Exhibit No.:
Issue: *Tariff Issues*
Witness: *Robin Kliethermes,*
Michael Stahlman
Sarah Lange
Sponsoring Party: *MoPSC Staff*
Type of Exhibit: *Rebuttal Testimony*
Case No.: *GR-2019-0077*
Date Testimony Prepared: *June 7, 2019*

MISSOURI PUBLIC SERVICE COMMISSION

COMMISSION STAFF DIVISION

TARIFF/RATE DESIGN DEPARTMENT

COMPILED REBUTTAL TESTIMONIES

OF

ROBIN KLIETHERMES, MICHAEL STAHLMAN, & SARAH LANGE

Staff Exhibit No. 120
Date 8-15-19 Reporter CD
File No. GR-2019-0077

UNION ELECTRIC COMPANY
d/b/a AMEREN MISSOURI

CASE NO. GR-2019-0077

Jefferson City, Missouri
June 2019

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase Its Revenues for Natural Gas Service	)))	**Case No. GR-2019-0077**

NOTICE OF EFIS FILING COMBINATION OF THE REBUTTAL TESTIMONIES OF ROBIN KLIETHERMES, MICHAEL STAHLMAN, AND SARAH LANGE

COMES NOW the Staff of the Missouri Public Service Commission, by and through counsel, and for its Notice states that Staff has joined the EFIS filing of the rebuttal testimonies of Robin Kliethermes, Michael Stahlman, and Sarah Lange to aid the Commission in better understanding the weather and conservation mechanism rebuttal testimony discussed by each Staff witness. Because the testimonies build on each other, they are presented together in a logical order that makes it easier for the reader to follow than if the testimonies had been filed individually.

Respectfully submitted,

/s/ Robert S. Berlin
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OF

ROBIN KLIETHERMES

UNION ELECTRIC COMPANY
d/b/a AMEREN MISSOURI

CASE NO. GR-2019-0077

REBUTTAL TESTIMONY

OF

ROBIN KLIETHERMES

UNION ELECTRIC COMPANY
d/b/a Ameren Missouri

CASE NO. GR-2019-0077

Q. Please state your name and business address.

A. Robin Kliethermes, 200 Madison Street, Jefferson City, MO 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission ("Commission") as the Tariff and Rate Design Manager of the Tariff and Rate Design Department of the Commission Staff Division.

Q. Have you previously filed testimony in this case?

A. Yes. I previously filed in Staff's Cost of Service Report filed on April 19, 2019 and in Staff's Class Cost of Service Report filed on May 3, 2019.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to respond to Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") witnesses Ryan Ryterski, Michael Harding and Laureen Welikson regarding Ameren Missouri's weather normalization process and proposed Weather Normalization and Conservation Rider ("WCAR").

Q. Please summarize your testimony.

A. My testimony generally discusses Staff's concerns regarding Ameren Missouri's proposed WCAR and I introduce an alternative adjustment rider to capture changes in usage due to weather and conservation. Further, my testimony also addresses Staff's concerns

regarding the inclusion of a 200 heating degree day (HDD) breakpoint in Ameren Missouri's proposed WCAR.

CONCERNS WITH AMEREN MISSOURI'S WCAR DESIGN

Q. How is Ameren Missouri's proposed WCAR designed?

A. Ameren Missouri's proposed WCAR is made up of two elements: one element addressing weather normalization and one element addressing the implementation of energy efficiency measures, which Ameren Missouri asserts captures changes in conservation.

Q. Do you agree with Mr. Harding that the weather normalization portion of Ameren Missouri's proposed WCAR is generally consistent with weather normalization adjustment riders recently approved by the Commission for Spire and Liberty Utilities?

A. No. As addressed in more detail later in my testimony, Ameren Missouri includes a coefficient for mild weather and a coefficient for cold weather which is based on a breakpoint of 200 HDD per average billing cycle month. This distinction is not made in the weather normalization adjustment riders for Spire and Liberty Utilities. Further, Ameren Missouri's WCAR unreasonably averages the HDDs from the Cape Girardeau and Columbia weather stations together rather than having a separate weather adjustment for each weather station as proposed by Staff.

Q. How is the conservation element of Ameren Missouri's proposed WCAR designed?

A. The conservation element of Ameren Missouri's proposed WCAR is designed similar to Ameren Missouri's electric Throughput Disincentive portion of its MEEIA mechanism for electric energy efficiency programs. The similarities include the use of a deemed savings table that imputes how many Ccf sales are avoided based on the installation of a gas

energy efficiency measure and a set of margin rates that will ultimately determine the level of revenues avoided due to ratepayer funded energy efficiency measures that Ameren Missouri will be allowed to collect through the WCAR.

Q. Are there differences between Ameren Missouri's MEEIA mechanism for electric energy efficiency programs and Ameren Missouri's proposed gas energy efficiency recovery mechanism?

Yes. Most significantly, Ameren Missouri does not propose that the ratepayer funded gas energy efficiency programs undergo an independent third party Evaluation Measurement and Verification ("EM&V") review. Therefore, under the Ameren Missouri WCAR the level of avoided sales for which Ameren Missouri shareholders are compensated would not be trued-up for the difference between deemed savings and the level of savings determined through EM&V. Further, under Ameren Missouri's WCAR, the deemed savings level per gas energy efficiency measure, once established, will not be updated until the next rate case, even if the actual achieved savings are wildly divergent from the deemed level. Lastly, the WCAR is designed to reimburse Ameren Missouri for the cumulative deemed avoided sales until the deemed avoided sales can be accounted for in Ameren Missouri's billing determinants in a rate case. Ameren Missouri filed its last rate case for its gas operations in 2009.[1] Ameren Missouri's proposed design makes no provision to reintroduce avoided sales that were attributable to measures with a measure-life of a shorter duration. For example a furnace tune-up only has a 2 year measure life.

[1] Ameren Missouri files rate cases for its electric operations no less than every four years to comply with the Fuel Adjustment Clause statute.

Q. In general, what are Staff's concerns with the conservation element of Ameren Missouri's proposed WCAR?

A. As discussed in more detail in Staff Witness Michael Stahlman's rebuttal testimony, Staff has concerns that Ameren Missouri's method of adjusting for weather and conservation is biased and would allow Ameren Missouri to over-recover lost sales from energy efficiency measures. Also, Staff has concerns that the design of Ameren Missouri's conservation element is not allowed under the authorizing statute RSMo §386.266.3.

Q. Does Staff's proposed WNAR have a conservation element?

A. No. As discussed further in Mr. Stahlman's testimony, Staff has not found any significant changes in residential usage or base usage attributable to conservation. Therefore, a conservation element is not needed at this time. However, if the Commission orders a mechanism to include a factor for conservation, Staff has developed an alternative proposal that would adjust for changes in Ccf sales due to weather and for conservation without the concerns of imputed savings present in the Ameren Missouri proposed WCAR.

VOLUMETRIC INDIFFERENCE RECONCILIATION TO NORMALS

Q. If the Commission wishes to include a factor for conservation, what is Staff's recommendation?

A. Should the Commission desire a mechanism to adjust for weather and conservation, Staff recommends in the Rebuttal Testimony of Michael Stahlman, the Volume Indifference Reconciliation to Normal Mechanism (VIRN). In order for this mechanism to properly function and produce reasonable results, it needs to be coupled with a two blocks rate design that is designed to recover the portion of the revenue requirement associated with equity recovery in the first block and is designed to recover the portion of the revenue requirement

associated with debt recovery in the second block, with a break point between blocks reasonably related to the portion of usage per customer per month that may be subject to variation due to weather and conservation. The details of this rate design are provided in the Rebuttal testimony of Sarah Lange.

Q. How does the VIRN operate?

A. The VIRN fully reconciles changes in volumetric recovery of the portion of the residential revenue requirement associated with expense, and reconciles sales in block to rate case billing determinates for the volumetric portion of the residential revenue requirement associated with debt costs. However, VIRN will not reconcile billing determinates in block 1 for the volumetric portion of the residential revenue requirement associated with equity recovery, thus the VIRN insulates the company from fluctuations in the volumetric recovery associated with the portion of the residential revenue requirement associated with expense and debt, while retaining company risk in the recovery of the volumetric portion of the residential revenue requirement associated with equity recovery.[2] This design insulates the company from sales fluctuations associated with deviations in weather-related sales from normal, whether driven by the actual weather, or by conservation efforts related to weather. The VIRN fully protects the company from ratepayer-funded conservation efforts that target customers with usage exceeding the first block. The VIRN retains the opportunity for the company to increase revenue by increasing the number of customers taking service, and retains the risk for the company of decreases in revenue driven by customers leaving the system. The VIRN's impact

[2] Staff is not opining that "equity-associated" revenues referred to above should be retained or booked by the company in any particularly manner. The VIRN provides stability in the level of non-gas revenues received from the residential class to the extent that the volumetric-recovered debt costs and expenses comprise the residential revenue requirement. Whether or not the company earns above or below its authorized rate of return in a particular operating period is not relevant to the overall VIRN design.

on customers includes (1) limitation of the degree to which residential ratepayers *collectively* under or over contribute and (2) passing along to residential ratepayers the benefit (or detriment) of increases (or decreases) in sales associated with customer growth (or loss).

An adjustment to the VIRN rate would be filed annually by the utility based on changes, if any, in actual volumetric sales compared to the level of volumetric sales, by block, used in establishing rates in the rate case. Since the VIRN measures changes in actual sales it is not necessary to depend on deemed savings or generic load shapes based general assumptions of how customers conserve energy.

Q. Does Staff recommend that the VIRN only apply to the Residential class?

A. Yes. Since, the VIRN is dependent upon the assumption that changes in weather and conservation occur in the second rate block, the VIRN does not work for Ameren Missouri's currently designed General Service class.[3] Additionally, larger customers also tend to be less weather sensitive than the residential class.

RESPONSE TO THE INCLUSION OF A 200 HDD BREAKPOINT IN THE WCAR

Q. What is your understanding of Ameren Missouri's proposed 200 HDD breakpoint used in the Company's proposed WCAR?

A. As explained above, Ameren Missouri's proposed WCAR contains two elements: one element addressing weather normalization and one element addressing the implementation of energy efficiency measures, which Ameren Missouri asserts captures changes in conservation. In regard to the weather normalization element of Ameren Missouri's

[3] Ameren Missouri's current General Service class includes the smallest firm sales customer to the largest firm sales customer. For example, the class includes customers using approximately 100 Ccf per month up to customers using 20,000 Ccf per month. The currently block size for the GS class is the first 7,000 Ccf and above 7,000 Ccf.

proposed WCAR, Ameren Missouri includes a variable to distinguish between cold weather and mild weather for each billing cycle in the WCAR. Specifically, Ameren Missouri's WCAR applies a higher coefficient[4] to changes from normal HDD that occur in billing cycles with over 200 HDDs and a lower coefficient to changes from normal HDD that occur in billing cycles with under 200 HDDs.[5]

Q Does Staff have concerns with Ameren Missouri's regression using the 200 HDD breakpoint spline for purposes of weather normalization and WCAR? [6]

A. Yes. Ameren Missouri's regression uses a spline of average HDDs per billing months from January 2011 through August of 2018, and average HDDs per billing month in excess of 200 HDDs applied to average usage per billing month to determine a class's relationship between usage and weather.

Q. Is the approach of using a HDD spline reasonable?

A. It may not be unreasonable for a mechanism such as a WCAR or WNAR to use a different coefficient to represent the weather-induced variability of usage above and below a statistically significant breakpoint, if an appropriate analysis indicates that a clear breakpoint exists.

Q. Was the analysis Ameren Missouri relied on reasonable?

[4] The coefficient determines the amount of usage change due to a one unit change in HDD.
[5] Ameren Missouri evaluated the significance of a 200 HDD breakpoint and applicable coefficient using a regression model involving average billing month data. However, Ameren Missouri's WCAR proposes to take the billing month determined coefficients and apply them to changes in HDD based on billing cycle changes.
A billing month is the sum of all billing cycles within a month. For example, in any month of the year Ameren Missouri has 21 billing cycles where a set of customer's meters are read for billing. Generally, a set of customer's meters are read on each business day of the month. Therefore a customer's meter that is read and billed on June 1, 2019 most likely contains the prior 30 days of usage and is typically the first billing cycle of the month. A specific billing cycle will refer to one of the 21 billing cycles within a billing month.
[6] A spline refers to a line with two or more segments where segments do not have the same slope.

A. No, as will be discussed below, Ameren Missouri unreasonably aggregated and averaged data in a manner that diminished the reliability of the data relied on, although it provides the appearance of a statistically significant line.

Q. Does Staff agree that the 200 HDD breakpoint is a clear breakpoint?

A. No, as will be discussed below, using Ameren Missouri's direct filed regression inputs and regression model, Staff found that other breakpoints also produce significant results.

Ameren Missouri's data is unreasonably aggregated and averaged

Q. Did Ameren Missouri do a separate analysis of the weather responsiveness of residential customers in Columbia versus Cape Girardeau?

A. No. While Staff's analysis indicated that the weather responsiveness of residential customers in Columbia differs from that of residential customers in Cape Girardeau, Ameren Missouri aggregated the usage data and used a simple average HDD per billing month based on a simple average of all the HDDs per billing cycle per billing month and then weighting the average billing month HDD for both Columbia and Cape Girardeau by the percent of total usage over the seven year period per respective area to create an average HDD per billing month to compare to the total usage that occurred in that billing month.

Q. Is Ameren Missouri's decision to use a simple average of billing cycles reasonable to measure the residential class's response to weather?

A. Since better information is available, it is not reasonable to use a simple average. Ameren Missouri did not weight the averaging for the quantity of customers or usage in each

billing cycle, although data is readily available indicating that some billing cycles have more than double the quantity of customers than in other billing cycles.[7]

Q. What is the impact of these simple averages on the reliability of Ameren Missouri's analysis?

A. Since the HDDs per billing cycle per billing month are simply averaged and combined for both weather stations, much of the variation in usage that exists due to weather is smoothed out and can cause the regression to inadvertently result in a high R–square and significant P-values[8] for the coefficients even though the coefficients that result do not accurately represent a customer's response to weather.[9]

Selection of 200 HDD is not clearest breakpoint

Q. Did Staff analyze Ameren Missouri's data and process to determine the appropriateness of the 200 HDD breakpoint, if one accepts the data discussed above?

A. Yes. As provided in the table below, it is not clear why Ameren Missouri selected a breakpoint of 200 HDD rather than any of the other breakpoints provided in the table below:

[7] This is also consistent for the General Services class.

[8] In linear regression analysis, the p-value for each term tests the null hypothesis that the coefficient is equal to zero. A low p-value indicates that you can reject the null hypothesis. In other words, a predictor that has a low p-value is likely to be a meaningful addition to your model because changes in the predictor's value are related to changes in the response variable. Conversely, a larger p-value suggests that changes in the predictor are not associated with changes in the response. Therefore a larger p-value means the result is not statistically significant.

[9] For interpretation of model statistics, R-squared value tells that how much variation is explained by the regression model. Therefore, if a model has a higher R-squared value, the data is explained better by the model. Whereas P-value indicates if there is a significant relationship described by the model, so that if the P-value is less than the significance level, then the model fits the data well. Therefore, if P-value is very small we can conclude that there is a significant linear relationship between gas usage and weather. However, a high R–square and significant P-values do not indicate a regression model is adequate or unbiased.

	Adj. R - Square	Standard Error	Intercept P-Value	HDD Variable P-Value	X Variable 2 P-Value (HDD >200 or >150)
Ameren Missouri 225	98.8746%	4.3634	1.12E-23	2.97E-19	3.47E-06
Ameren Missouri 200	98.8802%	4.3526	1.20E-23	8.88E-16	2.76E-06
Ameren Missouri 175	98.8846%	4.3441	1.43E-23	3.92E-12	2.30E-06
Ameren Missouri 150	98.8873%	4.3389	1.87E-23	9.15E-09	2.06E-06
Ameren Missouri 125	98.8905%	4.3325	2.70E-23	3.19E-05	1.80E-06

Further, Staff expanded Ameren Missouri's regression to include billing cycle level data from June 2014 through June 2018 and differentiated for weather station (Cape Girardeau and Columbia). Staff found that a regression using 143 HDD produced the highest R-square and lowest standard error for the Columbia area and a regression using 213 HDD produced the highest R-square and lowest standard error for the Cape Girardeau area. Based on this break point analysis, the structural characteristics of the weather responses of the two service areas are totally different. Therefore, combining data sets of the two areas may introduce significant biased adjustments of weather normalization. Biased adjustments of weather normalization can result in a higher or lower amount of usage being adjusted than what otherwise should be.

Q. Does Ameren Missouri provide any support for why 200 HDDs was chosen as the breakpoint, compared to using any other level of HDDs as a breakpoint?

A. In the Company response to Staff Data Request 0145, Ameren Missouri stated that multiple iterations were regressed and the regression including 200 HDDs produced the highest R-square and the most significant P-values. However, Ameren Missouri also stated that the multiple iterations using other breakpoints were not saved and therefore could not be provided to Staff for review. Ameren Missouri did not provide any further explanation, quantitative or qualitative for why a 200 HDD breakpoint was selected.

Q. Does this conclude your rebuttal testimony?

A. Yes, though I will direct the Commission to refer to the Rebuttal Testimony of Michael Stahlman, which follows this testimony, for additional details regarding the VIRN and weather and conservation mechanisms. Additionally, Mr. Stahlman's testimony is followed by the Rebuttal Testimony of Sarah Lange, which provides analysis of an appropriate rate design for the operation of the VIRN.

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REBUTTAL TESTIMONY

OF

MICHAEL L. STAHLMAN

UNION ELECTRIC COMPANY
d/b/a AMEREN MISSOURI

CASE NO. GR-2019-0077

REBUTTAL TESTIMONY

OF

MICHAEL L. STAHLMAN

AMEREN MISSOURI

CASE NO. GR-2019-0077

Q. Please state your name and business address.

A. My name is Michael L. Stahlman, and my business address is Missouri Public Service Commission, P.O. Box 360, Jefferson City, Missouri, 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission ("Commission") as a Regulatory Economist III in the Tariff & Rate Design Department.

Q. Are you the same Michael L. Stahlman that supported sections in Staff's Class Cost of Service/Rate Design Report ("CCOS Report")?

A. Yes.

Q. What is the purpose of your testimony?

A. The purpose of my rebuttal testimony is to respond to Ameren Missouri's witnesses Michael W. Harding and Laureen M. Welikson concerning the proposed Weather and Conservation Adjustment Rider ("WCAR").

Q. Please summarize your testimony.

A. As explained in my testimony, and the above rebuttal testimony of Staff witness Robin Kliethermes, Staff finds Ameren Missouri's method of adjusting for weather and conservation is biased and could overestimate the level of revenues not received due to energy efficiency measures. Additionally, Staff has significant concerns about using the proposed Technical Resource Manual ("TRM") as the measure of lost sales. Staff continues to recommend the Weather Normalization Adjustment Rider ("WNAR") proposed in

the CCOS Report if the Commission determines that a mechanism to account for changes in usage due to variations in either weather or conservation is in the public interest and is just and reasonable. However, if the Commission determines that a conservation adjustment is reasonable, Staff proposes a Volume Indifference Reconciliation to Normal Mechanism (VIRN). A more thorough description of the VIRN can be found later in my testimony while Staff witness Sarah Lange (Ms. Lange's testimony is found below) will explain the rate design implications of the VIRN implementation.

CONCERNS WITH AMEREN MISSOURI'S WCAR

Q. How is Ameren Missouri's proposed WCAR designed?

A. Ameren Missouri's proposed WCAR is made up of two elements: one element addressing weather normalization[10] and one element addressing the implementation of energy efficiency measures, which Ameren Missouri asserts captures changes in conservation by deeming levels of lost sales caused by energy efficiency measures.

Q. What is Mr. Harding's intent for the WCAR, as expressed in his testimony?

A. Mr. Harding states that Ameren Missouri's proposed WCAR is intended "to normalize the annual variations in weather and account for the loss in revenues associated with implementation of Company-sponsored conservation measures."[11]

Q. Does Ameren Missouri have "conservation measures"?

A. It is unclear whether the energy efficiency measures in Ameren Missouri's "various energy efficiency programs"[12] is synonymous with "conservation" in the authorizing statute. "Conservation" is not defined in RSMo §386.266.3, the authorizing statute, and used only one

[10] Please see the Rebuttal testimony of Robin Kliethermes for Staff's concerns regarding the weather normalization element of Ameren Missouri's proposed WCAR.
[11] Direct Testimony of Michael W. Harding, p. 14 ll. 12-14.
[12] Direct Testimony of Michael W. Harding, p. 18 ll. 1-2.

other time in that chapter; Section §386.266.14, which reads: "The public service commission shall appoint a task force, consisting of all interested parties, to study and make recommendations on the cost recovery and implementation of conservation and weatherization programs for electrical and gas corporations."

When §393.1075 (MEEIA) was enacted in 2009, the legislature did not refer to "conservation," but rather "energy efficiency." Although these are different statutes there is no reason to assume that the legislature used different words but intended the same meaning.

The U.S. Energy Information Administration states:

> The terms energy efficiency and energy conservation have distinct meanings:
>
> - Energy efficiency is using technology that requires less energy to perform the same function. Using a compact fluorescent light bulb that requires less energy instead of using an incandescent bulb to produce the same amount of light is an example of energy efficiency.
> - Energy conservation is any behavior that results in the use of less energy. Turning the lights off when leaving the room and recycling aluminum cans are both ways of conserving energy.[13]

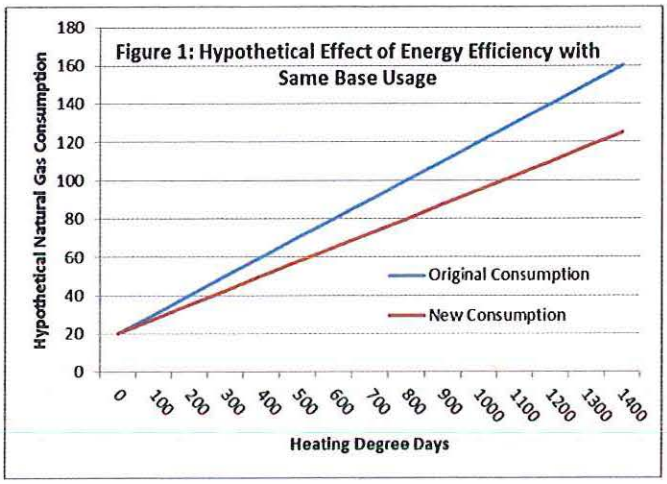
Q. Assuming that the energy efficiency measures fall within the statutory definition of conservation, does Ameren Missouri properly account for the "impact on utility revenues of increases or decreases in residential and commercial customer usage due to variations in either weather, conservation, or both"?[14]

[13] U.S. Energy Information Administration (2016). "Energy Efficiency and Conservation." https://www.eia.gov/energyexplained/index.cfm?page=about_energy_efficiency. (22SEP17).
[14] RSMo §386.266.3

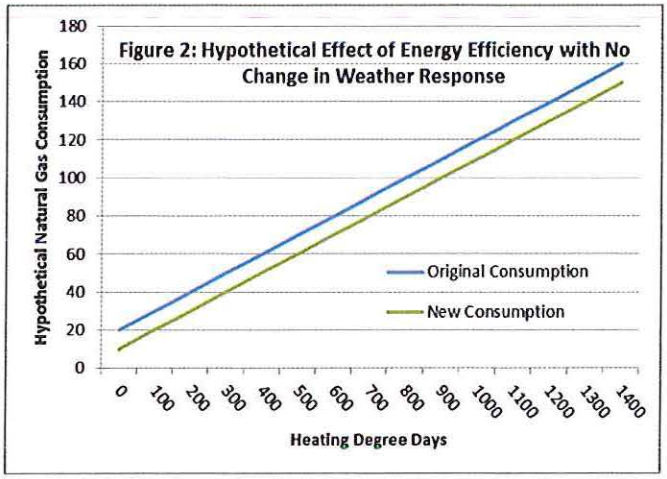
A. No. Neither Mr. Harding nor Ms. Welikson account for the interaction between weather and conservation variables. Additionally, Ms. Welikson uses a level of deemed energy efficiency savings per measure based on a series of assumptions about each measure and generalizations of the household installing the measure. The deemed savings per measure are included in Ameren Missouri's proposed TRM.

Q. How would energy efficiency interact with a weather response variable?

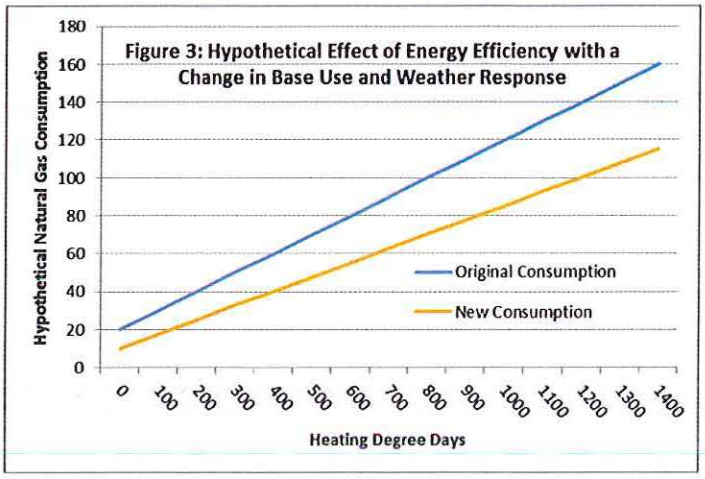
A. As I provided above, energy efficiency is using technology that requires less energy to perform the same function. With a more efficient furnace, we could expect that energy savings would increase as the weather became colder; the more the furnace is operating, the greater the savings between an efficient and less efficient furnace. Figure 1 is a visualization of this type of savings, where there is no change in the base usage and savings accrue with colder weather.



Additionally, it is possible that some energy savings are achieved that are not responsive to changes in weather; the savings remain fixed regardless of changes in weather. Figure 2 below visualizes this type of savings.

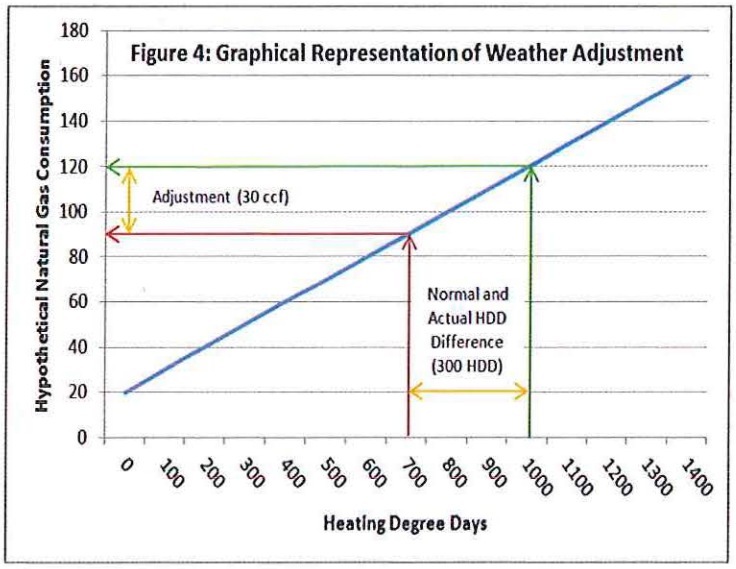


Depending on the mix of energy efficiency measures, an energy efficiency portfolio may be a mix between both effects. For example, a more efficient water heater will save energy in the summer months since hot water is used throughout the year, but may also show some additional savings in the winter months, even at the same level of use, since the inlet water is colder in the winter than the summer. This is shown in Figure 3.



Q. How is the weather variable adjustment made in Staff's WNAR and Ameren Missouri's proposed WCAR?

A. A simplified version of part of the weather adjustment, which at its bare bones is identical for both Staff and Ameren Missouri,[15] is shown in Figure 4. In this example, presume the vertical green line is the normal weather for the month (1000 HDD) and the actual weather is the red vertical line (700 HDD), which is to say that the hypothetical billing month is warmer than normal. In the weather adjustment for the rider, this 300 HDD difference would be multiplied by the slope of the line (β or Beta) to show that, on average, we expect customers to consume 30 Ccf less than they would have otherwise. This difference, in the WNAR, would then be multiplied by the number of customers in that billing cycle and the appropriate margin rate to arrive at the dollars that Ameren Missouri would recover through the WNAR.

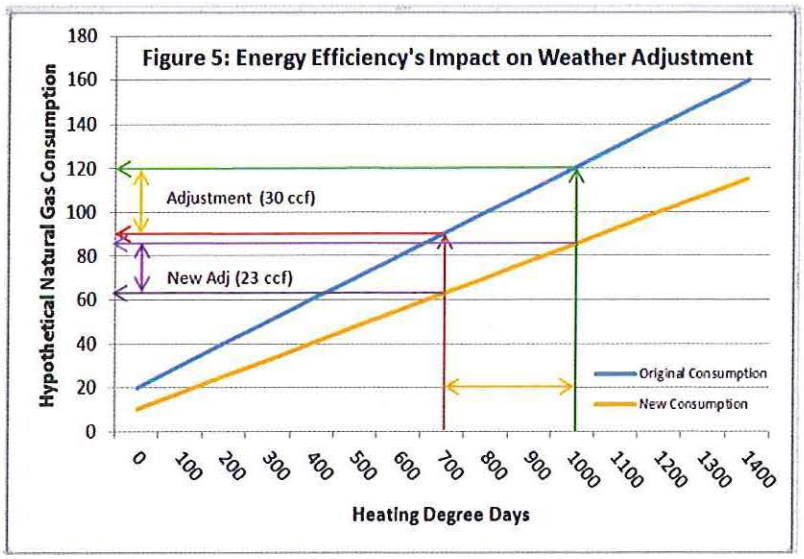


Q. How would energy efficiency affect this adjustment?

A. Both Staff's WNAR and Ameren Missouri's methods assume that the slope of the line, the "β", does not change in between rate cases, so the adjustment in the weather calculation would not change. This slope is assumed to be the average customer's response to a change in

[15] The main difference between Staff and Ameren Missouri is the 200 HDD breakpoint on Ameren Missouri's graph. For the purposes of this example, going into the differences between Staff's and Ameren Missouri's weather adjustment is unnecessary.

the weather. However, as seen in Figure 5, energy efficiency would theoretically reduce the impact of weather on a customer's usage. In the hypothetical model used in Figure 5, the weather adjustment factor of a WNAR would result in a 30 Ccf adjustment when weather actually resulted in a 23 Ccf change.



Q. How did Ameren Missouri model the interaction between energy efficiency and weather?

A. Ameren Missouri simply assumed that the measures did not affect a customer's response to weather, thus it is modeled similar to Figure 2 above. To complicate matters, Ameren Missouri also modeled these savings with monthly load shapes that would, in effect, result in different base levels of usage for each month.[16]

Q. Does Ameren Missouri witness Laureen M. Welikson confirm that much of the impact of energy efficiency measures would impact a customer's response to weather?

A. Yes. On page 13, lines 6 through 8 of her direct testimony states: "Monthly load shapes by end-use category are used to distribute types of energy savings…across the months

[16] Direct Testimony of Laureen M. Welikson, p. 13, ll. 6-13.

in the year to better reflect the seasonality of the savings that were achieved." This monthly load shape is meant to approximate the savings distribution due to more savings happening in the colder months.

Because these savings would also be captured in the weather adjustment factor, Ameren Missouri's proposed WCAR inaccurately accounts for these conservation savings.

Q. Does Ameren Missouri's weather regression to weather normalize Ccf sales add credence to there being significant energy efficiency savings?

A. No. Ameren Missouri's weather regression[17] for the period January 2011 through August 2018 had an adjusted R^2 of 98.8%; in other words, a base level of usage and weather explains nearly 99% of variations in natural gas consumption for its residential customers. Additionally, Staff used Ameren Missouri's workpaper and added a trend variable for each year in Ameren Missouri's regression. If there were significant energy efficiency savings during that period, one would expect to see that reflected trend variable. However, the trend variable was insignificant and not distinguishable from zero.[18]

[17] Staff witness Ms. Kliethermes addresses issues with Ameren Missouri's weather regression.
[18] In linear regression analysis, the p-value for each term tests the null hypothesis that the coefficient is equal to zero. A low p-value indicates that you can reject the null hypothesis. In other words, a predictor that has a low p-value is likely to be a meaningful addition to your model because changes in the predictor's value are related to changes in the response variable. Conversely, a larger p-value suggests that changes in the predictor are not associated with changes in the response. Therefore a larger p-value means the result is not statistically significant.

Figure 6: Regression Results Of Ameren Missouri's Data with a Trend Variable

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.994565401
R Square	0.989160337
Adjusted R Square	0.988790803
Standard Error	4.354763715
Observations	92

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	152286.9758	50762.32525	2676.778	2.60757E-86
Residual	88	1668.829097	18.96396701		
Total	91	153955.8048			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	10.17298188	1.222976726	8.32	0.000	7.743	12.603
Weighted Average HDD's	0.069057032	0.007036593	9.81	0.000	0.055	0.083
Marginal HDD's >200	0.041661493	0.008399964	4.96	0.000	0.025	0.058
Year trend	0.195468319	0.204852977	0.95	**0.343**	(0.212)	0.603

Typical significance levels are 1%, 5%, and 10% depending on the data source and quality. The table above shows the Intercept, Weighted Average HDD's, and Marginal HDD's >200 all show significant correlation since the p-value is less than 0.010 (1% significance). However, the "Year trend" variable does not show significance, even at the 10% significance level (0.100). Additionally, the "Lower 95%" and "Upper 95%" give the confidence interval at 5% significance (0.050), which mean we are 95% confident that the true value is between -0.212 and 0.603. Since zero is in between these two values, it is further evidence that there is no significant correlation between the Year trend and average residential natural gas consumption.

Q. Did Staff also look at changes to base consumption, usage independent of weather, during that time period?

A. Yes. Staff ran a regression on the months with less than 1 HDD in Ameren Missouri's workpapers. The results of that regression, in Figure 7 below, showed that

there were no significant changes to base consumption from to January 2011 through August 2018.

Figure 7: Regression Results Comparing Trend of Consumption of Months with Less than 1 HDD

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.312364
R Square	0.097571
Adjusted R Square	0.015532
Standard Error	0.609668
Observations	13

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.442067	0.442067	1.189329	0.29877762
Residual	11	4.08864	0.371695		
Total	12	4.530707			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95.0%*	*Upper 95.0%*
Intercept	11.58741	0.317051	36.5474	7.75E-13	10.8895799	12.2852308
X Variable 1	-0.00021	0.000192	-1.09056	0.298778	-0.00063226	0.0002133

Q. Do the results of the regressions discussed above mean that no conservation has occurred in Ameren Missouri's service territory?

A. No, but it does mean that there is currently no evidence that there are any significant variations to average customer usage due to conservation.

Q. Ms. Welikson proposes a conservation factor based on deemed savings. Are there concerns with using deemed savings?

A. Yes. The authorizing statute, RSMo §386, requires there be "increases or decreases in residential and commercial customer usage due to variations in either weather, conservation, or both."[19] Ameren Missouri proposes deeming values whether or not increases or decreases

[19] RSMo §386.266.3

in usage exist. For example, Ms. Welikson's proposal uses monthly load shapes to deem savings "to better reflect the seasonality of the savings that were achieved",[20] but if January's weather is warmer than normal, there is no mechanism to readjust for the savings that do not occur.

Additionally, the assumptions that go into the deemed savings are very generic, with no difference in deemed savings between furnaces that are installed in southern Missouri or in Columbia; there is no consideration for the interaction between different energy efficiency measures, for family size, or the state of the housing stock in which the equipment was actually installed. This means that there is a wide range of reasonable assumptions that can be used but results in vastly different results. For example, Figure 8 shows difference between the same or similar energy efficiency measures evaluated by Ameren Missouri in Case No. GT-2011-0410 and for this rate case.

[20] Direct Testimony of Laureen M. Welikson, p. 13, l. 8

Figure 8: Comparison of the Same or Similar Measures Between Case Nos. GR-2019-0077 and GT-2011-0410

Boilers 90% AFUE	TRC	CCF Savings per Year	Measure Life	Incremental Cost	Net-to-Gross	Baseline Unit Comparison
GR-2019-0077	6.83	433.6	27	$ 884	1.00	85%
GT-2011-0410	1.16	140	15	$ 1,100	0.85	80%

Furnace 96% AFUE	TRC	CCF Savings per Year	Measure Life	Incremental Cost	Net-to-Gross	Baseline Unit Comparison
GR-2019-0077	4.93	369.1	19	$ 821	1.00	80% AFUE
GT-2011-0410	1.30	150.0	15	$ 1,050	0.60	80% AFUE

Furnace	TRC	CCF Savings per Year	Measure Life	Incremental Cost	Net-to-Gross	Baseline Unit Comparison
GR-2019-0077 (94.8% AFUE)	5.74	329.3	19	$ 628	1.00	80% AFUE
GT-2011-0410 (95% AFUE)	1.50	148.9	15	$ 958	0.60	80% AFUE

Programable Thermostat	TRC	CCF Savings per Year	Measure Life	Incremental Cost	Net-to-Gross	Baseline Unit Comparison
GR-2019-0077	2.41	26.5	10	$ 70	1.00	Assumed Reduction
GT-2011-0410	3.74	43.9	9	$ 73	0.87	No Setback

Ceiling Insullation (no audit)	TRC	CCF Savings per Year	Measure Life	Incremental Cost	Net-to-Gross	Baseline Unit Comparison
GR-2019-0077 (R-48)	2.44	99.7	25	$ 543	1.00	R-12.7
GT-2011-0410 (R-30)	0.52	46.5	20	$ 990	1.00	R-11

Ceiling Insullation	TRC	CCF Savings per Year	Measure Life	Incremental Cost	Net-to-Gross	Baseline Unit Comparison
GR-2019-0077 (R-50, audit)	1.25	65	25	$ 693	1.00	R-16.3
GT-2011-0410 (R-30)	0.64	34.1	20	$ 594	1.00	R-19
GT-2011-0410 (R-50)	0.11	6	20	$ 594	1.00	R-38

The Total Resource Cost ("TRC")[21] test results for many of Ameren Missouri's proposed measures has gone up even though the NYMEX natural gas prices, which is used as the avoided cost, fell from approximately $5 in the 2011case to $3 in this rate case. Further, the annual

[21] Per NAPEE 2008 "Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers," the TRC is a comparison of program administrator and customer costs to a utility resource savings. A positive TRC result indicates that the program will produce a net reduction in energy costs in the utility service territory over the lifetime of the program.

savings for furnaces has more than doubled even though the baseline comparison for both cases was the same.

Finally, Ameren Missouri has had natural gas energy efficiency programs in place since before 2011[22], but, as mentioned above, there is no evidence that there are any significant variations to customer usage due to conservation.

Q. Ms. Welikson also compares the proposed WCAR to the process used in MEEIA.[23] Are there differences between what is allowed in MEEIA and the WCAR authorizing statute RSMo §386?

A. Yes. The MEEIA statute is specifically limited to electric utilities, designed to offset supply-side and delivery investments, and must benefit all customers whether or not they participate in an energy efficiency program. Additionally, the MEEIA statute and the Commission's MEEIA rules are designed to provide protection to ratepayers, such as the retrospective evaluation, verification and measurement ("EM&V") process and the review by the Commission's independent auditor. RSMo §386 is limited to increases or decreases in customer usage due to variations of weather and/or conservation. Finally, to date, the MEEIA mechanisms for throughput disincentive ("TD") have been the products of stipulations that were unopposed as to the TD mechanism's operation.

Q. Mr. Harding proposes to apply the WCAR to all classes.[24] Is this proposal allowed under RSMo §386?

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[22] Ameren Missouri's natural gas energy efficiency programs began in File No. GR-97-393, where Union Electric Gas (which subsequently became AmerenUE and then Ameren Missouri) began including ratepayer funding to supplement weatherization for income-qualified customers. Natural gas energy efficiency programs other than low-income weatherization began with File No. GR-2003-0517, which provided that Staff, OPC, and DNR along with AmerenUE would develop the implementation detail for the Energy Efficiency programs.
[23] Direct Testimony of Laureen M. Welikson, p. 14, ll. 12-15.
[24] Direct Testimony of Michael W. Harding, p. 16 l. 15.

A. No. RSMo §386.266.3 limits the proposed rate adjustment mechanism to the residential class and the smallest general service class.

Q. Mr. Harding also states that the WCAR reduces the complexity of rate design for customers.[25] Do you agree?

A. No. It is unclear how an additional line item on top of Ameren Missouri's rate structure will reduce the complexity of rate design. Mr. Harding provides no justification of that statement.

Q. Mr. Harding states "...the WCAR will more accurately account for changes in weather and conservation that impact non-gas revenues over time, as allowed by law."[26] Do you agree?

A. No. As discussed above, the authorizing statute, RSMo §386, requires there be "increases or decreases in residential and commercial customer usage due to variations in either weather, conservation, or both."[27] Ameren Missouri proposes deeming the level of savings attributable to any one energy efficiency measure whether or not increases or decreases in usage *actually* exist. Additionally, as stated above, using the data and regression analysis provided by Ameren Missouri to support this case, there is no evidence of any significant variations to average customer usage due to conservation.

Q. Mr. Harding states, "In addition to promoting revenue stability for the Company, the WCAR will provide customers with continued predictability and stability on their bills."[28] Do you agree?

[25] Direct Testimony of Michael W. Harding, p. 16 ll. 2-3.
[26] Direct Testimony of Michael W. Harding, p. 16 ll. 3-5.
[27] RSMo §386.266.3
[28] Direct Testimony of Michael W. Harding, p. 16 ll. 12-13.

A. Not with regards to the conservation portion of the WCAR. The conservation portion only uses deemed savings values from the proposed TRM which can only ratchet up, even for weather-sensitive measures. There is no mechanism to account for decreases in conservation, which would increase usage. Therefore, the conservation element of the WCAR only increases customer bills, all else being equal, and provides additional revenue to the Company.

Q. Under the proposed WCAR, would there be a need for more frequent rate cases?[29]

A. Yes. Even though Ms. Welikson claims that the WCAR is modeled after the throughput disincentive mechanism in MEEIA, the WCAR lacks the protections discussed in MEEIA including the rate case timing and filing. In MEEIA Cycle 1, the throughput disincentive mechanism assumed rate case filings every 18 months, which is when energy efficiency measures would be factored into Ameren Missouri's rate base. MEEIA Cycle 2 included specific language regarding the annualization process in a rate case filing and terminated throughput disincentive after a period of time if no rate case was filed. Currently, there is no proposed mechanism discussing the ending of throughput disincentive collection in the WCAR, whether or not rate case filings occur.

Q. Are there additional concerns about the way proposed WCAR would interact with Ameren Missouri's current and proposed energy efficiency portfolio for gas service?

A. Yes. First, Ameren Missouri's energy efficiency portfolio has an unlimited budget[30]; the difference between actual program costs and projected program costs is tracked

[29] Direct Testimony of Laureen M. Welikson, p. 19 l. 13 – p.20 l. 5.
[30] Ameren Missouri's Energy Efficiency Plan is discussed in more detail in the Rebuttal testimony of Staff Witness Kory Boustead

in a regulatory asset or liability.[31] In the absence of a rate case filing timing requirement, there is no limit to the level of "avoided" energy sales that could be billed to customers.

Secondly, there has not been a specific approved evaluation of these programs in a long time. The most recent evaluation specific to Ameren Missouri's natural gas programs occurred in 2012. However, in File No. AO-2011-0035, Staff noted that Staff and other parties had significant issues with the evaluation and noted the following in particular:[32]

• ADM's initial final report is not consistent with the Scope of Work which directed ADM to include participants for 2010, which ADM had agreed to include at an additional cost of $35,000. This limited the analysis of temperature sensitive measures to only a portion of an unseasonably warm heating season.

• ADM's initial final report is not consistent with the S&A which states that "Post implementation evaluations of all programs or measures shall include usage data for program participants." Instead, the evaluation only used participant usage data for three measures and used engineering analysis for the rest.

• ADM did not properly calculate the cost effectiveness tests which led to: contradictory statements in the final report, the analysis lowering the heating degree days from a standard base 65 degrees Fahrenheit to base 56 degrees Fahrenheit, which would also reduce a participant's sensitivity to weather, and the regression in the initial final report potentially having technical problems in its statistical analysis.

[31] Direct Testimony of Laureen M. Welikson, p. 6 ll. 7-8.
[32] Status Report, File No. AO-2011-0035, May 7, 2013, p. 10.

Under the Commission's MEEIA rules, the Commission is required to hire an independent auditor to monitor an evaluation. There are no such protections for ratepayers under this proposal.

VOLUME INDIFFERENCE RECONCILIATION TO NORMAL MECHANISM

Q. If the Commission wishes to include a factor for conservation, does Staff have any recommendations?

A. Yes. Should the Commission desire a mechanism to adjust for weather and conservation, Staff recommends the Volume Indifference Reconciliation to Normal Mechanism ("VIRN").

Q. What is the VIRN?

A. The VIRN is a mechanism that is designed to insulate the company from fluctuations in the portions of its revenue requirement subject to volumetric recovery and associated with expense and debt, while retaining company risk in the recovery of its equity associated with volumetric recovery. This mechanism assumes a broad interpretation of "conservation"; one that includes the adoption of energy efficiency measures whether funded by ratepayers or not, as well as any other factor inducing changes to the volumes of gas sold.

The VIRN fully reconciles changes in volumetric recovery of expense, and reconciles sales in block 2 to rate case billing determinants for the debt recovery portion. However, the VIRN will not reconcile billing determinants in block 1 for equity recovery, thus the VIRN insulates the company from fluctuations in the volumetric recovery associated with expense and debt, while retaining company risk in the recovery of its equity. This design insulates the company from sales fluctuations associated with deviations in weather-related sales from what is normal, whether driven by the actual weather, or by conservation efforts related to weather.

The VIRN fully protects the company from ratepayer-funded conservation efforts that target customers with usage exceeding the first block. The VIRN retains the opportunity for the Company to increase their return by increasing the number of customers taking service, and retains the risk for the Company from decreases in their return driven by customers leaving the system. The VIRN's impact on customers includes (1) limitation of the degree to which residential ratepayers collectively under or over contribute and (2) passing along to residential ratepayers the benefit (or detriment) of increases (or decreases) in sales associated with customer growth (or loss).

An adjustment to the VIRN rate would be filed annually by the utility based on changes, if any, in actual volumetric sales compared to the level of volumetric sales, by block, used in establishing rates in the rate case. Since the VIRN measures changes in actual sales it is not necessary to depend on speculative deemed savings or generic load shapes based on general assumptions of how customers conserve energy.

Q. Is Staff expressing an opinion that "equity-associated" revenues referred to above should be retained or booked by the company in any particularly manner?

A. No. The VIRN operates by removing revenue risk associated with recovery of the debt costs and expense portions of the residential revenue requirement not recovered by the customer charge. This provides stability in the level of non-gas revenues received from the residential class to the extent that the volumetric-recovered debt costs and expenses comprise the residential revenue requirement. Whether or not the company earns above or below its authorized rate of return in a particular operating period is not relevant to the overall VIRN design.

Q. Is use of the VIRN dependent on adoption of a suitable rate design?

A. Yes. In order for this mechanism to properly function and produce reasonable results, it needs to be coupled with a two block rate design that is designed to recover the volumetric portion of the revenue requirement associated with equity recovery in the first block and is designed to recover the volumetric portion of the revenue requirement associated with debt recovery in the second block, with a break point between blocks reasonably related to the portion of usage per customer per month that may be subject to variation due to weather and conservation.[33]

Q. How is the VIRN dependent on this type of rate design?

A. The authorizing statute, RSMo §386, allows for a form of decoupling with respect to weather and conservation only. The VIRN assumes that consumption that occurs in Block 2 is (a) primarily correlated with heating usage, and (b) most subject to conservation efforts, whether prompted by ratepayer-funded programs, or independently undertaken by ratepayers. The VIRN recognizes that sales in the first block are related closely to the number of customers taking service. The complementary VIRN rate designs separate the volumetric rate recovery into three components, the revenue requirement associated with: (1) expenses, (2) equity return on rate base, and (3) debt return on rate base. For proper operation of the VIRN the debt portion of volumetric revenue requirement is recovered in the second block because the second block is assumed to be the block that substantially varies with weather and conservation efforts.

Q. Doesn't customer growth also impact gas usage in Block 2?

[33] This is conceptually similar – but opposite – to the development of Staff alternative inclining block rate design provided in its Direct Class Cost of Service and Rate Design Report.

A. Yes, but this mechanism does not decouple customer growth; while its volumetric impact is mitigated in Block 2, it is not decoupled in Block 1or as it relates to customer charge revenue. [34]

Q. If the Commission orders Ameren Missouri to implement the VIRN, does Staff recommend this mechanism for the residential class only?

A. Yes. Extending this mechanism to the general service class would challenge the assumption that Block 2 is primarily related to weather and consumption; many large customers in that class are also subject to business cycle conditions.

Q. How will the VIRN operate?

A. The VIRN will be a rider. Staff recommends an annual adjustment be applied to all residential Ccf sales. Staff recommends that the timing of these filings be such that the portion of sales that will be projected be during the summer, and that the revised rider rate will take effect prior to October 1 so that the same rate will be in effect for essentially all customers' winter usage. An example timeline for tariff filings and calculations is attached as Appendix 1 MLS-r1.

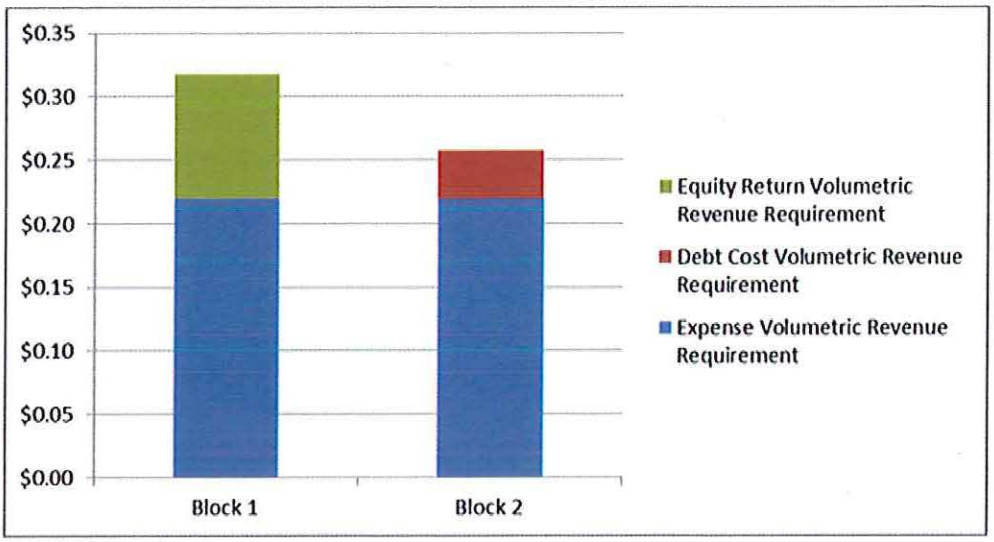
Q. How will the VIRN adjustment be calculated?

A. Under Staff's recommended volumetric rate design for the VIRN recovery of the portion of the revenue requirement to be recovered from volumetric rates associated with return on rate base is split between the blocks. The rate for the first units a customer purchases each month reflects the recovery of the return on rate base as a product of the cost of equity, the rate designed for the additional units a customer may purchase each month reflects the recovery of

[34] Staff acknowledges that the departure or addition of a customer does have an impact on second block sales; however the intent of the VIRN mechanism is to insulate the company from all sales variations in the second block.

the return on rate base as a product of the cost of debt. [35] The VIRN adjustment is calculated by fully reconciling the level of volumetric revenue requirement associated with debt and expense that was actually billed to the level of volumetric revenue requirement associated with debt and expense that was assumed when rates were set at the conclusion of this rate case. The resulting rates based on Staff's direct-filed revenue requirement are illustrated below.

Rate Composition	Block 1	Block 2
Expense Volumetric Revenue Requirement	$ 0.21989	$ 0.21989
Debt Cost Volumetric Revenue Requirement	$ -	$ 0.03801
Equity Return Volumetric Revenue Requirement	$ 0.09782	$ -
Rate per ccf	$ 0.31771	$ 0.25789



For each VIRN annual adjustment, the actual sales for the past year, by block, are compared to the level of sales by block used in designing the rates that resulted from this rate case.[36] The sales in both blocks will be reconciled to rate case billing determinants for the expense recovery portion. The sales in block 2 will be reconciled to rate case billing determinants for the debt recovery portion. However, the equity recovery portion of Block 1will not be reconciled, thus

[35] Staff evaluated six rate designs for compatibility with the VIRN and reasonableness. Some of those designs vary from the structure of the design discussed here.
[36] It will be necessary to reflect 3-4 months of projected sales to facilitate an annual filing. This projected portion will be trued up in the next annual filing.

the VIRN insulates the company from fluctuations in the volumetric recovery associated with expense and debt, while retaining company risk in the recovery of its equity.

Q. Why is this design reasonable in the context of a mechanism that considers conservation broadly?

A. This design insulates the Company from sales fluctuations associated with deviations in weather-related sales from normal, whether driven by the actual weather, or by conservation efforts related to weather, or any conservation measure that occurs in a month when that customer's usage exceeds the first block. Thus, the VIRN protects the company from ratepayer-funded conservation efforts that target customers with usage exceeding the first block, but retains the opportunity for the Company to increase their return by increasing the number of customers taking service, and retains the risk for the Company, and remaining ratepayers, from decreases in their return driven by customers leaving the system.

Q. What would the adjustment be in a scenario where customer usage decreased by 5%, while the number of customers remained constant?

A. As provided in the example below, if customer usage decreased by 5%, then residential class revenues would decrease approximately 2%. The VIRN would enable Ameren Missouri to collect those revenues through the next annual adjustment. Please note, for purposes of these examples, a residential customer count of only 50 customers and total sales of only 30,000 annual ccf are used. This facilitates calculation of observable differences and simplifies the examples provided.

% Change in Usage per Customer	No Change in Number of Customers							
	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	13,500	15,000	-	1,500		
Expense recovery	$ 2,969	$ 3,628	$ 2,969	$ 3,298	$ -	$ 330	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 570		$ 57	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,321	$ -			$ 1,321	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,289	$ 3,868	$ -	$ 387	$ 4,289	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,744	$	18,358			$	18,744
Revenue Difference from RR				$ (387)				$ -
% Change				-2.06%				2.06%

Q. What pieces of this calculation are most relevant to compare across examples?

A. Notice that in this example, only the usage per customer changed, thus the "Consumption" row, under the "Block 1" column under the "VIRN Adjustment" heading indicates that there were no changes in first block sales.[37] A column over, under the "Block 2" column under the "VIRN Adjustment" heading, we see that there were 1,500 fewer Block 2 sales. Thus, the VIRN would allow the company to collect $330 in additional revenue to compensate for the portion of revenue requirement associated with expense recovery that it did not receive in this period, and would also allow the company to collect $57 in additional revenue to compensate for the portion of revenue requirement associated with debt cost recovery that it did not receive in this period. With no adjustment for Block 1 sales applicable in this example, the total VIRN adjustment is $387. Since the Actual Recovery (including customer charges) was $18,358 which is $387 less than the residential class's revenue requirement responsibility in this example of $18,744, the $387 VIRN adjustment will result in full recovery of the revenue responsibility allocated to the residential class under this example.

[37] This is a simplified example; a true 5% change in each and every customer's usage in each and every month would result in changes in Block 1 sales.

Q. What would the adjustment be in a scenario where there was a 5% increase in the number of customers, while the level of usage per customer remained constant?

A. As provided in the example below, a 5% increase in the number of customers, assuming no changes in average usage per customer, would increase residential class revenues by 5%, for total Actual Revenues of $19,682 instead of the normalized revenue responsibility of $18,744 – a difference of $937 to the Company's benefit. The VIRN would enable Ameren Missouri to retain a portion of those additional revenues, while requiring it to return a portion to customers through the next annual adjustment, netting to the Company's benefit of $576.

					5% Increase in Number of Customers									
% Change in Usage per Customer		Normal Recovery			Actual Recovery			VIRN Adjustment			Actual Recovery with VIRN Adjustment			
0%		Block 1		Block 2		Block 1	Block 2		Block 1	Block 2		Block 1		Block 2
	Consumption	13,500		16,500		14,175	17,325		(675)	(825)				
	Expense recovery	$ 2,969	$	3,628	$	3,117	$ 3,810	$	(148)	$ (181)	$	2,969	$	3,628
	Debt Recovery	$ -	$	627	$	-	$ 658			$ (31)	$	-	$	627
	Equity Recovery	$ 1,321	$	-	$	1,387	$ -				$	1,387	$	-
	Total Volumetric	$ 4,289	$	4,255	$	4,504	$ 4,468	$	(148)	$ (213)	$	4,355	$	4,255
	Customer Chg. Rev.	$		10,200	$		10,710							
	Total Revenues	$		18,744	$		19,682				$			19,320
	Revenue Difference from RR						$ 937						$	576
				Change in Actual Recovery:			5.00%		VIRN % of total Recovery:					-1.93%

Notice that in this example sales in both blocks varied from the level used in designing rates at the conclusion of this rate case, so the adjustment reflects the change in expense recovery associated with both blocks in addition to the change in debt cost recovery associated with the second block.

Q. What would the adjustment be in a scenario where there was a 5% increase in the level of usage per customer, where the number of customers remained constant?

A. As provided in the example below, a 5% increase in level of usage per customer, assuming no changes in the number of customers would increase residential class revenues by 2.06%, for total Actual Revenues of $19,131 instead of the normalized revenue

responsibility of $18,744 – a difference of $387 to the Company's benefit. The VIRN would require Ameren Missouri to return the entirety of those revenues to customers through the next annual adjustment in this simple example.

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	13,500	18,000	-	(1,500)		
Expense recovery	$ 2,969	$ 3,628	$ 2,969	$ 3,958	$ -	$ (330)	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 684		$ (57)	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,321	$ -			$ 1,321	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,289	$ 4,642	$ -	$ (387)	$ 4,289	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,744	$	19,131			$	18,744
Revenue Difference from RR				$ 387				$ -
		Change in Actual Recovery:		2.06%		VIRN % of total Recovery:		-2.06%

Q. Are additional examples, including examples using an alternative incline design available?

A. Yes. Example calculations are provided in the attached Appendix 1 MLS-r2 and MLS-r3.

Q. Please conclude.

A. Because Ameren Missouri evaluated the impact of weather and energy efficiency independently of each other, Ameren Missouri failed to recognize the interaction between these two factors, resulting in biased coefficients that will allow Ameren Missouri to over-collect for energy efficiency savings. If the Commission finds that a mechanism to account for changes in usage due to variations in weather is in the public interest and is just and reasonable, Staff recommends its WNAR. If the Commission determines that a mechanism to account for changes in usage due to variations in either weather or conservation is in the public interest and is just and reasonable, Staff recommends the VIRN.

The development and review of potential rate designs for use with the VIRN is further discussed in Staff witness Sarah Lange's rebuttal testimony below.

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REBUTTAL TESTIMONY

OF

SARAH L.K. LANGE

UNION ELECTRIC COMPANY
d/b/a AMEREN MISSOURI

CASE NO. GR-2019-0077

REBUTTAL TESTIMONY

OF

SARAH L.K. LANGE

UNION ELECTRIC COMPANY
d/b/a AMEREN MISSOURI

CASE NO. GR-2019-0077

Q. Please state your name and business address.

A. My name is Sarah Lynne Kliethermes Lange, and my business address is Missouri Public Service Commission, P.O. Box 360, Jefferson City, Missouri, 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission ("Commission") as a Regulatory Economist III in the Tariff and Rate Design Department of the Commission Staff Division.

Q. Are you the same Sarah Lange that provided a recommendation in Staff's Class Cost of Service/Rate Design Report ("CCOS Report") concerning an alternative recommended inclining block rate design?

A. Yes.

Q. What is the purpose of your testimony?

A. The purpose of my rebuttal testimony is to respond to Ameren Missouri's witnesses Michael W. Harding and Laureen M. Welikson concerning the proposed Weather and Conservation Adjustment Rider ("WCAR").

SUMMARY

Q. Does Staff recommend the Commission approve Ameren Missouri's requested WCAR?

A. No. As described more fully in the Rate Design Rebuttal testimony of Staff expert Michael Stahlman above, in Staff's opinion, Ameren Missouri's method of adjusting for weather and conservation is biased and will allow Ameren Missouri to over-recover lost sales from energy efficiency measures. Staff continues to recommend the weather normalization adjustment rider proposed in the CCOS Direct Report if the Commission determines that a mechanism to account for changes in usage due to variations in either weather or conservation is in the public interest and is just and reasonable. However, if the Commission determines that a conservation adjustment is reasonable, Staff proposes a Volume Indifference Reconciliation to Normal Mechanism (VIRN). An overview of the VIRN is provided in the testimony of Robin Kliethermes above, and a detailed explanation is provided in the testimony of Michael Stahlman. My testimony focuses on rate design associated with the VIRN.

Q. What impact is the VIRN mechanism expected to have on customers?

A. The VIRN's impact on customers will include (1) limitation of the degree to which residential ratepayers collectively under or over contribute and (2) passing along to residential ratepayers the benefit (or detriment) of increases (or decreases) in sales associated with customer growth (or loss). Both of these impacts will apply to all residential customers with usage, with the second impact applying to each customer in proportion to that customer's share of total residential usage. The most significant impact to a given customer's bill will be more a product of the rate design selected rather than the absence or presence of the VIRN mechanism.

Q. Did Staff evaluate the reasonableness of various rate designs to use in conjunction with the VIRN?

A. Yes. In order for the VIRN mechanism to properly function and produce reasonable results, it needs to be coupled with a two block rate design that is designed to recover the portion of the volumetric revenue requirement associated with equity recovery in the first block and is designed to recover the portion of the volumetric revenue requirement associated with debt recovery in the second block, with a break point between blocks reasonably related to the portion of usage per customer per month that may be subject to variation due to weather and conservation.[1] To determine compatibility with the VIRN and the reasonableness of the results produced, Staff evaluated six designs, under three criteria for two scenarios.

Q. What designs were considered?

A. Staff evaluated a declining block design, three inclining block designs, and two flat-priced block designs. A summary of these designs is provided in Table 1 below:[2]

Table 1

Rate Designs	Decline Design (Equity-Debt)	Incline Design (Debt-Equity)	Flat Design (Debt-Equity)	Flat Design (Equity-Debt)	Incline Design (Equity only - Debt & Expense)	Incline Design (Equity-Debt) Seasonal
Customer Charge	$ 17.00	$ 17.00	$ 17.00	$ 17.00	$ 17.00	$ 17.00
Block 1 Rate	$ 0.3177	$ 0.2762	$ 0.2820	$ 0.2820	$ 0.1956	$ 0.2700
ccf/month Block Change	30	30	*25-30*	*50-55*	*10-20*	*30 summer / 100 winter*
Block 2 Rate	$ 0.2579	$ 0.2859	$ 0.2820	$ 0.2820	$ 0.3038	$ 0.3261

[3]

Q. Under what criteria and scenarios were these rate designs evaluated?

A. Staff reviewed these designs in relationship to the (1) stability and predictability of the billed level of non-gas costs to residential customers from the perspective of the company, (2) the stability and predictability of the level of non-gas bills to residential customers from the

[1] The VIRN operates by removing revenue risk associated with recovery of the debt costs and expense portions of the residential revenue requirement not recovered by the customer charge. This provides stability in the level of non-gas revenues received from the residential class to the extent that the volumetric-recovered debt costs and expenses comprise the residential revenue requirement. Whether or not the company earns above or below its authorized rate of return in a particular operating period is not relevant to the overall VIRN design.

[2] Based on Staff's recommended overall and residential class revenue requirements at the time of its direct filing, and estimated billing determinants.

[3] The block break points in italic text are estimates based on company-provided cumulative frequency distributions of residential bills, prior to weather normalization and growth adjustments, for the test period. These estimates are subject to further refinement and development.

perspective of those customers, and (3) the reasonableness of the relationship of any instability to risks that the company bears for returns to its equity investors. These three criteria were evaluated for each rate design on a stand-alone basis, and as coupled with the VIRN mechanism. Finally, the designs were evaluated as to the Company's insulation from variation in Second Block usage, and retention of risks and opportunities associated with changes in the numbers of residential customers, when coupled with the VIRN mechanism.

Q. Could you provide a summary of the relative strengths and weaknesses of these designs under each of these criteria?

A. Yes. The results of Staff's subjective evaluation and a ranking for each metric from 1-6 in terms of the ability of each design to achieve the indicated metric are provided in Table 2 below. The parentheticals in the title of each rate design in Table 2 indicates the allocation of the volumetric portion of residential revenue responsibility to each block of that rate design. For example in the Decline Design, the volumetric portion of residential revenue responsibility associated with recovery of the equity-associated revenue requirement will be recovered through the first rate block while the volumetric portion of residential revenue responsibility associated with recovery of the debt cost-associated revenue requirement will be recovered through the second rate block.

Table 2

	Decline Design (Equity-Debt)	Incline Design (Debt-Equity)	Flat Design (Debt-Equity)	Flat Design (Equity-Debt)	Incline Design (Equity only - Debt & Expense)	Incline Design (Equity-Debt) Seasonal
Stand-Alone Rate Rationale						
Revenue Stability	Strong 6	Minimal + 2	Moderate 4*	Moderate 4*	Moderate - 3	Minimal - 1
Mitigates Extreme Bills	Strong 6	Minimal + 2	Moderate 4*	Moderate 4*	Moderate - 3	Minimal - 1
Relationship to Revenue Risk	Slightly more Stable 1	Slightly less Stable 4	Stable 3	Stable 2	Less Stable 5	Much less Stable 6
VIRN-Coupled Rate Rationale						
Revenue Stability	Strong 5	*Inapplicable*	*Inapplicable*	Strong 5	Strong + 6	Moderate + 3
Mitigates Extreme Bills	Strong 6	*Inapplicable*	*Inapplicable*	Moderate 4	Moderate - 2	Minimal - 1
Relationship to Revenue Risk	Stable 2	*Inapplicable* *Inapplicable*	*Inapplicable* *Inapplicable*	Slightly Less Stable 3	More Stable 1	Much less Stable 6
Company is insulated from variation in Second Block Usage.	Fully	Inapplicable	Inapplicable	Some	Fully	Some
Company retains volumetric revenue growth/loss associated with change in number of customers.	Fully	Inappticable	Inapplicable	Some	Some	Fully

Revenue Stability refers to Company's revenues over time.
Extereme Bills refers to Customer exposure in real time.

Q. What additional factors should be considered in evaluating these rate designs?

A. Additional factors to consider include: how easy or difficult it will be for customers to understand their bills, availability of necessary determinants, and billing inequities that would result if the current company billing practices were applied to certain of these rate designs.[4] Compatibility with the VIRN mechanism is also an important consideration to this recommendation.

Q. Were any rate designs evaluated that Staff excluded for these reasons?

[4] Due to staggered Bill Cycles, customers with identical usage throughout the year may receive very different bills. If a rate design is intended to send a specific or extreme price signal, the difference in billing cycles may result in different price signals being sent to customers with similar usage for a given set of days. Many utilities, including Ameren Gas, bill based on "Billing Months." A Billing Month is made up of multiple Bill Cycles. A Billing Cycle is a series of days for which usage is measured to issue a bill. Billing based on Billing Months allows a utility to minimize the number of personnel and the amount of equipment necessary to read meters, calculate and issue bills, and receive and process payments. However, with more complex rate designs it can lead to billing iniquities. For example, a Billing Month typically spans approximately 62 calendar days, spread over 2-3 calendar months. Seasonal pricing and significant differences in pricing blocks can result in customers having the same usage experiencing very different bills and price signals, especially in calendar shoulder months, which may be priced very differently for the same days under different billing cycles.

A. Yes. The level of concern, where present, is identified in Table 3, below.

Table 3

	Decline Design (Equity-Debt)	Incline Design (Debt-Equity)	Flat Design (Debt-Equity)	Flat Design (Equity-Debt)	Incline Design (Equity only - Debt & Expense)	Incline Design (Equity-Debt) Seasonal
Additional Factors						
Customer Understandibility	Slight Concern	Slight Concern			Slight Concern	Significant Concern
Billing Determinant Availability			Some Concern	Some Concern	Some Concern	Significant Concern
Billing Inequities Possible or Likely	Some Concern	Some Concern			Some Concern	Significant Concern

Based on these conclusions, although it evaluated an inclining design with a seasonal split, Staff recommends exclusion of this design. While ultimately excluded, consideration of this design was useful in evaluating the reasonableness of the VIRN as a mechanism.

Q. Why were the Incline Design (Debt-Equity) and Flat Design (Debt Equity) determined to be incompatible with the VIRN mechanism?

A. The VIRN operates by removing revenue risk associated with recovery of the portions of the residential volumetric revenue requirements associated with the cost of debt and expenses. Conservation and weather most directly impact sales occurring in the second block, although this is subject to variation based on the size of the blocks. Using the VIRN to indemnify the company (and ratepayers) for fluctuations in first block sales would not tend to capture changes in sales volumes due to weather and conservation as well as using the VIRN to isolate the risks related to second block sales.[5]

RECOMMENDATION

Q. Based on Staff's evaluations of these rate designs, what rate design does Staff recommend be used with the VIRN mechanism, if the Commission orders use of the VIRN mechanism?

[5] Staff acknowledges that the departure or addition of a customer does have an impact on second block sales, however the intent of the VIRN mechanism is to insulate the company from all sales variations in the second block.

A. Staff primarily recommends the use of the Decline Design with the volumetric portion of the residential revenue responsibility associated with recovery of expenses allocated evenly to all residential Ccf[6] sales, the volumetric portion of residential revenue responsibility associated with equity recovery allocated solely to the first 30 Ccf each customer uses each month, and the volumetric portion of residential revenue responsibility associated with recovery of debt costs allocated to the Ccf a customer consumes each month in excess of 30 Ccf.

If, for policy purposes, the Commission determines that an inclining block design is most appropriate, Staff recommends the residential rate be designed to recover the volumetric portion of residential revenue responsibility associated with equity recovery in the first 15 Ccf each customer uses each month.[7] The volumetric portion of all residential revenue requirement associated with expenses along with the volumetric portion of residential revenue responsibility associated with recovery of debt costs would be allocated to the Ccf a customer consumes each month in excess of 15 Ccf.

Whether the first block ends at 30 Ccf under the Decline Equity-Debt design or at approximately 15 Ccf under the Incline Equity-Debt/Expense design, the second block will be reasonably expected to contain the usage most likely to be impacted by conservation and weather. Coupled with the VIRN, these rate designs will remove revenue risk associated with recovery of the debt and expense revenue requirements not recovered by the customer charge, while allowing Ameren Missouri to retain the risk and opportunity for recovery of customer

[6] Volume of 100 cubic feet.
[7] The exact break point will require further refinement and is subject to the final revenue requirement and revenue shift ordered amounts, and may be further adjusted based on data availability.

charge revenues and the portion of the residential volumetric revenue requirement associated with equity contained in the first block. [8]

ALTERNATIVE RATE DESIGNS

Q. How were the rates designed that Staff considered for use with the VIRN?

A. All of the studied designs were derived similarly to the Incline Design (Debt-Equity) that Staff provided as an alternative in its CCoS Direct at pages 13-15. The Staff-recommended residential revenue requirement, the total expenses allocated to the residential class, the total cost of long term debt allocated to the residential class, and the remaining equity-based recovery provided by the residential class are provided below:

Residential Recommended Revenue Requirement	$45,035,732
Residential allocated expenses net of other revenues	$35,116,884
Long-term debt revenue requirement	$ 3,623,833
Equity-based revenue requirement	$ 6,295,015

A $17.00 customer charge and the normalized and annualized residential class customer numbers will generate revenue of approximately $24,169,189 annually. Assuming this recovery is comprised of the class average relationship of debt, equity, and expense as the total residential class recommended recovery, the remaining dollars to be collected, by type, are provided below:[9]

Customer charge recovery	$24,169,189
Expense for volumetric recovery	$16,270,813
Debt costs for volumetric recovery	$ 1,679,042
Equity costs for volumetric recovery	$ 2,916,688
Residential Class Recovery:	$45,035,732

[8] The Decline Design results in the least bill variation across usage profiles, while the Incline (Equity only - Debt & Expense) design produces the most variation for small to average customers and the Incline (Equity-Debt Seasonal) Design produces the most variation for larger customers.

[9] Other reasonable allocations could include assignment of the revenue requirements of accounts functionalized into the customer charge calculation that vary with the number of customers served. To simplify the consideration of these designs Staff has not done that additional analysis at this time.

Q. What level of monthly usage is associated with Block 1 and Block 2 under each of the studied designs?

A. For the Decline (Equity-Debt) and Incline (Debt-Equity) designs, the existing rate structure of 30 Ccf as the break-point between blocks is retained. Billing determinants associated with these designs are consistent with those used to calculate revenues in the direct filings in this case, and are more certain. The Flat (Equity-Debt), Incline (Equity Only – Debt & Expense) and Incline (Seasonal Equity-Debt) designs will all require development of new billing determinants. Some of these calculations will be more difficult than others. For example, the Incline (Seasonal Equity-Debt) would require development of three blocks of billing determinants.[10] Calculation of to what extent the calendar shoulder month usage falls into each billing cycle within each shoulder billing month would be important to the reliability of the calculated billing determinants.

Q. How was the revenue requirement associated with expense, equity recovery, and debt costs allocated to the volumetric rate elements of the studied designs for purposes of rate development?

A. With the exception of the Incline (Equity Only – Debt & Expense) design, recovery of the portion of the residential revenue requirement associated with expense and not recovered by the customer charge was allocated evenly to all volumetric rate elements. For the Incline (Equity Only – Debt & Expense) design, this expense portion was allocated only to Block 2, and the break-point with Block 1 was reduced. For each rate design, the recovery of the portion of the residential recommended revenue associated with equity recovery and debt

[10] During the 6 designated winter months, the blocks 0-30 and 31-100 would be priced at the stated "Block 1 Rate", and during the 6 designated summer months, the blocks 31-100 and 101+ would be priced at the stated "Block 2 Rate."

costs by block are indicated in the name by which the rate design is referenced. The associated $/Ccf values are provided in the table below:

Rate Designs	Decline Design (Equity-Debt)	Incline Design (Debt-Equity)	Flat Design (Debt-Equity)	Flat Design (Equity-Debt)	Incline Design (Equity only - Debt & Expense)	Incline Design (Equity-Debt) Seasonal
Expense per applicable ccf	$ 0.219890	$ 0.219890	$ 0.219890	$ 0.219890	$ 0.275369	$ 0.219890
Debt cost per applicable ccf	$ 0.038005	$ 0.056313	$ 0.062108	$ 0.062108	$ 0.028416	$ 0.106198
Equity cost per applicable ccf	$ 0.097822	$ 0.066020	$ 0.062108	$ 0.062108	$ 0.195643	$ 0.050128

For reference, the rates (based on Staff's direct filing and the levels of actual usage in the test period, subject to update) provided in Table 1 are reproduced below, including the level of Ccf associated with each block:

Rate Designs	Decline Design (Equity-Debt)	Incline Design (Debt-Equity)	Flat Design (Debt-Equity)	Flat Design (Equity-Debt)	Incline Design (Equity only - Debt & Expense)	Incline Design (Equity-Debt) Seasonal
Customer Charge	$ 17.00	$ 17.00	$ 17.00	$ 17.00	$ 17.00	$ 17.00
Block 1 Rate	$ 0.3177	$ 0.2762	$ 0.2820	$ 0.2820	$ 0.1956	$ 0.2700
ccf/month Block Change	30	30	*25-30*	*50-55*	*10-20*	*30 summer / 100 winter*
Block 2 Rate	$ 0.2579	$ 0.2859	$ 0.2820	$ 0.2820	$ 0.3038	$ 0.3261
Block 1 total ccf	29,816,369	29,816,369	27,034,085	46,961,312	14,908,185	58,184,985
Block 2 total ccf	44,179,028	44,179,028	46,961,312	27,034,085	59,087,213	15,810,412

EVALUATION OF ALTERNATIVE RATE DESIGNS

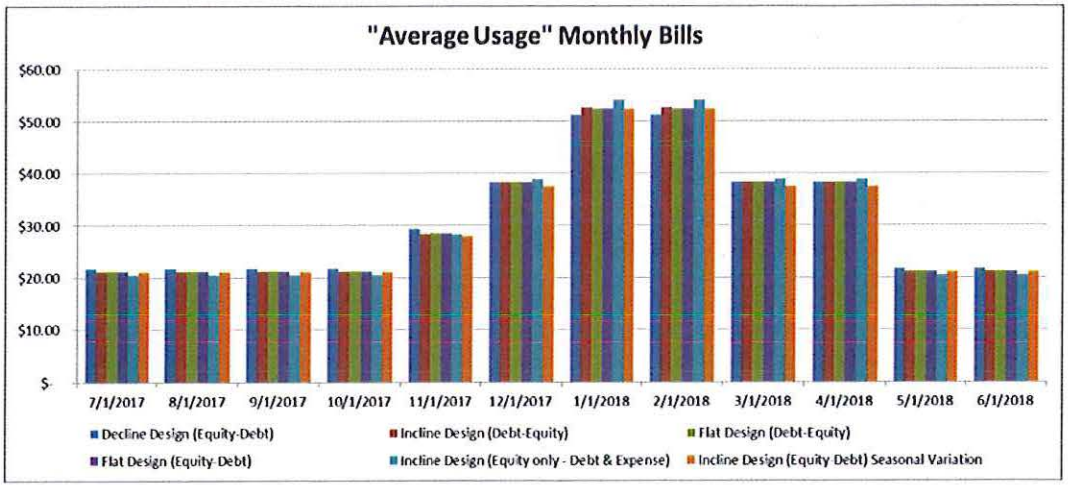
Q. How did Staff evaluate revenue stability and bill extremity of the non-gas rate design?[11]

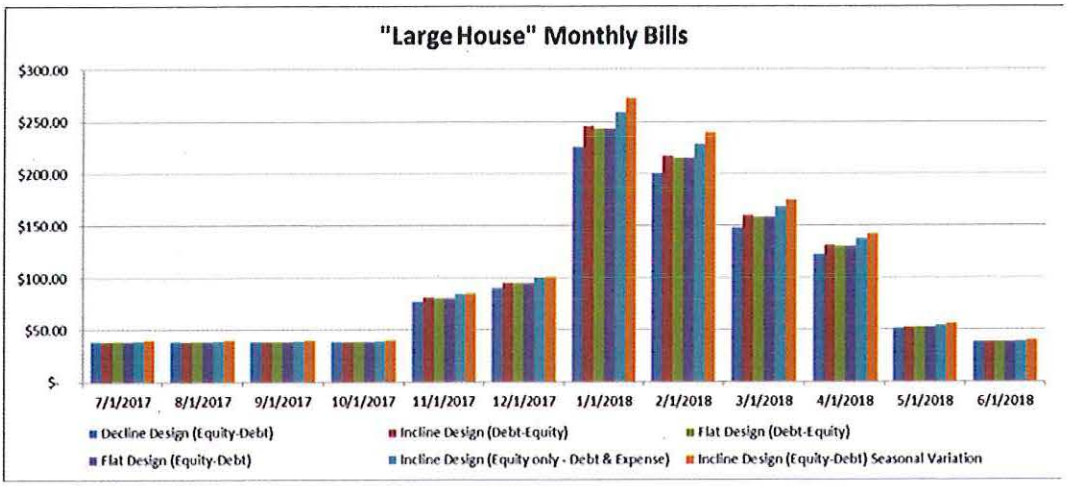
A. Staff developed two usage profiles, an "Average Usage" profile based on the mode of bills in the cumulative frequency distribution for the period 7/2017 – 6/2018, and a "Large House" profile based on the highest intervals containing a relatively large number of bills in each month of the cumulative frequency distribution for the period 7/2017 – 6/2018. The usage associated with each load profile, by month, is provided below:

	7/1/2017	8/1/2017	9/1/2017	10/1/2017	11/1/2017	12/1/2017	1/1/2018	2/1/2018	3/1/2018	4/1/2018	5/1/2018	6/1/2018
"Average Usage"	15	15	15	15	41	76	126	126	76	76	15	15
"Large House"	76	76	76	76	226	276	801	701	501	401	126	76

[11] PGA and ACA rates are not reflected in these calculations.

Staff priced out a years' worth of non-gas bills under each profile and each rate design. The resulting monthly bills, by revenue month, for each rate design are depicted in the graphs below:





Under a Stand-Alone review, revenue stability and bill extremity are nearly synonymous. While bill extremity can be thought to also reference dampening the seasonal impact of bill fluctuations, in general, a rate design that will safeguard a customer from extreme non-gas costs on a bill that is also reflecting high gas costs is a rate design that will safeguard Ameren Missouri from extreme revenue shortfalls in a billing month reflecting milder-than-normal winter weather.

As indicated above, for both load profiles the Decline Design results in the highest non-winter bills, and the lowest winter bills. For the "Average Usage" profile the

Incline (Equity only - Debt & Expense) Design caused the highest winter bills while the Incline (Equity-Debt Seasonal) Design caused bills nearly consistent with the relative magnitude of the Decline Design bills. However, for the "Large House" profile the Incline (Equity-Debt Seasonal) Design caused the highest winter bills.

Q. How do these results differ when each rate design's operation is considered in conjunction with Staff's proposed VIRN mechanism?

A. A rate design's potential for bill extremity is not affected by the VIRN. However, the performance of the Decline Design for revenue stability remains strong whether or not coupled with the VIRN, and the performance of the Incline (Equity only - Debt & Expense) and the Incline (Equity-Debt Seasonal) Design are significantly enhanced by the VIRN.

Q. How does the VIRN improve the revenue stability performance of the Incline (Equity only - Debt & Expense) design?

A. Under the Incline (Equity only - Debt & Expense) design when coupled with the VIRN, Ameren Missouri is shielded from variations in recovery of nearly 80% of the volumes it sells. Ameren Missouri has no disincentive to encourage conservation of any usage in excess of approximately the first 15 Ccf/month per customer, and Ameren Missouri is fully insulated from weather-related variations in sales down to the same level per customer per month.

Q. How does this relate to the evaluation of Relationship to Revenue Risk?

A. When coupled with the VIRN, Ameren Missouri retains the opportunity to increase its equity-associated revenues through additions of customers both in the form of additional customer charge revenues, and through additional equity-associated Block 1 volumetric revenues. Because the breakpoint for Block1/Block 2 is reduced to approximately

15 Ccf/month under the Incline (Equity only - Debt & Expense) design, Ameren Gas would effectively achieve an entire "customer's worth" of additional equity-associated revenues from the addition of a single new customer using only 15Ccf/month(even excluding the customer charge revenues).[12] Conversely, under the Incline (Equity-Debt Seasonal) Design a new customer would have to use 30 Ccf/month during the summer months and 100 Ccf/month during the winter months for Ameren Missouri to achieve the same level of retainable revenues. Similarly, under the Flat Design (Equity-Debt) a new customer would need to provide approximately 50-55 Ccf of usage each month to provide the same level of retainable revenues provided by 15 Ccf of a customer's usage under the Incline (Equity only - Debt & Expense) design or 30 Ccf/month usage under the Decline Design.

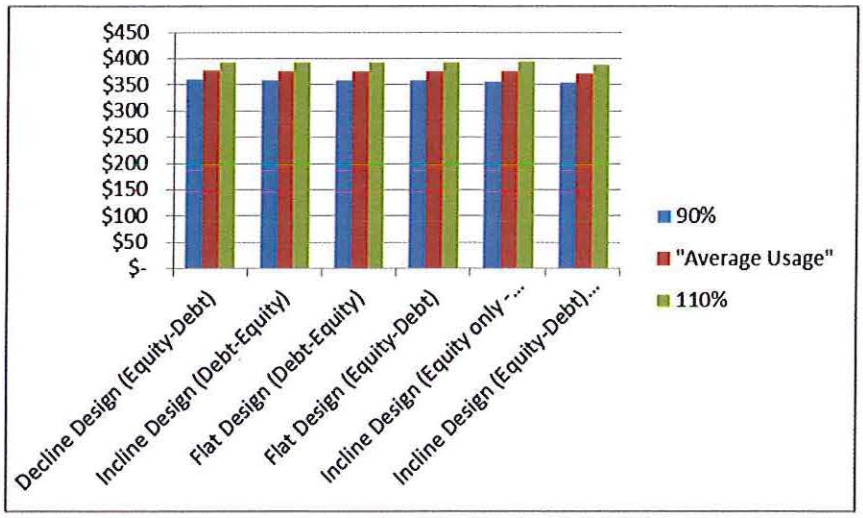
Q. Is Staff expressing an opinion that "equity-associated" revenues referred to above should be retained or booked by the company in any particularly manner?

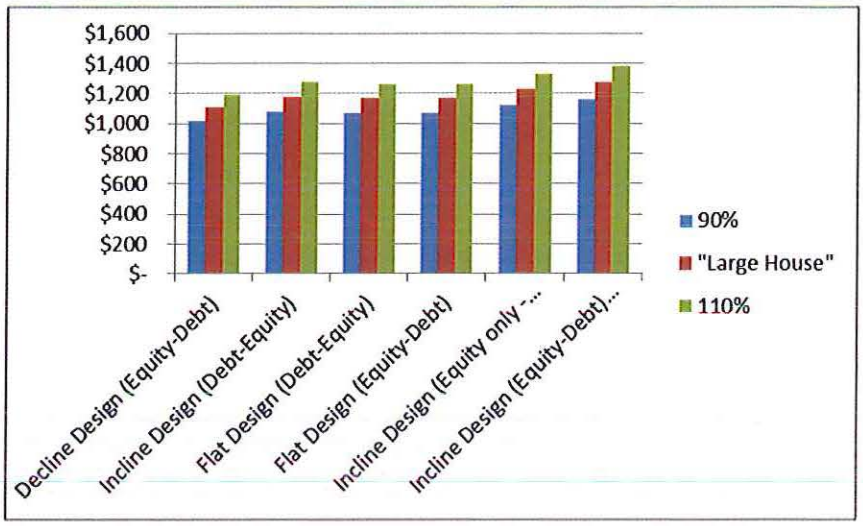
A. No. The VIRN operates by removing revenue risk associated with recovery of the debt costs and expense portions of the residential revenue requirement not recovered by the customer charge. This provides stability in the level of non-gas revenues received from the residential class to the extent that the volumetric-recovered debt costs and expenses comprise the residential revenue requirement. Whether or not the company earns above or below its authorized rate of return in a particular operating period is not relevant to the overall VIRN design.

Q. Did Staff study the impact of increases and decreases in usage on the bills associated with each load profile?

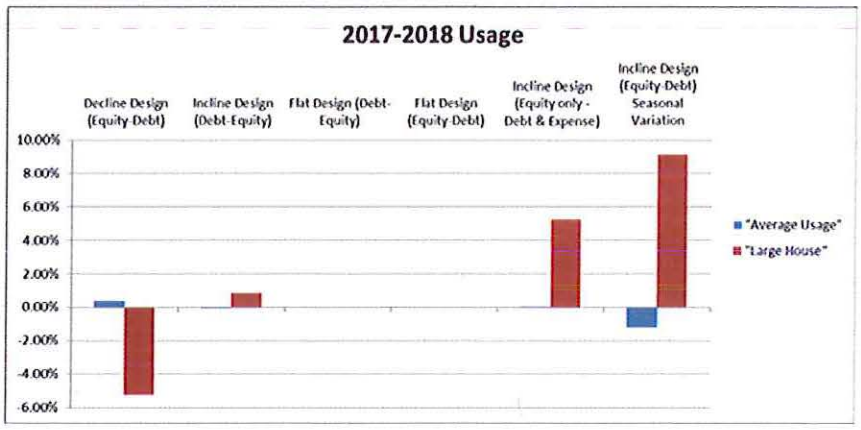
[12] The exact Ccf break point to be used in final rate design will vary within the range of approximately 10 – 20 Ccf/month/customer based on data availability.

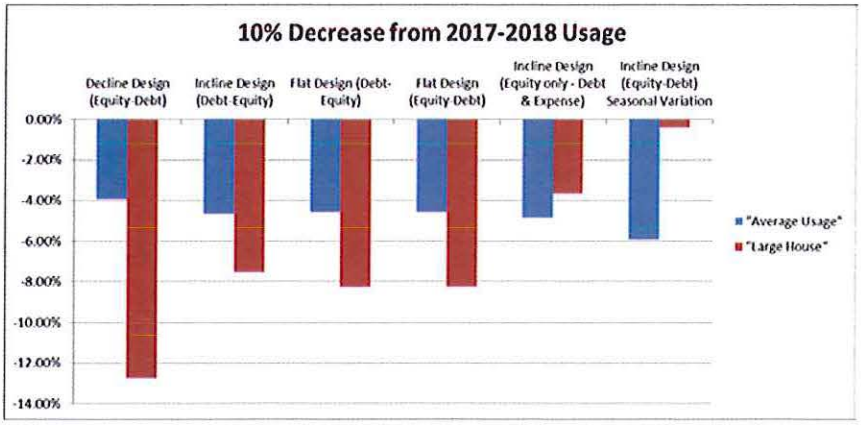
A. Yes. Staff developed scenarios under each profile reflecting a 10% increase, and a 10% decrease of each profile's usage in each month. The annual non-gas bill variation for a 10% decrease in the profile usage, the profile usage, and a 10% increase in the profile usage are provided in the graphs below:

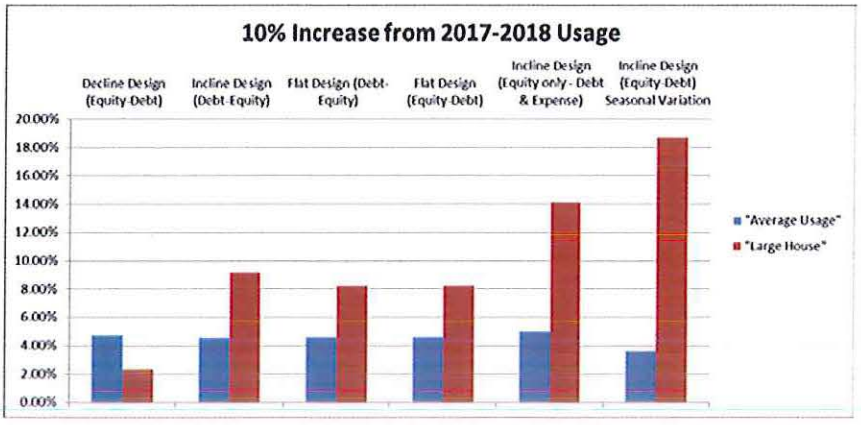




Staff then evaluated the range of variation relative to a flat design and 100% of the 2017 – 2018 usage for each profile, across rate designs and levels of usage. Those results are provided in the graphs below:

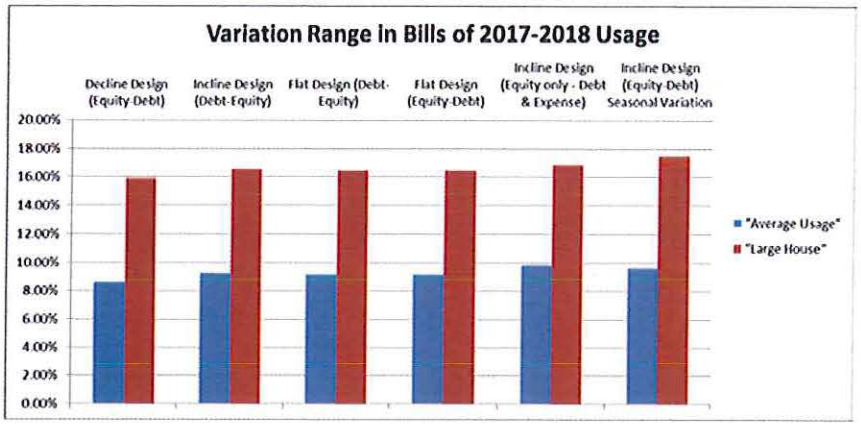






Finally, Staff reviewed the level of non-gas bill variation that would result from a 20% change (+/- 10%) in usage level under each load profile and rate design. Those results are provided in the table and chart provided below:

	"Average Usage"	"Large House"
Decline Design (Equity-Debt)	8.61%	15.92%
Incline Design (Debt-Equity)	9.22%	16.59%
Flat Design (Debt-Equity)	9.13%	16.50%
Flat Design (Equity-Debt)	9.13%	16.50%
Incline Design (Equity only - Debt & Expense)	9.83%	16.88%
Incline Design (Equity-Debt) Seasonal Variation	9.61%	17.48%



Q. How do each of these exercises relate to revenue stability and bill extremity?

A. Because of the insulation to revenues provided by the VIRN, these results do little to modify the evaluation of the relative revenue stability and relationship to revenue risk of the various designs. As it relates to Mitigation of Extreme bills, the results of these exercises are largely consistent with those of the simple bill analysis discussed at length above. Namely, the Decline Design results in the least bill variation across usage profiles, while the Incline (Equity only - Debt & Expense) design produces the most variation for small to average customers and the Incline (Equity-Debt Seasonal) Design produces the most variation for larger customers.

Q. Did Staff evaluate the Incline Design (Debt-Equity) that was recommended as an alternative rate design in Staff's CCoS Report?

A. Yes, however Staff determined that this design is not compatible with the VIRN. Similarly, Staff determined that the Flat Design (Debt-Equity) is not compatible with the VIRN.

Q. Why is the VIRN not compatible with either of these designs?

A. The VIRN adjusts for changes in the recovery of the portion of the residential revenue requirement associated with volumetric recovery of allocated expenses and debt costs. Because the debt costs are allocated for recovery in the first block of sales under these designs, it is not reasonable to couple them with a mechanism designed to insulate the company from fluctuations in usage associated with weather and conservation.

Q. Why should the Incline (Equity-Debt Seasonal) Design not be adopted?

A. Several reasons. First, billing determinants necessary to refine the rate do not presently exist, and will be relatively difficult to develop. Second, the relatively large difference between the blocks could result in unreasonable bill variation among similar usage customers and unpredictable revenue variation for the Company as it pertains to early winters or late springs, even when coupled with the VIRN.[13] Finally, when coupled with the VIRN, the incline design is not necessary to promote the policy goals the Commission has sought to achieve with inclining block rates. Specifically, if the purpose of a mechanism such as the VIRN is to remove the company's disincentive to reduce sales by encouraging conservation, then an incline design is not needed as the primary means of encouraging conservation – a ratepayer funded program administered by or through the utility would presumably be the primary means of promoting conservation.

Q. Why does Staff recommend adoption of the Decline Design over the Incline (Equity only - Debt & Expense) and the Flat Design (Equity-Debt)?

A. The Decline Design mitigates extreme bills for the customer. While the VIRN is designed to limit the extent to which customers ***collectively*** over pay or under pay over the

[13] For example, the calendar month of October may result in usage that is very consistent with normal usage, but it could spread to billing months in a manner that would result in a substantial adjustment, or vice versa.

course of a year, there is nothing in either the Ameren Missouri proposal or the VIRN that in itself tempers extreme bills. The Flat Design (Equity-Debt) is a middle ground in extreme bill mitigation, and is consistent with Staff's primary volumetric charge design recommendation. However, Staff recommends coupling the VIRN with the Decline Design over the Flat Design for two reasons. First, it is *possible* that the lower amount of Ccf per month fully insulated under the Flat Design versus the Decline Design would not provide adequate removal of the disincentive for Ameren Missouri to effectively implement a ratepayer-funded conservation program. Second, while the VIRN does not itself mitigate bill impacts, if the VIRN in a given year results in an increase to the charge per Ccf the VIRN (and Ameren's proposed mechanism) would serve to increase the non-gas costs reflected on a customer bill. A Decline Design would not only help to dampen the share of non-gas costs borne by larger customers, but would also tend to decrease the level of recovery subject to be flowed back to customers through the VIRN.

VIRN OPERATION UNDER EACH RECOMMENDED DESIGN

Q. How are the rates of the Decline Design (Equity-Debt) and the Incline Design (Equity only – Debt & Expense) derived as it relates to the VIRN mechanism?

A. The VIRN adjustment is calculated by fully reconciling the level of volumetric revenue requirement associated with debt and expense that was actually billed to the level of volumetric revenue requirement associated with debt and expense that was assumed when rates were set at the conclusion of this rate case. For an appropriate rate design for the VIRN mechanism the rate for the first units a customer purchases each month should reflect the recovery of the return on rate base as a product of the cost of equity, and the rate designed for the additional units a customer may purchase each month reflects the recovery of the return on rate base as a product of the cost of debt. The differences in rates under these two rate designs are the result of (1) whether or not revenue requirement associated with recovery of expenses

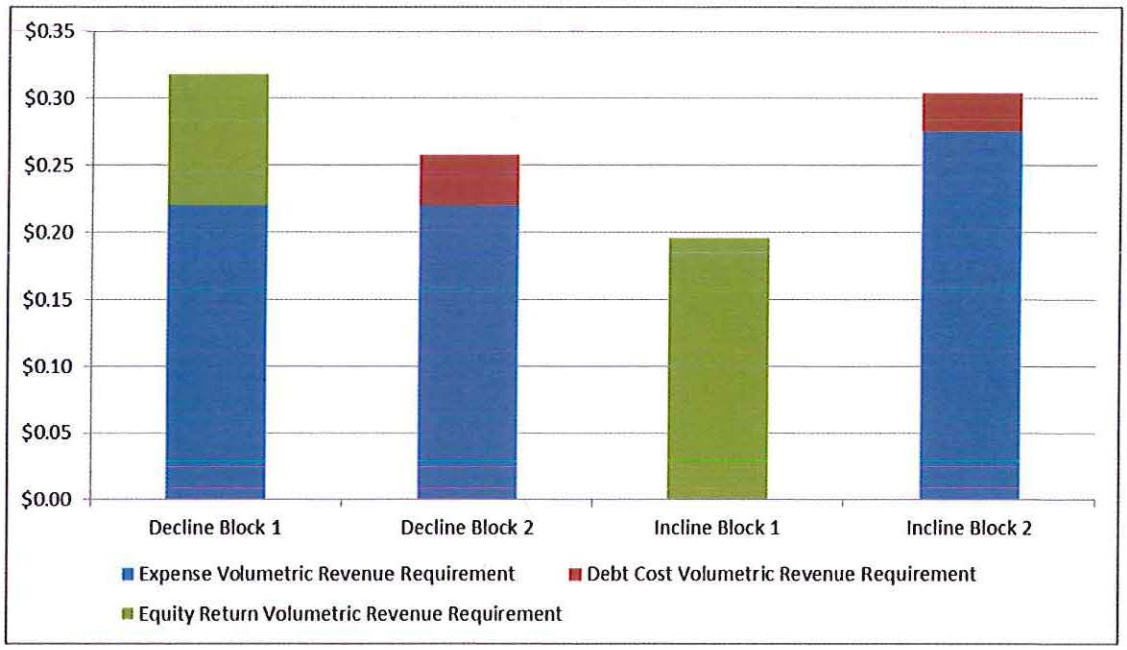
is included in Block 1, and (2) how many Ccf per customer per month are defined as Block 1 usage.

The Decline Design does include expense-associated recovery at the same level in each Ccf sold, while this particular Incline Design does not include expense-associated recovery in the first block.

The Decline Design retains the existing block break point of billing the first 30 Ccf each customer consumes each month at a Block 1 rate, and all subsequent Ccf each customer consumes each month at the Block 2 rate. The Incline Design relies on a different block break point such that approximately the first 15 Ccf consumed by each customer each month would fall under the Block 1 rate, with each additional Ccf each month to be billed at the Block 2 rate.

The rates resulting from each design based on Staff's direct-filed revenue requirement are illustrated below:

	Decline Design Equity - Debt		Incline Design Equity Only - Debt & Expense	
Rate Composition	**Block 1**	**Block 2**	**Block 1**	**Block 2**
Expense Volumetric Revenue Requirement	$ 0.21989	$ 0.21989	$ -	$ 0.27537
Debt Cost Volumetric Revenue Requirement	$ -	$ 0.03801	$ -	$ 0.02842
Equity Return Volumetric Revenue Requirement	$ 0.09782	$ -	$ 0.19564	$ -
Rate per ccf	$ 0.31771	$ 0.25789	$ 0.19564	$ 0.30379



Q. How would the VIRN adjustment vary under these two rate designs?

A. The VIRN adjustment would be calculated the same way in conjunction with both rate designs. However, the resulting adjustments would vary. For example, as provided in the example below, under the Decline Design, if customer usage decreased by 5%, then residential class revenues would decrease approximately $387, which would be fully recoverable through the VIRN. Under the Incline Design, the revenue decrease would be approximately $456, which would also be fully recoverable.[14]

[14] For purposes of these examples, a residential customer count of only 50 customers and total sales of only 30,000 annual Ccf are used. This facilitates calculation of observable differences and simplifies the examples provided. However, the total amount to be recovered under "normal" conditions varies under these two designs since actual billing determinants were not used.

VIRN Adjustment Calculation – Decline Design

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	13,500	15,000	-	1,500		
Expense recovery	$ 2,969	$ 3,628	$ 2,969	$ 3,298	$ -	$ 330	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 570		$ 57	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,321	$ -			$ 1,321	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,289	$ 3,868	$ -	$ 387	$ 4,289	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,744	$	18,358			$	18,744
Revenue Difference from RR				$ (387)				$ -
% Change				-2.06%				2.06%

VIRN Adjustment Calculation – Incline Design (Equity only – Expense & Debt)

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	9,000	19,500	-	1,500		
Expense recovery	$ -	$ 5,783	$ -	$ 5,370		$ 413	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 554		$ 43	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,761	$ -			$ 1,761	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,761	$ 5,924	$ -	$ 456	$ 1,761	$ 6,380
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,340	$	17,885			$	18,340
Revenue Difference from RR				$ (456)				$ -
			Change in Actual Recovery:	-2.48%		VIRN % of total Recovery:		2.48%

The differences in effective operation of the VIRN between the two rate designs are more noticeable in the scenario where there is a 5% increase in the number of customers, while the level of usage of each customer each month remains constant.[15]

VIRN Adjustment Calculation – Decline Design

5% Decrease in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
0%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	12,825	15,675	675	825		
Expense recovery	$ 2,969	$ 3,628	$ 2,820	$ 3,447	$ 148	$ 181	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 596		$ 31	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,255	$ -			$ 1,255	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,075	$ 4,043	$ 148	$ 213	$ 4,223	$ 4,255
Customer Chg. Rev.	$	10,200	$	9,690				
Total Revenues	$	18,744	$	17,807			$	18,168
Revenue Difference from RR				$ (937)				$ (576)
			Change in Actual Recovery:	-5.00%		VIRN % of total Recovery:		1.93%

[15] For purposes of these examples, each customer uses only 15 Ccf for 6 months of the year, and uses an average of 85 Ccf in each of the remaining 6 months.

VIRN Adjustment Calculation – Incline Design (Equity only – Expense & Debt)

5% Decrease in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
0%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	8,550	19,950	450	1,050		
Expense recovery	$ -	$ 5,783	$ -	$ 5,494		$ 289	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 567		$ 30	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,673	$ -			$ 1,673	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,673	$ 6,061	$ -	$ 319	$ 1,673	$ 6,380
Customer Chg. Rev.	$	10,200	$	9,690				
Total Revenues	$	18,340	$	17,423			$	17,742
Revenue Difference from RR				$ (917)				$ (598)
			Change in Actual Recovery:	-5.00%		VIRN % of total Recovery:		1.74%

Because this example causes changes to both blocks it is easier to observe the differences in how the rate design impacts the VIRN calculation. Specifically, columns under the "VIRN Adjustment" heading indicate that while there were additional sales in both blocks under both designs (see "Consumption" row), there are only adjustments applicable to Block 1 sales under the Decline Design. Also, note that while under the Incline Design there is only an adjustment related to expense recovery for Block 2 sales, its magnitude is similar to the sum of the expense adjustments under Blocks 1 and 2 of the Decline Design.

Additional examples of VIRN adjustment calculations under both rate designs for various combinations of customer growth/attrition and sales growth/reductions are provided as Appendix 1 Schedule MLS-r2 and MLS-r3.

Q. What is Staff's recommendation in this case?

A. Should the Commission determine that a conservation mechanism is appropriate, as explained above, Staff recommends coupling the VIRN with the Decline Design.

Q. Does this conclude you testimony?

A. Yes.

MISSOURI PUBLIC SERVICE COMMISSION

COMMISSION STAFF DIVISION

TARIFF/RATE DESIGN DEPARTMENT

APPENDIX 1
TO
REBUTTAL TESTIMONIES
Of
MICHAEL STAHLMAN
SARAH LANGE

UNION ELECTRIC COMPANY
d/b/a AMEREN MISSOURI

CASE NO. GR-2019-0077

Example timelines for tariff filings

6/1/2020 Tariff sheet filed for	VIRN rate A		
Includes projected sales for the period		4/1/2020 through	9/30/2020
10/1/2020 VIRN rate A takes effect, applies to all ccf sold*		10/1/2020 through	10/1/2021
*Assumes proration for billing cycles that begin before tariff effective date.			
6/1/2021 Tariff sheet filed for	VIRN rate B		
Reconciles sales projected for time period		4/1/2020 through	9/30/2020
Reflects projected sales for the period		4/1/2021 through	9/30/2021
10/1/2021 VIRN rate b takes effect, applies to all ccf sold		10/1/2021 through	10/1/2022

Initial Information

			Block 1	Block 2
Block 1 Normal Sales		13,500		
Block 2 Normal Sales		16,500		
Expenses per ccf	$	0.220	$ 0.220	$ 0.220
Debt recovery per ccf	$	0.038		$ 0.038
Equity recovery per ccf	$	0.098	$ 0.098	
			$ 0.318	$ 0.258
Normal Block 1 Recovery	$	4,289		
Normal Block 2 Recovery	$	4,255		
	$	8,544		

VIRN calculation for Rate A

				Block 1	Block 2
Actual Sales	10/1/2019 through	3/31/2020		9,720	14,850
Projected Sales	4/1/2020 through	9/30/2020		4,050	495
				13,770	15,345
Sales Difference				(270)	1,155
Expenses per ccf			$ 0.220	$ (59)	$ 254
Debt recovery per ccf			$ 0.038		$ 44
Equity recovery per ccf			$ 0.098		
				$ (59)	$ 298
VIRN A amount	$ 238				
Projected sales	10/1/2020 through	10/1/2021			31,350
VIRN Rate A	**$ 0.00761**				

VIRN calculation for Rate B

				Block 1	Block 2
Actual Sales	4/1/2020 through	9/30/2020		3,974	501
Less Sales as Projected for	4/1/2020 through	9/30/2020		(4,050)	(495)
Actual Sales	10/1/2020 through	4/1/2021		9,739	14,256
Projected Sales	4/1/2021 through	9/30/2021		4,253	483
				13,916	14,745
Sales Difference				(416)	1,755
Expenses per ccf			$ 0.220	$ (91)	$ 386
Debt recovery per ccf			$ 0.038		$ 67
Equity recovery per ccf			$ 0.098		
				$ (91)	$ 453

Reconciliation of Rate A

Sales under Rate A		28,731
*In initial VIRN reconciliation initial Projected period is excluded because no rate was in place at that time.		
Collected under Rate A	$	219
Rate A amount	$	238

VIRN B amount	$ 381		
Projected sales	10/1/2021 through	10/1/2022	33,701
VIRN Rate B	**$ 0.01131**		

VIRN Examples on Decline Design, 30 ccf in First Block

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	13,500	15,000	-	1,500		
Expense recovery	$ 2,969	$ 3,628	$ 2,969	$ 3,298	$ -	$ 330	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 570		$ 57	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,321	$ -			$ 1,321	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,289	$ 3,868	$ -	$ 387	$ 4,289	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,744	$	18,358			$	18,744
Revenue Difference from RR			$	(387)			$	-

5% Increase in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
0%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	14,175	17,325	(675)	(825)		
Expense recovery	$ 2,969	$ 3,628	$ 3,117	$ 3,810	$ (148)	$ (181)	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 658		$ (31)	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,387	$ -			$ 1,387	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,504	$ 4,468	$ (148)	$ (213)	$ 4,355	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,710				
Total Revenues	$	18,744	$	19,682			$	19,320
Revenue Difference from RR			$	937			$	576

5% Decrease in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
0%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	12,825	15,675	675	825		
Expense recovery	$ 2,969	$ 3,628	$ 2,820	$ 3,447	$ 148	$ 181	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 596		$ 31	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,255	$ -			$ 1,255	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,075	$ 4,043	$ 148	$ 213	$ 4,223	$ 4,255
Customer Chg. Rev.	$	10,200	$	9,690				
Total Revenues	$	18,744	$	17,807			$	18,168
Revenue Difference from RR			$	(937)			$	(576)

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	13,500	18,000	-	(1,500)		
Expense recovery	$ 2,969	$ 3,628	$ 2,969	$ 3,958	$ -	$ (330)	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 684		$ (57)	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,321	$ -			$ 1,321	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,289	$ 4,642	$ -	$ (387)	$ 4,289	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,744	$	19,131			$	18,744
Revenue Difference from RR			$	387			$	-

5% Increase in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	13,500	16,500	14,175	15,750	(675)	750		
Expense recovery	$ 2,969	$ 3,628	$ 3,117	$ 3,463	$ (148)	$ 165	$ 2,969	$ 3,628
Debt Recovery	$ -	$ 627	$ -	$ 599		$ 29	$ -	$ 627
Equity Recovery	$ 1,321	$ -	$ 1,387	$ -			$ 1,387	$ -
Total Volumetric	$ 4,289	$ 4,255	$ 4,504	$ 4,062	$ (148)	$ 193	$ 4,355	$ 4,255
Customer Chg. Rev.	$	10,200	$	10,710				
Total Revenues	$	18,744	$	19,275			$	19,320
Revenue Difference from RR			$	531			$	576

VIRN Examples on Incline Design, approx. 15 ccf in First Block

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	9,000	19,500	-	1,500		
Expense recovery	$ -	$ 5,783	$ -	$ 5,370		$ 413	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 554		$ 43	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,761	$ -			$ 1,761	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,761	$ 5,924	$ -	$ 456	$ 1,761	$ 6,380
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,340	$	17,885			$	18,340
Revenue Difference from RR			$	(456)			$	-

5% Increase in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
0%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	9,450	22,050	(450)	(1,050)		
Expense recovery	$ -	$ 5,783	$ -	$ 6,072		$ (289)	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 627		$ (30)	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,849	$ -			$ 1,849	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,849	$ 6,698	$ -	$ (319)	$ 1,849	$ 6,380
Customer Chg. Rev.	$	10,200	$	10,710				
Total Revenues	$	18,340	$	19,257			$	18,938
Revenue Difference from RR			$	917			$	598

5% Decrease in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
0%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	8,550	19,950	450	1,050		
Expense recovery	$ -	$ 5,783	$ -	$ 5,494		$ 289	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 567		$ 30	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,673	$ -			$ 1,673	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,673	$ 6,061	$ -	$ 319	$ 1,673	$ 6,380
Customer Chg. Rev.	$	10,200	$	9,690				
Total Revenues	$	18,340	$	17,423			$	17,742
Revenue Difference from RR			$	(917)			$	(598)

No Change in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	9,000	22,500	-	(1,500)		
Expense recovery	$ -	$ 5,783	$ -	$ 6,196		$ (413)	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 639		$ (43)	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,761	$ -			$ 1,761	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,761	$ 6,835	$ -	$ (456)	$ 1,761	$ 6,380
Customer Chg. Rev.	$	10,200	$	10,200				
Total Revenues	$	18,340	$	18,796			$	18,340
Revenue Difference from RR			$	456			$	-

5% Increase in Number of Customers

% Change in Usage per Customer	Normal Recovery		Actual Recovery		VIRN Adjustment		Actual Recovery with VIRN Adjustment	
-5%	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2	Block 1	Block 2
Consumption	9,000	21,000	9,450	20,475	(450)	525		
Expense recovery	$ -	$ 5,783	$ -	$ 5,638		$ 145	$ -	$ 5,783
Debt Recovery	$ -	$ 597	$ -	$ 582		$ 15	$ -	$ 597
Equity Recovery	$ 1,761	$ -	$ 1,849	$ -			$ 1,849	$ -
Total Volumetric	$ 1,761	$ 6,380	$ 1,849	$ 6,220	$ -	$ 159	$ 1,849	$ 6,380
Customer Chg. Rev.	$	10,200	$	10,710				
Total Revenues	$ -	18,340	$	18,779			$	18,938
Revenue Difference from RR			$	439			$	598

Schedule SLKL-r1

	Decline Design (Equity-Debt)	Incline Design (Debt-Equity)	Flat Design (Debt-Equity)	Flat Design (Equity-Debt)	Incline Design (Equity only - Debt & Expense)	Incline Design (Equity-Debt) Seasonal Variation
On stand-alone basis, does Co. bear risk of changes to revenue due to increased/decrease sales, relative to 30ccf breakpoint?	*same*	*same*	*very slightly lower*	*slightly higher*	*lower*	*Higher for much of year and unstable year-to-year due to shoulder month weather and billing cycle issues.*
On stand-alone basis, does Co. bear risk of changes to revenue due to increased/decrease sales, due to prices of blocks, relative to flat pricing?	*Slightly more first block revenue.*	*Slightly less first block revenue.*	*same price*	*same price*	*Less first block revenue.*	*Less first block revenue.*
On stand-alone basis, does Co. receive benefit/detriment of risk of revenue recovery due to increased/decrease sales, relative to 30ccf and flat rate?	*Recovery is slightly more stable.*	*Recovery is slightly less stable.*	*Yes, but not relevant because rate is flat.*	*Risk is slightly lower because first block ends at a higher level, but not really relevant because rate is flat.*	*Revenues are less stable due to lower break point AND incline design.*	*Revenues are less stable because higher breakpoint, variability of weather in shoulder months, billing month timing, and incline design.*
Stand-Alone Rationale of Overall Relationship of Risk to Revenues	Slightly more Stable 1	Slightly less Stable 4	Stable 3	Stable 2	Less Stable 5	Much less Stable 6
When coupled with VIRN, does Co. bear risk of changes to revenue due to increased/decrease sales, relative to 30ccf breakpoint?	*same*	*Inapplicable*	*Inapplicable*	*Slightly more ccf are at risk due to customer growth/loss. Generally low enough block break point that most or all weather-related usage will carry to second block.*	*Fewer ccf at risk due to customer growth/loss. Virtually all weather-related usage will carry to second block.*	*Slightly more ccf are at risk due to customer growth/loss. Change in break point could cause volatility as to whether a given shoulder month or billing month is billed at a given rate. Possible that some customer's weather-related usage will not extend into second block, particularly in shoulder months for customers in some billing cycles.*
When coupled with VIRN, does Co. bear risk of changes to revenue due to increased/decrease sales, due to prices of blocks, relative to flat pricing?	*Inapplicable*	*Inapplicable*	*Inapplicable*	*Inapplicable*	*Inapplicable*	*Inapplicable*
When coupled with VIRN, does Co. receive benefit/detriment of risk of revenue recovery due to increased/decrease sales, relative to 30ccf and flat rate?	*Overall recovery is relativley stable.*	*Inapplicable*	*Inapplicable*	*Overall recovery is slightly less stable.*	*Overall recovery is very stable.*	*Overall recovery is less stable, but more related to timing of weather and billing cycles than to factors in utility's day-to-day control.*
VIRN-Coupled Rationale of Overall Relationship of Risk to Revenues	Stable 2	*Inapplicable* *Inapplicable*	*Inapplicable* *Inapplicable*	Slightly Less Stable 3	More Stable 1	Much less Stable 6

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase its Revenues for Natural Gas Service	)))	Case No. GR-2019-0077

AFFIDAVIT OF ROBIN KLIETHERMES

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW ROBIN KLIETHERMES and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing *Rebuttal Testimony*; and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

ROBIN KLIETHERMES

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 6th day of June 2019.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase its Revenues for Natural Gas Service	)))	Case No. GR-2019-0077

AFFIDAVIT OF MICHAEL L. STAHLMAN

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW MICHAEL L. STAHLMAN and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

MICHAEL L. STAHLMAN

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 5th day of June 2019.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase its Revenues for Natural Gas Service	)))	Case No. GR-2019-0077

AFFIDAVIT OF SARAH L.K. LANGE

STATE OF MISSOURI	)	
	)	ss.
COUNTY OF COLE	)	

COMES NOW SARAH L.K. LANGE and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing *Rebuttal Testimony*; and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

Sarah L K Lange

SARAH L.K. LANGE

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 6th day of June 2019.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

D Suzie Mankin

Notary Public