BEFORE THE
STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET NO. DE 21-030

IN THE MATTER OF:
UNITIL ENERGY SYSTEMS, INC.
REQUEST FOR CHANGE IN RATES

DIRECT TESTIMONY

OF

JASON BALL

ON BEHALF OF

NEW HAMPSHIRE DEPARTMENT OF ENERGY

NOVEMBER 23, 2021

TABLE OF CONTENTS

ATTACHMENTS

Attachment JLB-01 Professional Experience and Qualifications

Attachment JLB-02 RMI Rate Design for the Distribution Edge

Attachment JLB-03 RAP Electric Cost Allocation for a New Era

Attachment JLB-04 NARUC Cost Allocation Manual

Attachment JLB-05 UES Responses to Data Requests

Attachment JLB-06 DOE Allocated Cost of Service Study Results

I. INTRODUCTION

Q. Please state your name and business address for the record.

A. My name is Jason Ball. I am a principal at Transform Consulting, LLC. My business address is 8701 Camden St Alexandria, VA 22308. My email address is jason@transformconsulting.com.

Q. Please summarize your educational background.

A. I earned a degree from New Mexico State University in 2010 with a dual major in Economics and Government. In 2013, I graduated with honors from New Mexico State University with a Master of Economics degree specializing in Public Utility Policy and Regulation.

Q. Please summarize your professional work experience.

A. I have served as a senior economist for the Washington State Utilities and Transportation Commission since 2013. I have extensive experience building, modifying, and examining complex cost of service models for utilities with annual revenues from $100 million to over $2 billion. Among other initiatives, I led a multi-division rulemaking team to codify first-of-their kind administrative rules for presenting and equitably assigning electric and natural gas costs to individual customer groups. The new rules established both the calculation and presentation of cost-of-service methods, such as the use of design-day to classify and allocate costs. These rules also included the Renewable Future Peak Credit Method, an innovative formula that incorporates the impacts of storage and other renewable technologies directly into rate design. I have participated and testified in numerous utility rate cases and proceedings, prepared analysis and testimony on revenue

requirements, revenue and expense adjustments, pro-forma plant policy, cost of service, rate design, tariffs, property sales, environmental remediation, demand response, inter-jurisdictional cost allocations, integrated resource planning, reliability, and critical infrastructure security. My education and professional background is detailed in Attachment JLB-01.

Q. On whose behalf are you testifying today?

A. I am testifying on behalf of the New Hampshire Department of Energy.

Q. Have you testified previously before the New Hampshire Public Utilities Commission?

A. No.

II. PURPOSE AND RECOMMENDATIONS

Q. What is the purpose of your testimony in this proceeding?

A. I respond to Until Energy Systems, Inc.'s ("UES" or "Company") request for change in rates pending before the New Hampshire Public Utilities Commission ("the Commission"). Specifically, I respond to the Cost of Service studies and revenue apportionment recommendations sponsored by UES witness Ron Amen.

Q. Please summarize your recommendations.

A. I recommend the Commission reject the Company's proposed cost of service studies and that the Commission instead rely on the Allocated Cost of Service study I present here to apportion revenue requirement between the classes. Based on this study, I recommend the

Commission allocate no rate increase to any customer class already paying more than its relative cost to serve (also referred to as parity).[1]

DOE Proposed Revenue Apportionment

Customer Class	*Relative Increase (%)*	*DOE Proposed Revenue Apportionment*	*Difference from UES Proposal*
D - Domestic Delivery Service	2.87%	$906,426	$(8,539,779)
G2 - Regular General Service	0%	$0	$(1,747,155)
G1 - Large General Service	2.87%	$225,053	$(576,979)
Outdoor Lighting	0%	$0	$0
Total	1.95%	$1,128,479	$(10,863,913)

I recommend the commission reduce the fixed monthly charges for all of the current customer classes except outdoor lighting to bring them closer to their actual cost of service.[2] I also recommend the commission adopt a gradual approach to begin reducing the fixed monthly charges rather than doing it all at once.

DOE Proposed Changes to Fixed Monthly Charges

Customer Class	**Customer Unit Cost *per DOE ACOSS***	**Current Fixed Monthly Rate**	**DOE Proposed Fixed Monthly Rate**	**DOE Proposed Reduction (%)**
D - Domestic Delivery Service	$15.25	$16.22	$15.74	-3%
G2 - Regular General Service	$21.83			
Standard		$29.19	$25.51	-12.6%
kWh Meter		$18.38	$16.06	-12.6%
Water/Space Heating		$9.73	$8.50	-12.6%
G1 - Large General Service	$114.99			
Secondary		$162.18	$138.59	-14.5%
Primary		$86.49	$73.91	-14.5%

[1] For the purposes of revenue apportionment, the "relative increase" applies to all customer groups within each rate class. For the G2 class this includes the kWh and Water/Space heating groups and for G1 this includes the Primary and Secondary customers.

[2] The ACOSS provided in this cases does not differentiate between the different levels of services inside of the G2 and G1 classes. The proposal here assigns the same relative percentage decrease to each of the service levels in each of the classes to maintain the current differences between each of the basic charges.

Lastly, I recommend the Commission order the Company to begin a collaborative process with all stakeholders regarding the collection and analysis of data for the purposes of conducting a marginal cost study. I recommend this process be completed prior to UES's next general rate case filing.

III. BACKGROUND FOR COST OF SERVICE

Q. What is a cost of service study, and how is it used?

A. A cost of service study (COSS) identifies the costs necessary to provide service to each group of customers, referred to as customer classes. These classes are often grouped by individual tariff schedules but not always. Each customer class is assigned a share of the utility's revenue, expenses, and capital investments (referred to as rate base). Many methodologies exist to "properly" assign costs amongst the classes, with a variety of strengths and weaknesses.

Q. What principles are important to building a cost of service study?

A. There have been many over time. James Bonbright is cited frequently and indeed another UES witness, John D. Taylor, specifically references Bonbright's principles.[3] Overall, it is important for any cost study to use a consistent set of principles. However, it is also important that these principles are updated as the energy industry changes. Broader data collecting, more granular analysis, changing customer expectations, and advanced technologies are all very different from the world James Bonbright inhabited. RMI

[3] John D. Taylor Direct Testimony at Bates 1385-1386.

provides an excellent modern interpretation of Bonbright's principles.[4] I rely on these updated principles as I respond to UES's cost studies.

Q. How does a cost of service study affect the rates customers pay?

A cost of service study informs the Commission's decision to set a proposed rate increase or decrease (called revenue apportionment) for each rate class. There are two key outputs from a COSS study.

1) The Parity Ratio is the relative difference between the costs a class is assigned (i.e. the revenue requirement) and the revenue the current rates produce if the company was earning its authorized rate of return. The parity ratio describes the relationship between costs and revenue *as it may exist in the upcoming rate year.*

2) Unit Costs are the costs assigned to each class per unit of usage or other relevant descriptor of the class. These generally include demand (cost per kW), energy (cost per kWh), and customer (costs per customer month). Unit costs are very useful in setting or changing individual rate components of a customer schedule and bill, such as the fixed monthly customer charge or the demand charge.

Q. What principles are important to how revenue is apportioned to customer classes?

A. Revenue apportionment can be driven by many considerations including the current economic conditions of the utility's service territory, the competitiveness of the rates themselves, the relative revenue each class produces (as described by the parity ratio), and the overall public interest. In general, I recommend a gradual, yet sustained

[4] Glick, D (et al.) RMI. *Rate Design for the Distribution Edge*. August 2014. Available at https://rmi.org/wp-content/uploads/2017/04/2014-25_eLab-RateDesignfortheDistributionEdge-Full-highres-1.pdf. Included as Attachment JLB-02 at 38.

movement closer to parity for every class while taking into account the fairness of any overall rate increase. I find that parity ratios within 10 percent (positive or negative) of a class's revenue target produces the most reasonable rates.

A. Allocated vs Marginal Cost of Service Studies

Q. Please describe the COSS's the Company provided.

A. The Company presented two COSS's in this case.

1) An Allocated Cost of Service Study (ACOSS) relies on the company's historical assets and expenses, or "embedded" costs, to allocate revenue requirement to each customer class. An ACOSS uses recent customer information from the test year (such as the number of meters, usage during specific times or at different locations, and the voltage level of the service provided) to assign revenue requirement.[5] The specific ratios and information that is used to assign costs to each class are referred to as "allocators."

2) A Marginal Cost of Service Study (MCOSS) creates a forward looking projection of the cost to serve the next kW, kWh, or individual customer in each customer class. A MCOSS relies on both historical and forward looking information to make assumptions about the relationship between costs and customers in the upcoming rate year.

[5] Lazar, J. (et al.). Regulatory Assistance Project. *Electric Cost Allocation for a New Era: A Manual*. January 2020. Available at https://www.raponline.org/wp-content/uploads/2020/01/rap-lazar-chernick-marcus-lebel-electric-cost-allocation-new-era-2020-january.pdf. Included as Attachment JLB-03 at 71.

Q. Is an ACOSS better than a MCOSS?

A. Not necessarily. Each type of cost study has its own strengths and weaknesses.

Allocated Cost of Service Studies (ACOSS)	Marginal Cost of Service Studies (MCOSS)
Strengths	
• Closely related to the revenue requirement as approved in a rate case • Easily comparable between cases • Widely used and accepted by Commissions	• Related most closely to fundamental tenants of economics and pricing • Reflects value of the system as it is used today • Long history of consideration across the United States
Weaknesses	
• Different methods can create large swings in costs • Allocators can vary significantly over different time periods	• Relies heavily on forecasts that may not materialize • Is long-run focused

A key consideration in balancing these strengths and weaknesses is the policy goals in place when setting the rates themselves. For example, the impacts from new, innovative rate designs and service offerings can be incorporated into any cost of service study. However, cost of service studies are only one tool to guide the judgment of decision makers when implementing these services and ultimately changing the rates. Cost of service studies should not be used as the sole basis to increase or decrease rates for a class or to make innovative rate offerings.

Q. How do you recommend the Commission evaluate the cost of service studies in this case?

A. I recommend the Commission remain flexible when determining how and to what extent it relies on the cost of service studies in setting rates. As discussed above, a key principle

for public utility ratemaking is ensuring the customer experience is "practical, simple, and understandable."[6] This flexibility is doubly important in the current environment, where new technologies are changing the type and scope of interactions between customers and their energy service providers. I also recommend the Commission look to the cost of service studies in this case as a guideline for understanding the historical assignment of costs. However, I caution the Commission that there is the potential for moderate or severe inequities and subsidies that have been "baked in" over many years in these types of studies.

IV. OVERVIEW OF COMPANY COST OF SERVICE STUDIES

Q. Please provide an overview of the Company's COSSs.

As noted above, the Company provided an ACOSS and a MCOSS. Both studies rely on standard ratemaking processes as outlined in the National Association of Regulated Utilities Commission (NARUC) cost allocation manual to assign or determine the necessary revenue requirement for each customer class.[7] Both studies share a key methodology, called the minimum system method.

Q. How does the Company propose the Commission use these COSSs?

A. The Company recommends the Commission rely only on the ACOSS for apportioning revenue to the various customer classes. The table below summarizes the proposed

[6] *Supra* 5
[7] National Association of Regulatory Utility Commissioners (NARUC). *Electric Utility Cost Allocation Manual*. January 1992. Available at https://pubs.naruc.org/pub/53A3986F-2354-D714-51BD-23412BCFEDFD. Included as Attachment JLB-04.

revenue allocation to each of the customer classes as determined by the Company's ACOSS.[8]

Customer Class	*Relative Increase (%)*	*Company Proposed Revenue Apportionment*
D – Domestic Delivery Service	145%	$9,446,205
G2 – Regular General Service	50%	$1,747,155
G1 – Large General Service	50%	$799,032
Outdoor Lighting	0%	$0
Total	100%	$11,992,393

Q. Do you agree with the Company's proposal to apportion revenue based on their ACOSS?

A. No. The company proposed this revenue apportionment based on the parity ratios from its ACOSS. However, I disagree with these parity ratios and the method the Company used to classify customer costs in their ACOSS. I discuss this issue in more detail below. I also present an alternative cost of service study, with updated parity ratios and unit costs, in section V. I do agree with the Company that the Commission should not rely on the marginal cost study to apportion the revenue requirement between customer classes.

A. Company Allocated Cost of Service Study (ACOSS)

Q. Is the Company's ACOSS in this case consistent with its 2016 ACOSS?

A. Yes. The Company's ACOSS is substantially similar to the study UES presented in their 2016 general rate case, including the use of the minimum system method.[9] The table below summarizes the differences in each allocator. All of these differences are caused by using 2020 and 2021 data in the ACOSS versus the 2016 case.

[8] Schedule RJA-2.
[9] DOE 3-42 (Attachment JLB-05 at 4 - 7).

Allocator	D - Domestic Delivery Service	G2 - Regular General Service	G1 - Large General Service	Outdoor Lighting
Coincident Peak (CP) @ Supply	-10%	5%	5%	0%
Non-Coincident Peaks (NCPs) @ Supply	-9%	4%	4%	0%
NCPs @ Sub-Transmission	-9%	4%	4%	0%
NCPs @ Primary	-7%	5%	2%	0%
NCPs @ Secondary	-20%	11%	8%	0%
NCPs @ Meter	-9%	4%	4%	0%
Customer Count - billing	0%	0%	0%	0%
Number of Customers Using Primary System	-1%	0%	0%	1%
Number of Customers Using Secondary System	-1%	0%	0%	1%
Number of Customers Billed at Primary Voltage	0%	11%	-11%	0%
Number of Customers and Light Fixtures	-1%	0%	0%	1%
Allocation of Meter Investments	10%	-11%	1%	0%
Allocation of Services	-1%	1%	0%	0%
Uncollectible	5%	-4%	-1%	0%
Customer Deposits	24%	-23%	-1%	0%
Meter Reading	10%	-11%	1%	0%
Customer Records and Collections	0%	0%	0%	0%
Customer Assistance	-10%	1%	0%	9%
Direct Assignment of Lighting	0%	0%	0%	0%
MWh Sales	2%	6%	-8%	0%
Distribution Revenue	-3%	3%	0%	0%

Q. What is the Minimum System Method?

A. The minimum system method calculates costs to serve the minimum load of a utility's distribution system with the least amount of equipment and up-sizing as possible. In essence, the minimum system method isolates the portion of the distribution system that is related only to accessing the electrical distribution grid but not necessarily related to actually using it. For the purposes of the ACOSS, the minimum system method provides a ratio that classifies virtually all of UES's distribution plant as "customer related." This means that, under the minimum system method, the majority of distribution plant is assigned to each class's monthly fixed customer charge.

Q. Can you provide an example of how the minimum system method results in higher fixed customer charges?

A. Yes. In discovery, the Company provided a history of its proposed residential customer charges dating back to its 2005 rate case filing.[10] Below is a table summarizing the Company's response:

	Basic Customer Approach		Minimum System Approach	
Unitil Residential Customer	DE 05-178	DE 10-055	DE 16-384	DE 21-030
Marginal Monthly Cost per Customer	$11.94	$15.63	$40.99	$46.24
Company Requested Monthly Charge	$8.50	$12.50	$15.00	$21.07
Commission Approved Monthly Charge	$8.40	$10.27	$15.00	TBD

As indicated by the Company's previous cost studies, the drastic jump in its calculated monthly marginal cost per customer, and associated gradual increase in the fixed monthly charge, is not the result of *actual* higher fixed costs per customer. Instead this jump is associated primarily with what the Company *chooses to characterize* as the fixed cost per customer via the minimum system method. In 2010, the Company classified almost all of the distribution system assets as demand related, but in 2016 the Company classified almost all of the same assets as fixed customer costs.[11]

Q. Do you agree with the Company's rationale for using the minimum system method?

[10] OCA 3-26 (Attachment JLB-05 at 11-12)
[11] Primarily these costs are related to FERC Account Nos. 364-368.

A. No. Ron Amen presents the essence of the Company's rationale in his direct testimony:

> The inclusion of fixed costs in the variable charge sends an inaccurate price signal to customers. This price signal overstates the value of energy consumption and understates the costs necessary to be able to provide service regardless of how much energy the customer uses. This inaccuracy essentially overcompensates the customer for energy conservation/efficiency and under compensates the utility for the assets and facilities that are needed to provide customers with any amount of electric service. Conversely, this inaccuracy also overcompensates the utility for its fixed costs when customers use large amounts of energy. The result of this inaccuracy is essentially an intra-class mismatch of costs and revenue.[12]

The premise of this argument is that price signals for fixed costs can only be accurate if they are included in a fixed charge, i.e. a variable cost must be reflected in a variable charge. This argument is erroneous. Price signals, especially those in a regulated industry, must take into account far more than just the types of costs the rates are seeking to recover. For example, inclining block rates are not solely based on cost causation. These rates, where higher kWh usage corresponds to higher per-unit prices, counter the Company's logic since higher usage would, via economies of scale, result in lower average costs. Such rate structures, popular across the country, are an example of policies that encourage conservation at the expense of pure cost causation.[13] In practice, UES's argument erects economic barriers (*i.e.*, an access charge for the privilege of service) to participating in the markets that rely on electricity, an essential aspect of modern life.

Q. Does the minimum system method have any other flaws?

A. Yes. As described by the Regulatory Assistance Project, the minimum system method uses incorrect assumptions for at least eight other reasons:[14]

[12] Amen Direct Testimony at 16:3-11.
[13] Attachment JLB-03 at 82.
[14] Attachment JLB-03 at 148-149.

1) Distribution systems are built geographically in addition to where customers and load exist.

2) The theoretical minimum system and the actual physical electrical system do not necessarily consist of the same number of assets.

3) Load can determine the types of equipment, a situation not accounted for in the minimum system method.[15]

4) There is no discount given for the load that could be met with the minimum system.

5) The minimum system design changes through time.

6) The minimum system method assumes that new customers always require new transformers or poles and wires which is not necessarily true.

7) Overall investment is a function of expected sales from the customer(s) which is assumed to be zero in the minimum system method.

8) Offsets to distribution costs are not accounted for in the minimum system method, such as contributions from new line extensions.

Q. What benefit can the use of the minimum system method provide for Company shareholders?

A. Company shareholders may value increased fixed charges resulting from the minimum system method in between rate cases because it leads to more consistent revenues. In –

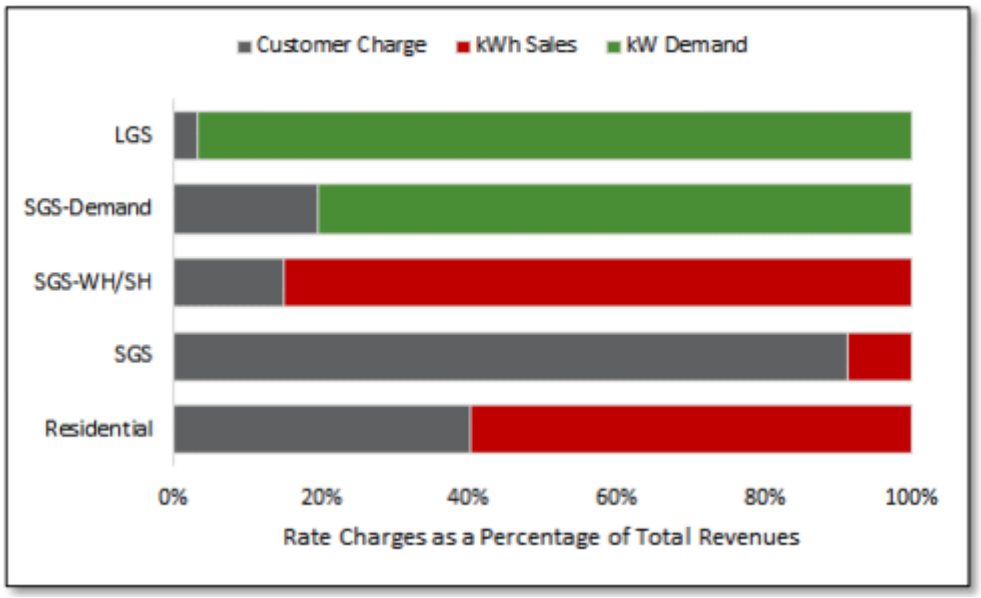
[15] This exact situation was confirmed to exist for UES through discovery. See DOE 3-38, part c (Attachment JLB-05 at 1).

turn, revenue consistency makes it easier for the Company to maintain or increase the return on equity. For example, events outside of a utilities control, such as a cooler than normal summer or an economic downturn, can shrink revenues and make it more difficult to achieve a specific return on equity, all else equal. If the Commission accepts the Company's proposal to use the minimum system method, and it is followed to its logical conclusion in the future, the company's rates would eventually consist of significantly higher monthly fixed customer charges. The fixed customer charge would then represent a significant percentage of an individual customers overall bill, leading to less revenue that is subject to external events like weather.

Q. How big of an impact on a customers' utility bill can the minimum system method have?

A. Based on the Company's current fixed monthly charges, the impact from the minimum system method could be severe. As the table below shows, the Company already collects more than 40 percent of its residential class revenues and more than 90 percent of its small general service revenues through the fixed monthly customer charge.

Customer Charge as a Percentage of Total Revenues by Class[16]



While higher fixed customer charges may benefit the Company through greater revenue stability, it can also be a detriment to customers. Inflating the fixed customer charges in the manner prescribed by the Company would affect low-income households the most, since a fixed monthly charge represents a higher percentage of their monthly income and cannot be offset by reduced consumption. This is especially problematic since, according to Oak Ridge National Laboratory, low income customers already have an average energy burden three-times higher than other households.[17]

Q. Do you have any other concerns with the treatment of costs in the ACOSS?

Yes. As a result of relying on the minimum system method, the Company allocates transformers primarily on the number of customers and partially on the amount of

[16] Lyons Testimony, Exhibit TSL-1, Page 9 of 12, Bates 001462.
[17] Brown, M (et al). Oak Ridge National Laboratory. *Low-Income Energy Affordability: Conclusions from a Literature Review*. March 2020. Available at https://info.ornl.gov/sites/publications/Files/Pub124723.pdf at 9.

demand that exists. Under this theory, the mere existence of a customer necessitates a basic transformer, and the majority of costs should therefore be recovered through the fixed monthly charge. However, this theory ignores operational reality. If transformers existed on the basis of a customer's continued existence, then the logical reverse would occur when a customer leaves the system. However, the company does not operate this way in practice.[18] Further, allocating transformers in this way undermines conservation and energy efficiency programs, as well as time-of-use rates, by reducing the savings generated from lower levels of consumption.

Q. Do similar problems exist for any other type of assets included in the company's cost study?

A. Yes. Substations are allocated using the same fatal flaw as transformers. Again, the company has ignored key operational realities in making this cost assignment.[19] The combination of both transformers and substations makes up a significant component of UES's distribution assets. The overall effect of the Company's theory has been to shift large amounts of costs into the fixed monthly charges.

Q. Are there any widely accepted alternatives to the minimum system method?

A. Yes. The basic customer method is a broadly accepted alternative to the minimum system method, and has been adopted to varying degrees in Arkansas, California, Colorado, Illinois, Iowa, Massachusetts, Texas, and Washington.[20] Instead of allocating costs based on a hypothetical minimum system designed by the Company, the basic customer method

[18] DOE 3-39 (Attachment JLB-05 at 2)
[19] DOE 3-41 (Attachment JLB-05 at 4)
[20] Attachment JLB-03 at 145.

classifies only customer-specific plant as fixed charge related — this includes customer meters, service drops, billings, and collections. The remaining shared distribution network is classified as demand or energy related.

Q. Is the use of the minimum system method consistent with other proposals made by the company in this case?

A. No. The company is also proposing a new decoupling mechanism as well as some innovative rate designs that include time-of-use and electric-vehicle focused options. The Company explicitly did not account for the impact these new rate offerings could have on the allocation factors necessary to create its ACOSS or MCOSS.[21] At a minimum, the Company should have considered alternative methods for allocating costs in the ACOSS, like the basic customer method, given the Company's recommended decoupling mechanism.[22] As my Colleague Dr. Larry Blank discusses, UES's proposed decoupling mechanism has failed to address the issue of recovering fixed charges through energy usage.

Q. Can large fixed monthly charges be used as a method to recover fixed costs?

A. While they can certainly be designed that way, doing so runs counter to the principles of cost of service that I outlined previously. Modern technology enables customers to receive precise price signals instead of relying on large, indirect access charges. As seen with the results of the minimum system method, high fixed monthly charges yield a poor customer experience with few options to customers. Moreover, these high access charges

[21] DOE 4-83 (Attachment JLB-05 at 8)
[22] Decoupling, at its most basic, ensures that the Company will receive the revenue requirement associated with its fixed system, regardless of whether sales fluctuate between rate cases, thereby obviating the benefits of revenue/payment certainty associated with high fixed charges that might accrue to shareholders, or ratepayers.

fundamentally mute the direct incentives to customers to invest in technologies that yield economic efficiency, such as energy saving appliances.

Q. Would your recommendation change if the Commission does not authorize a decoupling mechanism for UES?

A. No. Higher fixed monthly charges is not the appropriate response to revenue sufficiency or stability concerns. While economic viability is a serious issue that I do not dismiss, I believe there are far better options available to UES if it needs additional ways to recover demand related costs. The most direct path forward is to increase customer flexibility by offering a suite of rate designs such as TOU rates, peak time rebates or even real time pricing. Further pathways to more stable fixed cost recovery could also exist by enabling two-way communication between customers and the utility, investing in demand response technologies, and providing customers with information about their available options. All of these possibilities could yield higher certainty of cost recovery to the utility without sacrificing the customer experience and without erecting barriers to ratepayer's participation in the electricity market.

B. Company Marginal Cost of Service Study (MCOSS)

Q. Please describe the Company's MCOSS.

A. The MCOSS determines class revenue responsibility using estimated engineering costs from account level data, interviews with UES staff, design standards, cost manuals, and utility system data similar to the ACOSS.[23] The MCOSS, unlike the ACOSS, casts a

[23] Amen Direct Testimony at 37:1-4.

forward looking projection for the incremental cost of serving the next customer or unit of load.

Q. Does the Company's MCOSS also use the minimum system method?

A. Yes. The information that created the minimum system method was critical to the Company's MCOSS.[24]

Q. Does the minimum system create the same flaws in the MCOSS as it did in the ACOSS?

A. Yes. By relying on the minimum system method, the Company's MCOSS contains the same assumptions as the Company's ACOSS. However, in the case of the MCOSS, the lack of load diversity analysis is particularly troubling.[25] Newer rate designs, such as time-of-use rates, as well as modern technologies, such as customer roof-top solar, will impact the hour-by-hour and day-by-day characteristics of UES's electrical distribution system. The company's MCOSS relies heavily on historic, long-term trends in costs (as well as today's engineering standards). This means the MCOSS UES prepared will ultimately have little relationship to tomorrow's electrical grid or the way it is used.

Q. Did the Company consider using other information or analysis to conduct the marginal cost study?

A. Yes. The company evaluated the use of mathematical extrapolations known as regression analysis but did not use them "because of poor statistical results."[26] This answer is

[24] *Id.* at 37:6-8.
[25] DOE 4-87 (Attachment JLB-05 at 9)
[26] DOE 4-89 (Attachment JLB-05 at 10)

wholly unsatisfactory especially given that at least one other utility in New Hampshire uses statistical evidence in the creation of their studies.[27]

Q. Do you have other concerns with the MCOSS?

A. Yes. The MCOSS that the company provides is essentially just a long term embedded cost study of UES's distribution system masquerading as a forward looking marginal cost study. UES witness Ron Amen describes the process as follows:

> As stated earlier, marginal costs are generally forward-looking and require making estimates of future costs with an understanding of the elements that drive those future costs. As a practical matter, marginal costs bear no relationship to the mix of actual historical costs that constitute the utility revenue requirement.[28]

Unfortunately, the MCOSS the company provided is chiefly based on the historical costs for the utility. Transformers are, again, a clear example. The MCOSS takes an average cost of the transformers across the entire embedded system, converts them to 2020 dollars, and calculates a per customer average transformer charge. This calculation is just an embedded system cost averaged through time, not a forward looking estimate of future costs. These historical trends and their assumptions are no longer reliable. For instance, if near-future electrical load growth is driven by the demand for electric vehicle (EV) charging equipment, then the related investments would most likely have little resemblance to the investments made throughout the 20th century. Transformers designed to serve residential and industrial load growth will not necessarily be the best fit for densely concentrated, frequently accessed, EV super chargers. Disruptive technologies,

[27] Liberty Utilities, DE 19-064.
[28] Amen Direct Testimony at 35:5-9.

such as distributed generation and storage will only further divorce historical cost trends from their forward-looking counterparts.

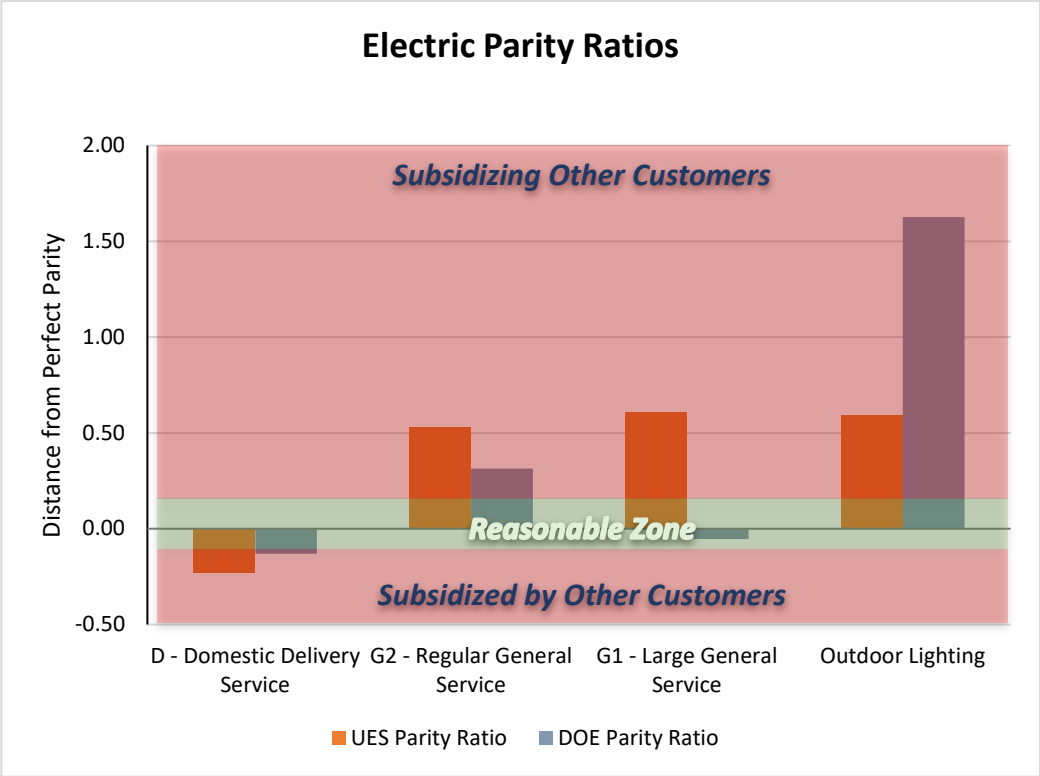
Q. What is your overall recommendation regarding the use of a MCOSS for this case?

A. I recommend the Commission disregard the MCOSS for the purposes of revenue apportionment. To the extent the MCOSS is necessary for creating new rate designs, I recommend the Commission rely on the MCOSS, as I discuss below, since there isn't an alternative readily available.

V. DOE ALLOCATED COST OF SERVICE STUDY

Q. Have you prepared an alternative cost of service study for the Commission to consider?

Yes. Attachment JLB-06 provides the results of an ACOSS that uses the "basic customer method" instead of the minimum system method. The differences in the parity ratios between this study compared and the Company's ACOSS is summarized below.



Q. Please summarize the unit costs from your proposed ACOSS.

A. The unit costs are summarized in the table below.

Summary of Unit Costs from DOE ACOSS

Customer Class	Energy (kWh)	Demand (kW)	Customer (Fixed Monthly)
D - Domestic Delivery Service	$160.16	$0.52	$15.25
G2 - Regular General Service	$144.32	$0.52	$21.83
G1 - Large General Service	$129.62	$0.52	$114.99
Outdoor Lighting	$136.48	$0.52	$4.09

Q. How do the customer costs compare to the fixed monthly charges that customers currently pay?

A. In general, the customer costs produced from the ACOSS are significantly lower than the current fixed monthly customer charges, as described in the table below. I recommend the commission adopt a gradual approach to begin reducing the fixed monthly charges to reflect more cost based rates.

DOE Proposed Changes to Fixed Monthly Charges

Customer Class	Customer Unit Cost *per DOE ACOSS*	Current Fixed Monthly Rate	DOE Proposed Fixed Monthly Rate	DOE Proposed Reduction (%)
D - Domestic Delivery Service	$15.25	$16.22	$15.74	-3%
G2 - Regular General Service	$21.83			
Standard		$29.19	$25.51	-12.6%
kWh Meter		$18.38	$16.06	-12.6%
Water/Space Heating		$9.73	$8.50	-12.6%
G1 - Large General Service	$114.99			
Secondary		$162.18	$138.59	-14.5%
Primary		$86.49	$73.91	-14.5%

Q. How do you recommend the Commission apply the results of DOE's proposed ACOSS?

A. I recommend the Commission begin reducing the fixed monthly charges to reflect the unit costs in the DOE ACOSS. Aligning these rates with their actual cost encourages equitable access to the electrical system without creating inappropriate price signals. This is tempered however by the need for gradualism and to reduce the instability of customers overall bills. As discussed in the next section, I also recommend the Commission adopt a revenue apportionment based on the parity ratios from the DOE ACOSS.

Q. Is your proposed ACOSS and proposed fixed monthly charges consistent with the principles you outlined in section III?

A. Yes. The fixed monthly customer method provides a flexible customer experience where innovative rate designs can send appropriate price signals to customers. The minimum system method the Company uses places significant amounts of costs in the fixed customer charge, limiting the potential for more expansive and broader rate offerings, and reducing customer options. Reducing the fixed monthly charges to reflect cost causation is also an important component of accurate price signaling

Q. Did you prepare a marginal cost of service study?

A. No. A proper MCOSS would require detailed information about customer usage including hourly data for each customer class, metrics on system reliability, investment analysis, and statistical relationships between expenses and key cost drivers.[29] Collecting this information and conducting the relevant analysis is outside the scope of my testimony here. However, the Commission should consider directing the Company, in its next rate case, to develop a marginal cost of service study that uses class specific customer usage profiles (derived either from default service load research meters, or the Company's continued deployment of interval data collectors) and relies on the Company's actual five-year investment plan to determine key cost drivers. I recommend the Commission order UES to conduct a collaborative process with all stakeholders so that everyone has a chance to weigh-in on the appropriate methods of collection and analysis.

[29] Attachment JLB-03 at 189.

VI. REVENUE APPORTIONMENT

Q. Based on your proposed ACOSS, how do you recommend apportioning the revenue increase amongst the customer classes?

A. I recommend the Commission limit the rate increase to just the Domestic Delivery Service (Residential) and Large General Service customer classes.[30] These two classes are the only ones currently below parity (i.e. not generating enough revenue to cover their allocated cost to serve). The other two classes are so far above parity (i.e. generating revenues in excess of their costs to serve) that apportioning any revenue increase to them in this case *increases* their parity and makes the over collection worse. The table below summarizes my recommendation using the DOE revenue requirement proposal.

DOE Proposed Revenue Apportionment

Customer Class	*Relative Increase (%)*	*DOE Proposed Revenue Apportionment*	*Difference from UES Proposal*
D - Domestic Delivery Service	2.87%	$906,426	$(8,539,779)
G2 - Regular General Service	0%	$0	$(1,747,155)
G1 - Large General Service	2.87%	$225,053	$(576,979)
Outdoor Lighting	0%	$0	$0
Total	1.95%	$1,128,479	$(10,863,913)

Q. Is your proposed revenue apportionment consistent with the principles you outlined above?

Yes. This revenue apportionment balances the need to move classes towards parity without causing significant cost burden to any one customer group. Further, all customer

[30] This is equivalent to "Scenario B" as presented by the Company in Schedule RJA-3.

classes that are close to parity and would not be harmed through an allocation (i.e. move further from parity) are sharing in the overall rate increase, contributing to the principle of fairness.

Q. Would you change your recommendation if the Commission approves a different revenue requirement increase?

A. Possibly. The revenue requirement increase that the DOE proposes is the main driver of my recommendation, as are the principles I outlined previously. If the Commission authorizes a different revenue requirement, my revenue apportionment recommendation could potentially be affected. In general, I recommend the Commission rely on the ACOSS I have presented as well as the principles I have cited above to determine the appropriate spread.

Q. Do you agree with the Company's rationale for not allocating any revenue increase to the lighting schedules?

A. Yes. The lighting schedules are undergoing a significant revision from the proposed move towards LED lighting. Allocating a revenue increase during this time would only complicate the rate change further. In addition, the stark difference in the technologies, as discussed by my colleague Dr. Larry Blank, could have profound implications on the classes load profiles. However, the ACOSS I have provided indicates that the lighting schedules are significantly overpaying their costs. I recommend the Commission examine this issue closely in the next rate case that UES files.

Q. Does this conclude your testimony?

A. Yes.