BEFORE THE
STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET **DE 23-039**

IN THE MATTER OF: Liberty Utilities (Granite State Electric) Corp.
d/b/a Liberty
Request for Change in Distribution Rates

DIRECT TESTIMONY

OF

Michael Ty Clark

December 13, 2023

TABLE OF CONTENTS

I. Introduction

Q. Please state your full name.

A. My name is Michael Ty Clark.

Q. By whom are you employed and what is your business address?

A. I am a Vice President at Christensen Associates Energy Consulting LLC ("CA Energy Consulting"). My business address is 800 University Bay Drive, Suite 400, Madison, Wisconsin, 53705.

Q. Please summarize your education and professional work experience.

A. I received a Bachelor of Arts degree in Economics from Utah State University in 2011, a Master of Science degree in Economics from Florida State University in 2013, and a Doctor of Philosophy degree in Economics from Florida State University in 2015. I have been employed by CA Energy Consulting since 2015 in positions of increasing responsibility. A copy of my curriculum vitae is attached as Attachment MTC-1.

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

A. The purpose of my testimony is to comment on the Marginal Cost of Service ("MCOS") study and rate design items – including Time-of-Use ("TOU"), electric vehicle ("EV") rates, and revenue decoupling – that Liberty Utilities (Granite State Electric) Corp. d/b/a/ Liberty ("Liberty" or "Company") has submitted in this proceeding. I am testifying on behalf of the New Hampshire Department of Energy.

Q. How is your testimony organized?

A. Section II provides an overview and evaluation of Liberty's use of the MCOS study. Section III evaluates Liberty's proposal for new and existing TOU rates. Section IV evaluates Liberty's proposal for new commercial EV charging TOU rates. Section V assesses

Liberty's revenue decoupling mechanism. Finally, Section VI provides a summary of recommendations and conclusion.

II. Marginal Cost of Service Study

Q. Please describe marginal costs.

A. Marginal costs reflect the change in the cost of electricity services with a change in the level of service provided. Amont electric utilites, this is typically measured in terms of $/unit or $/kWh. Pricing goods at their marginal costs is a well-known principle in the economic literature that has the desirable effect of maximizing the amount of consumer and producer welfare, thus creating economic efficiency.[1] Marginal costs are used in the energy industry for a variety of purposes, including rate design, revenue requirement allocation, resource planning, and the evaluation of load response. There are a few main categories of marginal costs fundamental to electric utilities: generation capacity, generation energy, transmission capacity, distribution capacity, and customer costs. The focus of Liberty's MCOS study is on the distribution- and customer-related marginal costs since Liberty is a distribution utility.

Q. Please provide an overview of Liberty's MCOS study.

A. Witness Bartos provided calculations and analyses for Liberty's MCOS study.[2] The process included estimating Liberty's demand- and customer-related marginal costs of different expenses for providing distribution services. Specifically, the Liberty MCOS study provides marginal cost estimates for distribution plant, outdoor lighting, Operation and Maintenance

[1] W. Kip Viscusi, Joseph E. Harrington, Jr., and John M. Vernon. *Economics of Regulation and Antitrust*, Fourth Edition (MIT Press Books, 2005), Chapter 4.
[2] Direct testimony of Melissa F. Bartos.

("O&M"), Administrative and General ("A&G"), Materials and Supplies ("M&S"), general plant, and customer accounting. Adjustments to the marginal cost estimates are applied as necessary to account for items such as loss factors, levelizing annual costs, and load factors. Each of the calculated marginal costs are combined with class-level billing determinants to compute the total marginal cost revenue requirement. The proportion of each customer class's total marginal costs serves as the primary allocation factor for Liberty's proposed revenue requirement. As well, the results from Liberty's MCOS study are used to inform rate design.

Q. Please describe how the marginal costs are estimated in Liberty's MCOS study.

A. Most of Liberty's marginal costs are estimated using regression analysis, which is a commonly used statistical tool that models the relevant cost as a function of a cost driver and other explanatory variables. Liberty's MCOS study incorporates fourteen regression models to estimate the marginal costs for different elements of providing distribution services. The primary cost driver differs depending on the type of cost being modeled. Distribution plant costs relating to growth is modeled as a function of some notion of peak demand and is estimated separately for the primary, secondary, and transformer plant additions. The O&M regressions relating to peak demand are bifurcated between Operations and Maintenance; each is modeled as a function of peak demand and is estimated separately by primary, secondary, and transformer expenses. O&M customer-related expenses are modeled as a function of the number of customers served. The A&G, M&S, and general plant costs are each loading factors; therefore, the regressions model ties these costs to other expenses instead of a cost driver. Specifically, A&G is a function of O&M and total plant in service, M&S is a function of total plant in service, and general plant costs are a function of

total plant in service after removing general plant. Lastly, customer accounting expenses are modeled as a function of the number of annual customers. Regressions are not used to calculate the marginal costs for customer-related plant additions and outdoor lighting. Instead, this cost information was provided by the Company.[3] Total outdoor lighting costs were developed and levelized to annual costs by using Company data and applying a fixed carrying charge rate to marginal costs of each type of luminaire, pole, and accessory.[4]

Q. Is regression analysis an appropriate method for calculating marginal costs?

A. Yes. Regression analysis is a proper statistical tool for evaluating the relationship between two variables. The estimated coefficients of cost drivers represent the marginal cost in a linear regression specification that models cost as a function of a cost driver. For example, Liberty's MCOS study models growth-related distribution plant costs as a function of demand. Therefore, the estimated coefficient on the explanatory variable of demand represents the marginal cost – i.e., the additional amount of distribution plant costs from a one unit increase in demand. Regression analyses, however, are subject to many decisions made by the researcher, such as what variables are included in the model and the functional form (e.g., linear, log-linear). It is important to develop a model based on theory (e.g., including appropriate explanatory variables) and evaluate whether results are robust to the chosen model specification and functional form. Note that Liberty also used regressions to estimate marginal costs in their previous rate case filing.[5]

[3] Direct Testimony of Melissa F. Bartos, p. 10.
[4] Direct Testimony of Melissa F. Bartos, p. 11.
[5] Docket No. DE 19-064; Direct Testimony of Melissa F. Bartos.

Q. How did you evaluate the regression analyses that are part of Liberty's MCOS study?

A. I first made sure that I was able to replicate the regression results from Liberty's MCOS study. Then I evaluated the regression specifications of the models to determine whether they were appropriate. I then modified the regressions by including different control variables to evaluate how the marginal costs differed with respect to changes in the model. Finally, I reviewed how potential changes affected the final proportion of total marginal cost revenue requirements by class.

Q. What is your assessment of the regressions used to estimate marginal costs in Liberty's MCOS study?

A. Witness Bartos includes a variety of year indicator and time trend variables in the marginal cost regressions. Year indicators and time trends can be an effective method for reflecting structural shifts that occur in the relationship between the cost variable and cost driver.[6] In many instances, indicator variables are used to control for outliers or unusual occurrences (e.g., Covid-19) in the data. Year indicator and time trend variables that represent structural shifts should be founded on theoretical reasoning where possible. For example, Witness Bartos "specifically looked for structural shifts that might have been related to the 2012 acquisition of Liberty" when determining the regression equations for marginal costs.[7] Witness Bartos tested additional structural shifts and included them in the regression specification if it increased the R-squared statistics and the coefficient was statistically significant while being the correct sign.[8] Table 1 shows the time indicator and trend

[6] Direct Testimony of Melissa F. Bartos, p. 6.
[7] Direct Testimony of Melissa F. Bartos, p. 6.
[8] Direct Testimony of Melissa F. Bartos, pp. 6-7.

variables Witness Bartos uses in each of the fourteen regression specifications. The year when Liberty was acquired, 2012, was only used in six of the specifications. Witness Bartos does not provide additional explanation or theoretical reasoning for choosing the time-related variables in the regression specifications chosen. This process therefore appears to represent "data mining" where the researcher is pursuing a specific result without a theoretical foundation.

Table 1: Time-Related Variables in Liberty's MCOS Study Regressions

Time Variable	Distribution Plant			Operation Expense (non-customer)			Maintenance Expense (non-customer)			O&M (Customer)	Cust Accounting	A&G Load Factor	M&S Load Factor	General Plant Load Factor
	Primary	Secondary	Line Transforme	Primary	Secondary	Line Transforme	Primary	Secondary	Line Transforme					
2002 Indicator												X		
2004 Indicator	X													
2005 Indicator		X		X			X							
2007 Indicator			X											
2009 Indicator												X	X	
2010 Indicator								X						
2011 Indicator													X	
2012 Indicator			X			X			X	X	X	X		
2013 Indicator		X			X	X				X		X		
2014 Indicator			X	X	X	X						X		
2015 Indicator											X			
2017 Indicator				X										
2021 Indicator														X
2022 Indicator			X											
Trend	X											X		
Trend 2015-2022		X												
Trend 2018-2022							X		X		X			
Trend 2002-2012				X										
Trend 2001-2011										X				
Trend 2003-2011											X			
2003-2012 Indicator					X									
2004-2011 Indicator						X								
2013-2015 Indicator							X	X						
2018-2022 Indicator								X						
2010-2011 Indicator												X		
2019-2022 Indicator												X		
2006-2008 Indicator														X
2009-2013 Indicator														X

Q. What is the concern with data mining in regression analysis?

A. Data mining can lead to estimates that are not robust to minor specification changes.[9] For example, in Liberty's previous filing of marginal costs, the specification for operating expenses of the secondary distribution system included an indicator variable for 2002; however, the current specification excludes this variable while keeping all other explanatory variables.[10] Witness Bartos does not explain why removing the 2002 variable from the current specification is theoretically justified given that the variable merited inclusion in the previous version of the model, which also included that year. When I examined how the estimated marginal cost changes when the 2002 indicator is included in the current version of marginal costs, I found that the cost driver loses its statistical significance even though the R-squared statistic increases. Therefore, it appears that removing the 2002 indicator variable from the current specification was done to ensure the cost driver was statistically significant. The simple inclusion of the 2002 indicator variable demonstrates how the model is unreliable due to its lack of robustness to small changes in specification.

[9] The increases in the number of time periods controlled for with year indicator or time trends results in the relationship between the cost variable and cost driver being determined over a smaller sample. For example, when examining annual data, controlling for a single year via an indicator variable essentially removes that observation from the estimation of the marginal cost. As a result, small changes in the time variables included in the model can lead to large changes in the estimates, making the model specification unreliable.

[10] Docket No. DE 19-064, Attachment MFB-4, p. 2. The previous filing model also included a 2001 indicator variable that is no longer in the current model because data for the operating expenses (non-customer) of the secondary distribution system are also not included for 2001.

Q. What is your assessment of the cost drivers used in the marginal cost regression specifications?

A. The process of data mining is also evident by the choice of the cost driver. For example, the marginal cost regressions for maintenance (non-customer) expenses use lagged versions of system peaks as the cost driver. However, the choice of a 1-year or 2-year lag differs between the marginal cost specifications for primary, secondary, and line transformer expenses without any theoretical justification. The R-squared statistic is lower when I estimate the model using the alternate lag variable (e.g., 1-year instead of 2-year and vice versa), further confirming that the choice of explanatory variable is not grounded in theory. It is reasonable that maintenance expenses have a cost driver based on previous year peaks. However, Witness Bartos provides no theoretical justification for why the primary distribution system maintenance expenses are driven by the previous year's system peak while the secondary and line transformer maintenance expenses are driven by the system peak that occurred two years prior.

Q. What is your recommendation regarding Liberty's MCOS study?

A. For the reasons mentioned above, the marginal cost regressions used in the MCOS study are highly susceptible to regression data mining because of the inclusion of various time-related indicator and trend variables for which no theoretical justification has been provided. As a result, some of the models are not robust to small changes in the specification, casting doubt on whether the estimates reflect the "true" marginal costs. Liberty should provide the theoretical justification, or admission of outliers, for the inclusion of the various time-related explanatory variables included in the marginal cost model specifications. Without providing transparent reasoning, model specifications should be based on a more parsimonious version

that reduces the number of time-related variables included. This prevents estimating a relationship between the cost of interest and the cost driver over only a few observations. While the proposed allocation factors developed from the MCOS study are similar to those provided in the previous rate case filing,[11] I recommend that Liberty explore calculating embedded cost-based allocation factors in future proceedings if Liberty is unable to provide robust and theoretically justifiable marginal cost estimates. The embedded cost method would be less prone to analyst discretion and have more transparency. In that case, Liberty could continue to provide MCOS studies to inform rate design, as appropriate.

Q. How are the results from Liberty's MCOS study used to allocate the revenue requirement across customer classes?

A. The MCOS study is used to calculate total marginal cost revenue requirements by customer class which are translated into allocation factors for the actual revenue requirement proposed by Liberty. (The total marginal cost revenue requirement is not to be confused with the actual revenue requirement proposed by Liberty.) Witness Therrien uses the results from the MCOS study to allocate Liberty's actual revenue requirement to each customer class.[12]

Q. Do you agree with how Witness Therrien used MCOS study results to allocate Liberty's revenue requirements?

A. Yes, though I have expressed doubts about the validity of the marginal cost estimates themselves, the way the marginal cost estimates are applied is valid. The same process of allocating revenue requirements was implemented and approved by the Commission in

[11] For example, compare Table 1 of Direct Testimony of Melissa F. Bartos from Docket No. DE 19-064 with Table 1 of Direct Testimony of Melissa F. Bartos from Docket No. DE 23-039.
[12] Direct Testimony of Gregg H. Therrien, p. 4.

Liberty's previous rate case filing in 2019.[13] Witness Therrien uses the Equi-Proportional Method ("EPM") to adjust the total marginal cost revenue target to the actual revenue requirement proposed by Liberty.[14] The use of EPM is appropriate to maintain the relative proportions of marginal costs between customer classes. Witness Therrien made further adjustments to the allocated revenue requirements by customer class by imposing class impact caps that limited the amount of increase assigned to a single class; any revenue shortfalls were assigned to all the other classes.[15] This is an appropriate method for mitigating the rate impact for any one rate class.

Q. How are the results from Liberty's MCOS study used to inform rate design?

A. Witness Therrien indicates that customer charges were selected for each class based on consideration of the marginal customer cost from the MCOS study, while also considering rate continuity, rate simplicity and customer impacts.[16]

Q. Do you agree with how Witness Therrien used the MCOS study to inform proposed customer charges?

A. Not entirely. Table 2 provides a summary comparison of the customer costs presented by Witness Therrien, including results from the MCOS study, the current customer charge, the proposed customer charge, the proposed customer charge increase percentage, and the proposed class increase percentage. The customer costs from the MCOS study indicated higher customer costs than the proposed customer charges for all customer classes except

[13] Docket No. DE 19-064; Direct Testimony of David A. Heintz.
[14] Direct Testimony of Gregg H. Therrien, p. 4.
[15] Direct Testimony of Gregg H. Therrien, p. 5.
[16] Direct Testimony of Gregg H. Therrien, p. 8.

Rates G-1 and G-2.[17] Notwithstanding the lower marginal customer costs, Witness Therrien proposes the largest percentage increase of the customer charge for these two classes. Witness Therrien acknowledges that the customer charges exceed the customer cost from the MCOS study, but proposes the increase be based on the overall class proposed percentage increase for rate continuity reasons as well as bill impact concerns, indicating that the higher-use customers in the class would experience large increases relative to smaller customers.[18] However, the bill impacts shown in Attachment GHT-5 pages 8 and 9 show that percentage bill impacts are higher for lower-use customers for both Rate G-1 and G-2. Therefore, I disagree with the proposal to increase the customer charge by 40 percent for Rate G-1 and G-2. Given the large discrepancy between Rate G-1's marginal customer unit cost, $83.24, and current customer charge, $422.90, it would not be advisable to move the customer charge completely to the MCOS study results because of rate stability purposes. However, I recommend that the customer charge for Rates G-1 and G-2 be increased by 5 percent rather than the 40 percent proposed by the Company. The smaller increase is more in line with the Company's MCOS study and reduces differences in the total percentage bill impact by size decile.

[17] This discussion assumes that Liberty's marginal customer cost estimates at least approximate the "true" value. That is, the proposed charges are not set to exactly equal the estimated marginal costs. Rather, the proposed marginal costs are primarily employed to assess their directional relationship to the existing and proposed customer charges.
[18] Direct Testimony of Gregg H. Therrien, p. 9.

Table 2: Comparison of Customer Costs

Category	Domestic D	Domestic - Opt. Peak D-10	Domestic - Opt. Battery Pilot D-11	General TOU G-1	General Long Hour G-2	General Service G-3	Limited All Electric T	Ltd Comm Space Heating V
Marginal Customer Cost*	$35.98	$36.65	$36.58	$83.24	$77.53	$38.45	$37.87	$38.40
Current Customer Charge+	$14.74	$14.74	$14.74	$422.90	$70.47	$16.19	$14.74	$16.19
Proposed Customer Charge^	$17.89	$17.89	$17.89	$594.16	$99.00	$21.65	$17.89	$21.65
Proposed Increase %	21.4%	21.4%	21.4%	40.5%	40.5%	33.7%	21.4%	33.7%
Proposed Class Increase-	30.4%	15.1%	2.7%	40.5%	40.5%	40.4%	2.7%	32.2%

*Direct Testimony of Gregg Therrien, Attachment GHT-3, Line 37.

+Direct Testimony of Gregg Therrien, Attachment GHT-3, Line 95.
^Direct Testimony of Gregg Therrien, Attachment GHT-3, Line 96.
-Direct Testimony of Gregg Therrien, Attachment GHT-3, Line 91.

III. Time-of-Use Rate Design

Q. What is a TOU rate?

A. TOU rates have prices that are known in advance (in the same manner as other retail delivery rates) but vary by the time of day according to a pre-defined schedule (e.g., for peak and off-peak pricing periods). TOU rates can vary in their design, such as the number of pricing periods (peak, off-peak, and super off-peak), definitions of the pricing periods (i.e., the included hours and days), and the price ratios between periods. TOU rates should reflect time-varying differences in the marginal cost of generating and delivering electricity. The peak period, for instance, is associated with higher prices to reflect the higher energy and capacity costs incurred during those hours. Similarly, the off-peak period is associated with lower prices to reflect lower costs. Setting retail prices to reflect marginal costs helps improve economic efficiency by providing price signals that customers can respond to by shifting their energy consumption from high- to low-priced periods.

Q. Please describe Liberty's proposal to introduce new TOU rates.

A. Liberty is proposing to introduce Rate D-TOU, a residential whole-home TOU rate, and Rate G-3-TOU, a small commercial full requirement TOU rate. Liberty is also proposing to introduce two commercial charging EV rates, EV-L-E and EV-M-E, as modified versions of the existing commercial charging EV rates; I discuss the EV TOU rates in more detail in Section IV.

Q. How are the TOU periods for the proposed TOU rates D-TOU and G-3-TOU determined?

A. Liberty reviewed historical Locational Marginal Prices ("LMP"), the TOU periods for their existing Battery Pilot and EV charging rates, and technical considerations for current metering solutions.[19] These factors led Liberty to decide to adopt the TOU periods from its existing Battery Pilot and EV charging rates for continuity and simplification. Witness Tillman has, however, also indicated that the TOU periods and seasons could be refined over time.[20] I agree and suggest that the TOU periods should be reevaluated in the future as conditions changes (e.g., customer response, penetration of solar generation, price patterns).

Q. How are the TOU prices determined for the proposed TOU rates?

A. The proposed TOU rates were designed to be revenue neutral with the standard rate classes (e.g., rate D for proposed D-TOU and rate G-3 for proposed G-3-TOU). Prices within each TOU period are separated into the three main categories of costs to serve the customer: generation (energy and capacity), transmission, and distribution. Each of these cost elements is assigned to TOU periods based on allocation methods that depend on the way the

[19] Direct Testimony of Greg Tillman, p. 16.
[20] Direct Testimony of Greg Tillman, pp. 17-18.

corresponding cost is incurred. For example, the marginal generation cost of energy is allocated to hours based on the hourly loads and market clearing price. Capacity related generation costs, on the other hand, are allocated to TOU periods based on a probability of peak analysis provided by Witness Tillman.[21] Similarly, the transmission capacity costs are allocated based on the probability an hour hits the monthly peak. Liberty allocates distribution costs for the proposed TOU rates based on square of hourly loads.[22] Lastly, price ratios between TOU periods can be calculated from the costs assigned to each period.

Q. Are Witness Tillman's allocation methods of generation (energy and capacity) and transmission costs appropriate to determine TOU prices?

A. Yes. There are, of course, many variations in the specific details of how marginal costs can be allocated to hours. Witness Tillman, nevertheless, is correct to allocate energy costs on an hourly basis and then assign capacity related costs to hours based on the likelihood of being a peak that aligns with how those costs are incurred. The distribution related costs are time-varying in accordance with Commission policy.[23] The resulting TOU period price ratios thus reflect the marginal costs to serve these customers.

Q. Should TOU prices aim to have specific price ratios between TOU periods (e.g., peak to off-peak)?

A. While the evidence suggests that customers have larger TOU peak usage reductions when the peak to off-peak price ratio is larger,[24] the TOU prices should reflect the marginal costs of the system so that customers have appropriate price signals in order to improve economic

[21] Direct Testimony of Greg Tillman, pp. 19-20.
[22] Direct Testimony of Greg Tillman, p. 23.
[23] Order No 26,394 at 15 (August 18, 2020).
[24] Direct Testimony of Greg Tillman, p. 10.

efficiency. Price ratios between TOU periods should therefore also rely on the underlying costs and do not have to meet a specific threshold.

Q. Is Automated Metering Infrastructure ("AMI") required for the proposed TOU rates?

A. No. Automated Meter Reading ("AMR") can provide sufficient data for billing customers on TOU rates. Liberty originally planned to deploy AMI meters and complete the first phase of the project in 2026.[25] My understanding is that the initiation phase of the AMI project has been delayed. Liberty is proposing to implement the new TOU rates before AMI is approved or deployed. Customers that enroll in the proposed TOU rates will have AMR technology capable of metering TOU usage installed before AMI is available.[26] Newly installed AMR meters would then need to be replaced by AMI meters if Liberty moves forward with its AMI project.

Q. Are there concerns related to Liberty's proposed TOU rates while Liberty is planning to deploy AMI?

A. The additional cost of switching out newly installed AMR meters with AMI meters may reduce any potential benefits of implementing TOU before AMI is deployed, even if the AMR meters are repurposed in other service territories. Therefore, my recommendations regarding the proposed TOU rates, D-TOU and G-3-TOU, depend on whether Liberty plans to, and is approved to, deploy AMI meters.

[25] Direct Testimony of D. Balashov and A. Strabone, p. 17.
[26] Direct Testimony of Greg Tillman, p. 12.

Q. Please provide your recommendations regarding the proposed TOU rates, D-TOU and G-3-TOU, if Liberty continues its AMI project.

A. In the case that Liberty deploys AMI on their initially proposed or delayed schedule, I recommend that limitations be placed on the type and number of customers that can enroll on the proposed D-TOU rate before AMI is deployed. Installing AMR meters to be replaced by AMI meters shortly thereafter increases the costs of introducing the proposed TOU rates now instead of waiting until after the deployment of AMI. It is unclear to me whether any potential benefits outweigh these additional costs in the short-term. However, Liberty can increase the short-term benefit of the proposed TOU rates, at least on a per-customer basis, if enrollment is limited to customers that have a higher likelihood of responding to TOU prices by shifting usage out of the peak period. Specifically, I recommend that only customers with EVs and/or smart thermostats be allowed to enroll in the proposed D-TOU rate until AMI is deployed. EV customers have high loads that can generally be shifted away from the peak period. As well, a whole-house EV rate is likely more economical for customers than an EV-only rate because customers do not have to pay for the additional metering costs required to bill an EV-only rate. Similarly, customers with smart thermostats have increased ability to respond to higher peak period prices.[27] I do not recommend that the limitations mentioned above for the proposed D-TOU rate be applied to the proposed G-3-TOU. The usage of customers on rate G-3 is higher than that of Domestic customers, therefore, it is reasonable to expect that customers that enroll in the proposed G-3-TOU rate will have more usage that can be shifted away from the peak thus offsetting the additional

[27] Direct Testimony of Greg Tillman, Figure 1.

meter cost. Lastly, I recommend that a cap be placed on the number of customers that can be enrolled in the proposed TOU rates, D-TOU and G-3-TOU, before AMI is deployed. This would constrain the additional costs from installing short-term AMR meters.

Q. Please provide your recommendations regarding the proposed TOU rates, D-TOU and G-3-TOU, if Liberty does not deploy AMI.

A. My concern regarding the additional costs of replacing newly installed AMR meters with AMI meters is lessened if Liberty does not deploy AMI on a timeline consistent with their original or delayed schedule. That is, the AMR meters required to bill TOU rates would likely have a longer time in service over which benefits would be accrued to offset the incremental cost of the meter. Therefore, if Liberty does not plan to deploy AMI (or is not approved to deploy AMI), then I agree with Liberty's proposal to introduce the new TOU rates, D-TOU and G-3-TOU, now without limitations.

Q. Please describe Liberty's proposal for existing TOU rates.

A. If Rate D-TOU is approved, the Company proposes to eliminate Rate D-10 and enroll these customers in Rate D.[28] If Rate D-10 is not closed, Witness Therrien proposes to change the existing peak to off-peak price ratio of energy-related delivery charges from 75:1 to 3:1.[29] As well, Liberty is proposing to establish a single consistent methodology to calculate the TOU period rates for the proposed TOU rates and the existing TOU rates: D-11 (Battery Storage Pilot), D-12 (Residential EV Charging), EV-M (High Draw EV Charging Medium), and EV-L (High Draw EV Charging Large).[30] The proposed consolidation of methodology

[28] Direct Testimony of Greg Tillman, p. 27.
[29] Direct Testimony of Gregg H. Therrien, p. 11.
[30] Direct Testimony of Greg Tillman, pp. 33-34.

was not suggested for Liberty's General Service TOU Rate G-1. Rate D-10 and Rate G-1 have different TOU periods than the other TOU rates – peak hours from 8 a.m. to 9 p.m. daily on Monday through Friday excluding holidays.

Q. What is your assessment of Liberty's proposal for Rate D-10?

A. I agree with Liberty that Rate D-10 should be closed if Rate D-TOU is approved in order to simplify the TOU rate options available to customers.[31] As well, the long TOU peak period of Rate D-10 (8 a.m. to 9 p.m.) does not provide customers with much opportunity to shift loads from high to low priced periods. If Rate D-10 is not closed, then Liberty is proposing to modify the peak to off-peak price ratio to 3:1 to be more in line with Commission guidance.[32] The peak to off-peak price ratio should reflect the underlying marginal costs. For this reason, I agree that the existing 75:1 ratio should be modified, as it appears large.

Q. If Rate D-10 is closed, do you agree with Liberty's proposal to enroll these customers in Rate D?

A. No. Witness Tillman has indicated that "the typical customer currently served on Rate D-10 will pay about 4.7% less if they opt to be served on Rate D-TOU rather than take service on Rate D."[33] Therefore, I propose that existing Rate D-10 customers be defaulted onto Rate D-TOU, if approved, and Rate D-10 is closed. Customers that are defaulted onto Rate D-TOU from Rate D-10 should not count towards Liberty's proposed TOU rate adoption Performance Incentive Mechanism (PIM).[34]

[31] Direct Testimony of Greg Tillman, pp. 26-27.
[32] Direct Testimony of Gregg H. Therrien, p. 11. Docket IR 20-004, Order No. 26,394 issued August 18, 2020.
[33] Direct Testimony of Greg Tillman, p. 27.
[34] Direct Testimony of Philip Hanser, p. 24.

Q. What is your assessment of Liberty's proposal to consolidate to a single methodology for allocating distribution related costs to TOU periods?

A. I agree with Liberty's proposal to use a single methodology for allocating distribution related costs between TOU periods. Witness Tillman explains that two methods have been used in the past: the cost-duration method and the squared load method. The latter is a simpler calculation, but both allocate a greater portion of costs to hours when loads are highest.[35] I am in favor of Liberty employing one method for consistency and simplicity. It is my understanding that the TOU periods and cost allocation methods will be the same for all of Liberty's TOU rates except for Rate D-10 (which is proposed to close) and Rate G-1.

IV. Electric Vehicle Rate Design

Q. Please describe Liberty's proposed electric vehicle rate modifications.

A. Liberty currently has two commercial EV charging rate options: Rates EV-L and EV-M. However, there are currently no customers subscribed on these rates. Witness Tillman acknowledges it isn't clear if the rate structure is the reason that no customers have joined these rates but suggests that the demand charge component of these rates is "unattractive" during the infancy stages of commercial charging.[36] As a result, Liberty is proposing to introduce two new commercial EV charging rates, EV-L-E and EV-M-E, which modify the existing commercial EV rates by removing the demand charge component and adjusting the TOU energy rates to be revenue neutral. The EV-L-E and EV-M-E rates are therefore

[35] Direct Testimony of Greg Tillman, p. 32.
[36] Direct Testimony of Greg Tillman, p. 28.

energy-only rates to "alleviate the impact of demand charges on customers building out their EV charging infrastructure."[37]

Q. How do the proposed commercial EV charging rates assist customers at low levels of utilization?

A. Liberty's proposed commercial EV charging rates, EV-L-E and EV-M-E, are designed to provide customers at low levels of utilization a lower bill than they would have paid on EV-L and EV-M. Conversely, the EV-L-E and EV-M-E rates are designed to have higher bills than their demand-based counterparts at higher levels of utilization. The rate design therefore provides commercial EV charging customers with a financial incentive to shift from the energy-only rate to the demand-based counterpart once utilization surpasses a certain threshold.

Q. Is Liberty's proposal for energy-only (i.e., omitting a demand charge) commercial EV charging rate options reasonable?

A. Yes. Liberty is faced with the issue of providing commercial customers with fast EV charging rate options while not being prohibitively expensive when utilization and load factors are low while EV adoption increases. Other utilities have encountered the same problem and attempts to address the situation differ. For example, demand waivers or limiters have also been used.[38]

[37] Direct Testimony of Greg Tillman, p. 28.
[38] For example, Florida Power & Light Company uses a demand limiter for their GSD-1EV rate. This rate effectively puts a floor on the customer's load factor in a given month. For example, the customer's demand would be reduced to the value consistent with a 10 percent load factor if their actual load factor was less than 10 percent.

Q. Do you have any recommendations regarding Liberty's proposed commercial EV charging rates, EV-L-E and EV-M-E?

A. Yes. Rates EV-L-E and EV-M-E are not likely to recover the full cost of service at low levels of utilization.[39] Therefore, I recommend that Liberty include a time provision for the proposed EV-L-E and EV-M-E rates that removes the proposed rates within ten years. Limiting the period when the proposed rates can exist provides another financial incentive for customers to increase their utilization rates to higher levels and transition to the demand-based counterparts before the proposed rates are closed. The Company can, of course, seek an extension or re-approval for the proposed rates at a future date.

V. Revenue Decoupling

Q. Please describe Liberty's Revenue Decoupling Mechanism ("RDM").

A. Liberty introduced revenue per customer decoupling in 2021.[40] The RDM allows Liberty to adjust customer rates based on the decoupling-year differences between actual and allowed revenues per customer. The amount of allowed revenue per customer is based on the approved revenue requirement and test-year number of customers, calculated separately for each customer class (excluding street lighting and rate classes D-11 and EV). When calculating decoupling deferrals, the actual amount of revenue is compared to the allowed revenue, calculated as the allowed revenue per customer multiplied by the number of customers served in that month.[41] Revenue deficiencies (i.e., when actual revenue is less

[39] Direct Testimony of Greg Tillman, p. 30.
[40] "Stipulation and Settlement Agreement Regarding Permanent Rates," Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities, State of New Hampshire, Public Utilities Commission, Docket No. DE 19-064.
[41] Liberty employs an "equivalent bill" methodology to remove the double counting of customers due to partial billing months.

than allowed revenue) or surpluses (i.e., when actual revenue greater than allowed revenue) are aggregated across months and customer classes to calculate an annual total adjustment. The RDM includes a "soft" cap which restricts the allowed adjustment to be within +/- 3% of the total company target revenues.[42] Adjustment amounts outside the soft cap can be deferred and recovered in future periods.[43] The annual allowed adjustment is then allocated to customer classes based on their percentage of total test-year distribution revenues. Finally, the $/kWh amount is calculated using forecast class usage for the upcoming year and is applied to future rates as a surcharge or discount (revenue deficiency results in a surcharge while a revenue surplus results in a discount). This amount represents the Revenue Decoupling Adjustment Factor ("RDAF").

Q. Please describe how Liberty's existing RDM allows for cross-subsidies between customer classes.

A. The current version of Liberty's RDM can create cross-subsidies between customer classes because the deferrals are pooled across customer classes prior to being reallocated to classes based on pre-defined shares. Therefore, a customer class that has a revenue surplus will still have a RDAF surcharge if the aggregate deferral across all classes reflects a shortfall. This results in customer classes with revenue surpluses cross subsidizing customer classes with revenue shortfalls when total revenues are deficient. For example, Table 3 contains the annual revenue surplus (shortfall) and decoupling adjustment refund (surcharge) amounts, by customer class, from Liberty's 2022 decoupling reconciliation filing.[44] The domestic and

[42] A soft cap means the utility can retain deferral amounts above or below the cap for future recovery or refund. In contrast, under a "hard" cap the utility would not be able to recover or refund amounts above or below the cap.
[43] Interest is applied to deferred amounts.
[44] Docket No. DE 22-052, Attachment MST-2.

commercial space heating classes each have a revenue surplus while the other customer classes have revenue shortfalls. The total revenue across classes results in a revenue shortfall. As a result, all customer classes have decoupling adjustment charges. (The total decoupling adjustment is less than the revenue shortfall because of the soft cap.) Some customers are better off while others are worse off because of the cross-subsidy. For instance, Domestic D customers have a decoupling adjustment surcharge instead of a refund while General TOU customers receive a decoupling adjustment surcharge that is much less than their revenue shortfall ($329,459 versus $1,163,409).

Table 3: Liberty 2022 Decoupling Reconciliation Calculations

	Domestic	Domestic - Opt. Peak	General TOU	General Long Hour	General Service	Limited All Electric	Ltd Comm Space Heating
Category	**D**	**D-10**	**G-1**	**G-2**	**G-3**	**T**	**V**
Annual Revenue Surplus (Shortfall)*	$800,588	$3,147	($1,163,409)	($495,996)	($233,983)	($19,478)	$461
Decoupling Adjustment Refund (Surcharge)+	($689,000)	($10,331)	($329,459)	($181,080)	($176,984)	($27,506)	($653)

*Docket No. DE 22-052; Attachment MST-2; Page 5, Line 150.
+Docket No. DE 22-052; Attachment MST-2; Page 6, Line 177.

Q. Do you recommend that Liberty's RDM be modified to remove the cross-subsidy?

A. Yes. I recommend that Liberty's RDM be modified so that the RDAF is calculated by pooling similar customer classes together as opposed to being calculated at the aggregate level. Specifically, I recommend the calculation of separate RDAF values for the following groups: 1) Domestic (D) and Domestic Opt. Peak (D-10); 2) General Long Hour (G-2); and 3) General Service (G-3), Limited All Electric (T), and Limited Space Heating (V). These groupings would reduce inter-class cross subsidies while minimizing the potential for volatile RDAF values that may occur when relatively few customers are included in a

decoupling group. I further recommend that General TOU (G-1) customer class is not decoupled.

Q. Why do you recommend that General TOU (G-1) customers are no longer decoupled?

A. Decoupling may not function well when the deferral is calculated for a group in which a few customers account for a significant share of group-level usage because the usage of a few customers can have a significant effect on the group's deferral. Witness Therrien's bill impact analysis demonstrates a large range of customer size for Rate G-1. For example, customers in the 0%-10% estimated bill percentile range have an average monthly usage of 14,616 kWh and max demand of 52 kW while customers in the 90%-100% bill percentile group have an average monthly usage of 487,249 kWh and max demand of 1,744 kW.[45] There is no similarly sized rate class that can be combined with Rate G-1 to reduce the potential for the largest customers in the class to have an outsized effect on the deferral.

Q. How does Liberty's proposed Multi Year Rate Plan ("MYRP") interact with its decoupling mechanism?

A. In Liberty's proposed MYRP, the revenue requirement is adjusted each year, which leads to an adjustment in the allowed revenue per customer values used for decoupling. For example, a 10% increase in the revenue requirement will result in a 10% increase in the allowed revenue per customer. Because Liberty has revenue per customer decoupling, its total allowed revenue also scales with the number of customers served. That is, increases in the number of customers served leads to a corresponding increase in utility revenue.

[45] Direct Testimony of Gregg H. Therrien, Attachment GHT-5, p. 8.

Q. Do you have any concerns with combining Liberty's proposed MYRP with its decoupling mechanism?

A. Yes, the combination of Liberty's proposed MYRP and its existing RDM would pay the Company twice for growth. As described above, the total allowed revenue under the RDM scales with the number of customers served. In addition, the Company incorporated growth in its capital investment forecasts, as reflected in Company witness Anthony Strabone's Direct testimony (Figure 5, page 25). Witness Strabone describes the growth category as "those used to expand the physical plant… projects such as extending distribution mains or services, installation of new feeders, and expansion of substations."

Q. What do recommend that would remove the double counting of growth in Liberty's proposal?

A. I recommend modifying the RDM to remove the per-customer element and instead decouple to the fixed total allowed revenue amounts determined during this proceeding, as modified over time via the MYRP. This allows Liberty's revenues to grow according to its expectations without overcompensating them via the RDM.

Q. Please summarize your recommendations regarding Liberty's RDM.

A. My recommendation is that Liberty modify their RDM in two ways. First, the RDAF should be calculated across groups of rate classes as opposed to the existing calculation that aggregates all eligible customers. This recommendation would reduce cross-subsidies that are created from the current RDM. Second, the RDM should be modified to remove the per-customer element and instead calculate deferrals relative to fixed total revenue amounts from the MYRP. This recommendation would remove the double counting that would occur from recovering customer growth related costs in both the MYRP and the RDM.

VI. Summary of Recommendations and Conclusion

Q. Please summarize your recommendations.

A. My recommendations are:

- Liberty should justify their MCOS study regression models or else explore calculating embedded cost-based allocation factors in future proceedings because the marginal cost regressions used in the MCOS study are not robust to changes in the specification and therefore cast doubt whether the estimates reflect true marginal costs.
- The proposed customer charge increase of 40.5% for Rate G-1 and Rate G-2 should be reduced to 5%.
- If Liberty deploys AMI on a timeline consistent with their original or delayed schedule, the proposed D-TOU rate should be constrained to EV or smart thermostat customers before AMI is deployed. As well, a cap should be placed on the number of customers that can be enrolled in the proposed TOU rates, D-TOU and G-3-TOU, before AMI is deployed. If Liberty's does not plan to deploy AMI (or is not approved to deploy AMI), then I agree with Liberty's proposal to introduce the new TOU rates, D-TOU and G-3-TOU now without limitations.
- If Rate D-10 is closed, Liberty should default current Rate D-10 customers onto the proposed Rate D-TOU (if approved). Customers that are defaulted onto Rate D-TOU from Rate D-10 should not count towards Liberty's proposed TOU rate adoption PIM.
- Liberty should include a time provision for the proposed EV-L-E and EV-M-E rates that removes the proposed rates within ten years.

- Liberty's RDM should be modified so that the RDAF is calculated by pooling similar customer classes together, as opposed to being calculated at the aggregate level, to reduce inter-class cross-subsidies in the existing RDM. Specifically, Liberty should calculate separate RDAF values for the following groups: 1) Domestic and Domestic Opt. Peak; 2) General Long Hour; and 3) General Service, Limited All Electric, and Limited Space Heating. The General TOU customer class should no longer be decoupled.
- If Liberty's proposed MYRP is approved by the Commission, Liberty should modify their RDM to remove the per-customer element and instead decouple to the fixed total allowed revenue requirement by decoupling group in order to prevent recovering customer growth related costs from both the MYRP and RDM.

Q. Does this conclude your testimony.

A. Yes.