. Empire is modeling based on known additions and retirements of SPP members. However, it is neither the mission of SPP nor of any of these members to do what is best for Empire's customers. SPP and its other members are doing

[11] Mertens direct, page 11:3-7

what they believe is best for each of them. It is very likely that many or all of them are considering the same changes to their generation mix that Empire is. This is evidenced by KCP&L's June 2, 2017, announcement[12] that it plans to retire 473 MW of KCP&L Greater Missouri Operations Company ("GMO") coal and 97 MW of natural gas generation and 340 MW of Kansas City Power & Light Company ("KCPL") coal generation by the end of 2019 and increase its renewable portfolio by the end of 2017. To that end, KCP&L just filed with this Commission, on February 2, 2018, that it has entered into purchased power agreements for an additional 444 MW of wind power. This is a big uncertainty in the future of the SPP and will impact the cost of maintaining Empire's reliability in the future.

CONCLUSION

Q. Would you summarize your testimony?

A. The savings in Empire's "Customer Savings Plan" are built on very uncertain assumptions that do not reflect current reality – a reality that is still changing. Even so, Empire is asking its customers to "foot the bill" on this enormous gamble of building 800 MW of wind generation that will shift to its customers all risk that the benefits are not realized while ensuring that Empire's shareholders and tax equity partners realize a tidy profit.

There is nothing preventing Empire from pursuing building wind generation through an unregulated affiliate with a tax equity partners. This would remove the risk from its retail electric customers. The addition of inexpensive wind generation into the SPP market should result in lower market prices for Empire's customers without placing the incredible risk on them and reducing the diversity of its owned-generation resources.

[12] https://www.kcpl.com/about-kcpl/media-center/2017/june/kcpl-continues-sustainability-commitment-by-announcing-retirement-of-six-units-at-three-power-plants

For these reason, OPC recommends the Commission not grant Empire its requests in this case.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

Education and Work Experience Background of

Lena M. Mantle, P.E.

In my position as Senior Analyst for the Office of the Public Counsel ("OPC") I provide analytic and engineering support for the OPC in electric, gas, and water cases before the Commission. I have worked for the OPC since August, 2014.

I retired on December 31, 2012 from the Public Service Commission Staff as the Manager of the Energy Unit. As the Manager of the Energy Unit, I oversaw and coordinated the activities of five sections: Engineering Analysis, Electric and Gas Tariffs, Natural Gas Safety, Economic Analysis, and Energy Analysis sections. These sections were responsible for providing Staff positions before the Commission on all of the electric and gas cases filed at the Commission. This included reviews of fuel adjustment clause filings, resource planning compliance, gas safety reports, customer complaint reviews, territorial agreement reviews, electric safety incidents and the class cost-of-service and rate design for natural gas and electric utilities.

Prior to being the Manager of the Energy Unit, I was the Supervisor of the Engineering Analysis Section of the Energy Department from August, 2001 through June, 2005. In this position, I supervised engineers in a wide variety of engineering analysis including electric utility fuel and purchased power expense estimation for rate cases, generation plant construction audits, review of territorial agreements, and resolution of customer complaints all the while remaining the lead Staff conducting weather normalization in electric cases.

From the beginning of my employment with the Commission in the Research and Planning Department in August, 1983 through August, 2001, I worked in many areas of electric utility regulation. Initially I worked on electric utility class cost-of-service analysis, fuel modeling and what has since become known as demand-side management. As a member of the Research and Planning Department under the direct supervision of Dr. Michael Proctor, I participated in the development of a leading-edge methodology for weather normalizing hourly class energy for rate design cases. I took the lead in developing personal computer programming of this methodology and applying this methodology to weather-normalize electric usage in numerous electric rate cases. I was also a member of the team that assisted in the development of the Missouri Public Service Commission electronic filing and information system ("EFIS").

I received a Bachelor of Science Degree in Industrial Engineering from the University of Missouri, at Columbia, in May, 1983. I am a registered Professional Engineer in the State of Missouri.

Lists of the cases I have filed testimony as an OPC, the Missouri Public Service Commission rules in which I participated in the development of or revision to, the Missouri Public Service Commission Testimony Staff reports that I contributed to and the cases that I provided testimony in follow.

Office of Public Counsel Case Listing

Case	Filing Type	Issue
WR-2017-0285	Direct, Rebuttal	Normalized usage
GR-2017-2015 & GR-2017-2016	Direct, Rebuttal, Surrebuttal	Energy Efficiency and Low-Income Programs
EO-2017-0065	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause Prudence Review
ER-2016-0285	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2016-0156	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause, Resource Planning
ER-2016-0023	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
WR-2015-0301	Direct, Rebuttal, Surrebuttal	Revenues, Environmental Cost Recovery Mechanism
ER-2014-0370	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2014-0351	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2014-0258	Direct, Rebuttal, Surrebuttal	Fuel Adjustment Clause
EC-2014-0224	Surrebuttal	Policy, Rate Design

Missouri Public Service Commission Rules

4 CSR 240-3.130	Filing Requirements and Schedule of Fees for Applications for Approval of Electric Service Territorial Agreements and Petitions for Designation of Electric Service Areas
4 CSR 240-3.135	Filing Requirements and Schedule of Fees Applicable to Applications for Post-Annexation Assignment of Exclusive Service Territories and Determination of Compensation
4 CSR 240-3.161	Electric Utility Fuel and Purchased Power Cost Recovery Mechanisms Filing and Submission Requirements
4 CSR 240-3.162	Electric Utility Environmental Cost Recovery Mechanisms Filing and Submission Requirements
4 CSR 240-3.190	Reporting Requirements for Electric Utilities and Rural Electric Cooperatives
4 CSR 240-14	Utility Promotional Practices
4 CSR 240-18	Safety Standards
4 CSR 240-20.015	Affiliate Transactions
4 CSR 240-20.017	HVAC Services Affiliate Transactions
4 CSR 240-20.090	Electric Utility Fuel and Purchased Power Cost Recovery Mechanisms
4 CSR 240-20.091	Electric Utility Environmental Cost Recovery Mechanisms
4 CSR 240-22	Electric Utility Resource Planning
4 CSR 240-80.015	Affiliate Transactions
4 CSR 240-80.017	HVAC Services Affiliate Transactions

Staff Direct Testimony Reports

ER-2012-0175	Capacity Allocation, Capacity Planning
ER-2012-0166	Fuel Adjustment Clause
ER-2011-0028	Fuel Adjustment Clause
ER-2010-0356	Resource Planning Issues
ER-2010-0036	Environmental Cost Recovery Mechanism
HR-2009-0092	Fuel Adjustment Rider
ER-2009-0090	Fuel Adjustment Clause, Capacity Requirements
ER-2008-0318	Fuel Adjustment Clause
ER-2008-0093	Fuel Adjustment Clause, Experimental Low-Income Program
ER-2007-0291	DSM Cost Recovery

Missouri Public Service Commission Staff Testimony

Case No.	Filing Type	Issue
ER-2012-0175	Rebuttal, Surrebuttal	Resource Planning Capacity Allocation
ER-2012-0166	Rebuttal, Surrebuttal	Fuel Adjustment Clause
EO-2012-0074	Direct/Rebuttal	Fuel Adjustment Clause Prudence
EO-2011-0390	Rebuttal	Resource Planning Fuel Adjustment Clause
ER-2011-0028	Rebuttal, Surrebuttal	Fuel Adjustment Clause
EU-2012-0027	Rebuttal, Surrebuttal	Fuel Adjustment Clause
ER-2010-0356	Rebuttal, Surrebuttal	Resource Planning Allocation of Iatan 2
EO-2010-0255	Direct/Rebuttal	
ER-2010-0036	Supplemental Direct, Surrebuttal	Fuel Adjustment Clause
ER-2009-0090	Surrebuttal	Capacity Requirements
ER-2008-0318	Surrebuttal	Fuel Adjustment Clause
ER-2008-0093	Rebuttal, Surrebuttal	Fuel Adjustment Clause Low-Income Program
ER-2007-0004	Direct, Surrebuttal	Resource Planning
GR-2007-0003	Direct	Energy Efficiency Program Cost Recovery
ER-2007-0002	Direct	Demand-Side Program Cost Recovery
ER-2006-0315	Supplemental Direct, Rebuttal	Energy Forecast Demand-Side Programs Low-Income Programs
ER-2006-0314	Rebuttal	Jurisdictional Allocation Factor
EA-2006-0309	Rebuttal, Surrebuttal	Resource Planning
ER-2005-0436	Direct, Rebuttal, Surrebuttal	Low-Income Programs Energy Efficiency Programs Resource Planning
EO-2005-0329	Spontaneous	Demand-Side Programs Resource Planning

Missouri Public Service Commission Staff Case Listing (cont.)

EO-2005-0293	Spontaneous	Demand-Side Programs Resource Planning
ER-2004-0570	Direct, Rebuttal, Surrebuttal	Reliability Indices Energy Efficiency Programs Wind Research Program
EF-2003-0465	Rebuttal	Resource Planning
ER-2002-425	Direct	Derivation of Normal Weather
EC-2002-1	Direct, Rebuttal	Weather Normalization of Class Sales Weather Normalization of Net System
ER-2001-672	Direct, Rebuttal	Weather Normalization of Class Sales Weather Normalization of Net System
ER-2001-299	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
EM-2000-369	Direct	Load Research
EM-2000-292	Direct	Load Research
EM-97-515	Direct	Normalization of Net System
ER-97-394, et. al.	Direct, Rebuttal, Surrebuttal	Weather Normalization of Class Sales Weather Normalization of Net System Energy Audit Tariff
EO-94-174	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
ER-97-81	Direct	Weather Normalization of Class Sales Weather Normalization of Net System TES Tariff
ER-95-279	Direct	Normalization of Net System
ET-95-209	Rebuttal, Surrebuttal	New Construction Pilot Program
EO-94-199	Direct	Normalization of Net System
ER-94-163	Direct	Normalization of Net System
ER-93-37	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
EO-91-74, et. al.	Direct	Weather Normalization of Class Sales Weather Normalization of Net System
EO-90-251	Rebuttal	Promotional Practices Variance
ER-90-138	Direct	Weather Normalization of Net System
ER-90-101	Direct, Rebuttal, Surrebuttal	Weather Normalization of Class Sales Weather Normalization of Net System
ER-85-128, et. al.	Direct	Demand-Side Update
ER-84-105	Direct	Demand-Side Update