COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

DIRECT TESTIMONY OF

JOHN D. TAYLOR

ATRIUM ECONOMICS, LLC

ON BEHALF OF

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

d/b/a UNITIL

(ELECTRIC DIVISION)

D.P.U. 23-80

EXHIBIT UNITIL-JDT-1

August 17, 2023

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I. INTRODUCTION

Q. Please state your name, affiliation, and business address.

A. My name is John D. Taylor, and I am employed by Atrium Economics, LLC ("Atrium") as a Managing Partner. My business address is 10 Hospital Center Commons, Suite 400, Hilton Head Island, South Carolina, 29926.

Q. On whose behalf are you appearing in this proceeding?

A. I am appearing on behalf of Fitchburg Gas and Electric Light Company d/b/a Unitil ("Unitil," "FG&E," or the "Company").

Q. Have you prepared an Exhibit describing your professional qualifications?

A. Yes. Exhibit Unitil-JDT-2 to my direct testimony presents my professional qualifications.

Q. What was Atrium's assignment in this proceeding?

A. Unitil requested Atrium conduct a fully-allocated class cost of service study ("ACOSS" or "COSS"), found in Exhibit Unitil-JDT-3, to determine the embedded costs of serving its various electric retail customers and support its rate design efforts. The ACOSS allocates the Company's cost of service associated with the Department of Public Utilities' (the "Department") jurisdictional operations to Unitil's retail customer classes. In this regard, I am sponsoring the ACOSS that allocates Unitil's electric distribution costs to its rate classes, class revenue increase apportionment, proposed rate design, and bill impacts. I also provide and support the Company's proposed residential heat pump rate and proposal to annualize the residential electric vehicle ("EV") rates approved in D.P.U. 21-92.

Q. Please summarize the content of your testimony.

A. First, I provide an overview of the ACOSS, including various principles and factors that influence the cost allocation framework and general methods and approaches to allocating costs to customer classes. Second, I discuss the underlying methodology and basis used in the ACOSS studies I conducted and am sponsoring for Unitil. I describe the studies of relative costs and other analyses employed to apportion the various categories of plant and operating and maintenance ("O&M") expenses to the respective customer classes. I present the class-by-class rate of return results and corresponding revenue surpluses or deficiencies from the ACOSS. Third, I present the rate design proposals that reflect the results of the ACOSS, the apportionment of the rate increase to each rate class, and bill impacts. Fourth, I present the Company's proposed residential heat pump rate. Fifth, I present the Company's proposal to annualize its residential EV rates. Sixth, I present the Company's Demand Charge Alternative Rates for General Service. Lastly, I provide the updated revenue targets for the Company's proposal for its Revenue Decoupling Adjustment mechanism.

Q. Mr. Taylor, are you sponsoring any exhibits in this proceeding?

A. I am sponsoring the following exhibits in support of Unitil's proposal:

Exhibit	Description
Exhibit Unitil-JDT-1	Testimony of John D. Taylor
Exhibit Unitil-JDT-2	Resume of John D. Taylor
Exhibit Unitil-JDT-3	ACOSS (Allocated Cost of Service Study)
Exhibit Unitil-JDT-4	Proposed Rate Design and Proof of Revenue

Exhibit	Description
Exhibit Unitil-JDT-5	Residential and Commercial Bill Impact Analyses
Exhibit Unitil-JDT-6	Residential Heat Pump Rate Design
Exbibit Unitil-JDT-7	Residential Electric Vehicle Annualized Rate
Exhibit Unitil-JDT-8	General Service Electric Vehicle Demand Charge Alternative
Exhibit Unitil-JDT-9	Revenue Decoupling Annual Target Revenue
Exhibit Unitil-JDT-10	Workpapers Supporting ACOSS
Exhibit Unitil-JDT-11	Workpapers Supporting Rate Design

II. OVERVIEW OF ACOSS METHODS

Q. Why do utilities conduct cost allocation studies as part of the regulatory process?

A. There are many purposes for utilities conducting cost allocation studies, ranging from designing appropriate price signals in rates to determining the share of costs or revenue requirements borne by the utility's various rate or customer classes. In this case, an embedded ACOSS is a valuable tool for determining the division of Unitil's total revenue requirement among its customer classes. It is also helpful for rate design because it can identify the important cost drivers associated with serving customers and satisfying their demands.

Q. Please describe the general approach used to develop the ACOSS.

A. The purpose of the ACOSS is to allocate Unitil's electric distribution adjusted test year revenues and costs to the various classes of service in a manner that reflects the relative costs of providing service to each class. This is accomplished by analyzing costs and assigning each customer or rate class a proportionate share of the Company's total revenues and costs within the test year. The results of these studies can be utilized to determine the relative cost of service for each customer class and to help determine the individual class

revenue responsibility. To allocate costs to the various classes, I reviewed Unitil's expense and plant accounts and developed studies of the relative costs of providing facilities and services for each rate class, and analyzed the key factors that cause the costs to vary.

Q. What is the guiding principle that should be followed when performing an ACOSS?

A. The ACOSS analysis is intended to establish cost responsibility among the various customer classes the utility serves. The analysis should result in an appropriate allocation of the utility's total revenue requirement among the various customer classes. The most critical theoretical principle underlying an ACOSS is that cost incurrence should follow cost causation. In other words, the costs assigned or allocated to particular customers should be those costs that the particular customers caused the utility to incur because of the characteristics of the customers' usage of utility service.

Q. What are the steps to performing an ACOSS?

A. A three-step analysis of the utility's total operating costs must be undertaken to establish each customer class's cost responsibility. The three steps that are the predicate for an ACOSS are (1) cost functionalization; (2) cost classification; and (3) cost allocation.

Q. Please describe cost functionalization.

A. The first step, cost functionalization, identifies and separates plant and expenses into specific categories based on the various characteristics of utility operation. Unitil's primary functional cost categories associated with electric distribution service include the following: Power Supply, Substation, Distribution Primary, Distribution Secondary,

Transformation, Onsite & Metering, Customer Accounts & Service, and Lighting Plant. Indirect costs that support these functions, such as General Plant and Administrative and General Expenses, are allocated to functions using allocation factors related to plant and/or labor ratios.

Q. Please describe cost classification.

A. The second step, classification of costs, further separates the functionalized plant and expenses according to the primary factors determining the level of costs incurred. These factors are as follows: (1) the number of customers; (2) the need to meet the peak demand requirements that customers place on the system; and (3) the amount of electricity consumed by customers. These classification categories have been identified for purposes of the ACOSS as 1) Customer Costs, 2) Demand Costs, and 3) Energy Costs, respectively.

Q. Please describe the types of costs in the Customer, Demand, and Energy Costs categories.

A. ***Customer Costs*** are incurred to extend service to and attach a customer to the distribution system, meter electric usage, and maintain the customer's account. Customer Costs are primarily a function of the number of customers served and continue to be incurred whether or not the customer uses electricity. They also include capital costs associated with services, meters, and customer billing and accounting expenses.

Demand Costs are capacity-related costs associated with plant that is designed, installed, and operated to meet maximum hourly or daily electric usage requirements, such as

generating plants, transmission lines, transformers and substations, or more localized distribution facilities designed to satisfy individual customer maximum demands.

Energy costs vary with the amount of kilowatt hours ("kWh") sold to customers. However, Unitil's distribution costs are fixed with respect to energy usage, and none of the remaining delivery service cost structure is energy-related.

Q. What is required to classify costs as Customer, Demand, and Energy appropriately?

A. Usually, the classification of costs can be determined simply by knowing the type of activities or assets that reside in a particular FERC account. In these instances, the account as a whole can be classified. However, for some FERC account functions, it is beneficial to conduct classification studies to determine the portion of an account associated with each classification.

Q. Are there generally accepted methods for preparing classification studies for electric utility distribution assets?

A. The generally accepted methods are set forth in the National Association of Regulatory Utility Commissioners ("NARUC") Cost Allocation Manual. The NARUC Manual (pg. 96-98) specifically states that an electric utility's distribution-related facilities are, from a design and operational basis, sized to meet customers' maximum kW load (demand) requirements. Moreover, the NARUC Manual (pg. 89) also states that all distribution costs should be classified as either customer- or demand-related, or a combination of these two factors. Classifying these facilities between a combination of customer and demand-related

costs requires a minimum system study. A minimum system study recognizes that these assets have a dual purpose (1) to meet peak demands and (2) to connect customers to the system and estimates the portion of the utility's investment affected by both purposes.

Q. Please describe the cost allocation portion of the ACOSS.

A. The final step, cost allocation, is the allocation of each functionalized and classified cost element to the rate class (or classes) that benefits from the cost. Customers are generally divided into customer classes based on the type and character of services they require. Costs are typically allocated to these customer classes based on the number of customers and the capacity required to serve the customer class. For example, much of the plant and equipment cost is related to the peak demand of the customers in each class, and these costs were accordingly allocated based on the non-coincident peak demands of the rate class. Other portions of the cost depend upon the number of customers on the system, and these costs were allocated on a customer, or weighted-customer, basis.

Q. How does the cost analyst establish the fully allocated costs related to various utility services?

A. To establish these relationships, the cost analyst must analyze a utility's electric system design, physical configuration, accounting records, and system and customer load data. From the results of those analyses, methods of direct assignment and common cost allocation methodologies can be chosen for all of the utility's plant and expense elements.

Q. Please explain the term "direct assignment."

A. The term "direct assignment" means assigning costs to a specific customer or class of customers based on that customer's or class's exclusive identification with the particular plant or expense at issue. Usually, costs that are directly assigned relate to costs incurred exclusively to serve a specific customer or class of customers. For example, FERC Account 373 - Street lighting and signal systems - is solely related to lighting and, as such, is directly assigned in full to that customer class. An alternative to direct assignment is an allocation methodology based on analyzing factors that affect the relative costs of serving particular customer classes. For example, in this proceeding, I developed a relative cost study for meter and service investment costs.

Q. Please explain the considerations in determining the cost allocation methodologies used to perform an ACOSS.

A. As stated above, to allocate costs within any cost of service study, the factors that cause the costs to be incurred must be identified and understood. Data availability in developing alternative cost allocation factors is also a consideration. In evaluating any cost allocation methodology, appropriate consideration should be given to whether it provides a sound rationale or theoretical basis, whether the results reflect cost causation and represent the costs of serving different types of customers, and the stability of the results over time. Further considerations can be given to the history of allocation methods used by a particular utility or common in a particular regulatory jurisdiction.

III. DESCRIPTION OF THE COMPANY'S ACOSS

Q. Please describe the process of performing Unitil's ACOSS presented in the Company's filing.

A. The detailed process description of Unitil's ACOSS analysis is presented in Exhibit Unitil-JDT-3. The exhibit provides a full scope of the process, including the development of allocation factors that support various cost of service studies presented in this proceeding, as discussed below.

Q. Would you briefly describe the contents of Exhibit Unitil-JDT-3?

A. Exhibit Unitil-JDT-3 consists of three sections (for which an index is provided) detailing the process of developing the ACOSS. Section I – Introduction includes an introduction, the general purpose, the process of the cost of service study, and an overview of the Excel-based fully functional ACOSS model presented in this proceeding. Section II – Unitil's Cost of Service Procedures presents the ACOSS development process specific to the Company, including the Functionalization, Classification, and Allocation of costs, which describes all internal and external allocation factors and the allocation processes used in the ACOSS. The last section, Section III – Unitil's Cost of Service Results depicts the results of the cost of service studies, including a comparison of cost of service with revenues under present and proposed rates and development of rate of return by customer class under present and proposed rates. The following is the list of Schedules included in Exhibit Unitil-JDT-3 Section III:

- Schedule 1 - Summary of Cost of Service Under Present and Proposed Rates
- Schedule 2 - Functionalized and Classified Results and Unit Costs by Customer Class

- Schedule 3 - Cost of Service Allocation Study Detail by Account
- Schedule 4 - Account Balances and Allocation Methods
- Schedule 5 - External Allocation Factors, Functionalization and Classification Study
- Schedule 6 - Internal Allocation Factors

Q. Have you provided a set of workpapers supporting the ACOSS?

A. Yes. I have provided my workpapers supporting the ACOSS in Exhibit Unitil-JDT-10.

Q. How are the Unitil rate classes structured for purposes of conducting its ACOSS?

A. For Unitil's ACOSS, I included the following rate classes:

Rate Schedule	ACOSS Customer Class
RD-1: Residential	RD-1, RD-2: Residential
RD-2: Residential, Low Income	RD-1, RD-2: Residential
GD-1: Small General	GD-1: Small General
GD-2: Regular General	GD-2, GD-4, GD-5: Regular General
GD-3: Large General	GD-3: Large General
GD-4: Regular General Optional TOU	GD-2, GD-4, GD-5: Regular General
GD-5: Water and/or Space Heating Rider	GD-2, GD-4, GD-5: Regular General
SD: Outdoor Lighting - Company Owned	SD: Outdoor Lighting - Company Owned
SDC: Outdoor Lighting - Customer Owned	SDC: Outdoor Lighting - Customer Owned

Q. What is the source of the cost data analyzed in Unitil's ACOSS?

A. All cost of service data has been extracted from the Company's total cost of service (*i.e.*, distribution rate revenue requirement) contained in this general rate case filing for the test year ending December 31, 2022. Where more detailed information was required to perform various analyses related to specific plant and expense elements, the data were derived from the historical books and records of the Company and information provided by Company personnel.

Q. How did you functionalize and classify Unitil's distribution costs?

A. To correctly classify all distribution costs as customer-related, demand-related or a combination of these factors, Unitil's distribution capital is functionalized into their primary and secondary voltage levels. Based on minimum size system studies, the functionalized plant is classified into the demand and customer components. These studies are based on historical electric distribution plant data, and the results are applied to the distribution plant for the test year. The functionalization and classification studies are provided as Exhibit Unitil-JDT-3.

Q. What cost assignment and allocation methods were utilized in your studies?

A. Below is a general description of the allocation factors relied upon in the ACOSS. Schedule 4 of Exhibit Unitil-JDT-3 details the allocation factors used for each FERC account and revenue requirement component.

Rate Base Allocation

Q. Please describe the allocation of rate base to customer classes.

A. Capacity-related distribution plant was allocated based on three different allocation factors in recognition of the load diversity across the distribution system and the nature of the costs. Substations costs were allocated on the coincident peak demands. Poles, conductors, conduit, and underground conductors were separated into primary and secondary cost categories and allocated on non-coincidental class peaks and customer counts. Line transformers were allocated on non-coincidental class peaks after accounting for customers

that own/rent their transformers. Loss factors were used to adjust the coincident peak demands and non-coincidental class peaks for each class at each voltage level of the system. Company records were analyzed to develop special studies to allocate services and meters to the rate classes. A summary of the services and meter study can be seen on Schedule 5 of Exhibit Unitil-JDT-3. The Company developed a range of typical service installations from their experience. The estimated cost for each service type was computed, and a weighted average was developed to estimate the replacement cost for each rate class's services. I multiplied each class' estimated cost per service by the number of customers for each class developed above.

Similarly, I developed the allocation of Meters (Account 381) by identifying the replacement cost new for each installed meter type and the rate classes they are used to serve. These current costs were then multiplied by the number of meters. The resulting values were summed and prorated by a percentage to match the original cost investment shown in the Company's books.

Q. How was general and intangible plant allocated in the ACOSS?

A. The items of general plant were allocated on an internally developed labor allocation factor. The labor portion of each O&M account was allocated separately in the same manner as the corresponding total expense accounts. The allocated labor costs were then subtotaled by function, classification, and customer class to determine the internal labor allocation factor. This internal allocation factor was then used to functionalize, classify, and allocate

the general plant items. Miscellaneous Intangible Plant is allocated on the total plant in service results by rate class and the internal labor allocation factor.

Q. How were other elements of rate base treated in the ACOSS model?

A. Each account was functionalized, classified, and allocated for accumulated depreciation reserves on the same basis as the corresponding plant item. Additions to net plant included materials and supplies, an allowance for cash working capital, and capitalized non-service retirement costs. The deductions from net plant were customer deposits, customer advances, unclaimed funds, and a reserve for accumulated deferred income taxes. The allowance for cash working capital was allocated on total O&M by rate class, Customer Deposits were directly assigned to rate classes, Customer Advances were allocated on the services study, and all other adjustments were allocated on total utility plant by rate class.

Operating Expense Allocation

Q. How were O&M expenses allocated?

A. Distribution O&M expenses follow the corresponding allocation of distribution plant. Plant-related expenses are allocated using the same allocators as the related plant investment. Similarly, depreciation and amortization expenses were allocated based on plant in service, similar to the allocation of accumulated depreciation reserves. Customer Accounts, Customer Service and Information Expenses, and Administrative and General Expenses were allocated using various methods based on labor, total plant, and the number of customers.

Q. How were taxes allocated in the ACOSS model?

A. Taxes Other Than Income Taxes that are plant-related were allocated on an internal factor that reflects total plant in service, and those that are labor-related were allocated on the internal labor allocator. Federal income taxes and state franchise taxes were computed for each customer class based on their revenues, less allocated expenses.

Operating Revenue Allocations

Q. Please describe the allocation of total revenue.

A. Distribution base revenues were directly assigned to the classes that generated those revenues. Late payment charges and credit card fees were directly assigned to the customer classes. Rent from property was credited to the rate classes based on the allocation of plant to each rate class. Miscellaneous Service Revenues, Wholesale Revenues, and Other Revenue were allocated using the overall revenue requirement by class.

Q. How does your ACOSS treat revenues for Special Contract customers?

A. The revenues from special contract customers were included in Other Revenues and allocated using the overall revenue requirement by class and thus credited against the overall revenue requirements for all rate classes. Other costs incurred to serve the special contract customers were not specifically identified and therefore assigned to all classes. As a result of this approach, all costs and revenue associated with the special contracts were shared with all rate classes through this allocation process. This approach is consistent with prior ACOSS studies filed by the Company.

IV. ACOSS STUDY RESULTS

Q. Please summarize the results of the electric cost of service study.

A. Table 1 below summarizes the Company's ACOSS that can be reviewed in Schedule 1 of Exhibit Unitil-JDT-3. The ACOSS shows an overall revenue deficiency of $4.102 million for the Company. This revenue deficiency reflects the net change of the Company's reported distribution revenue deficiency of $6.776 million offset by revenue of $2.674 million associated with reconciling mechanisms for which the costs have been transferred to base distribution rates, with a resulting net increase of $4.102 million. Supporting worksheets are provided in my rate design model.

Table 1 – Summary Results of the Company's ACOSS ($000)

Customer Classes	Current Revenues	Cost to Serve	Class Revenue (Deficiency)/ Excess	Percentage Change to Cost to Serve	Current Rate of Return	Current Revenue to Cost Ratio	Current Parity Ratio
RD-1, RD-2: Residential	$ 17,394,497	$ 22,701,838	$ (5,307,341)	30.51%	1.4%	0.78	0.88
GD-1: Small General	823,494	1,445,084	(621,590)	75.48%	-5.0%	0.59	0.67
GD-2, GD-4, GD-5: Regular General	6,161,847	4,424,094	1,737,753	-28.20%	23.4%	1.38	1.56
GD-3: Large General	4,134,127	3,832,875	301,253	-7.29%	12.7%	1.07	1.22
SD: Outdoor Lighting - Company Owned	266,880	413,274	(146,393)	54.85%	-1.4%	0.66	0.75
SDC: Outdoor Lighting - Customer Owned	46,203	111,661	(65,458)	141.68%	-28.4%	0.43	0.49
Other Revenues	1,418,766	1,418,766	-	0.00%			
Total System	**$ 30,245,814**	**$ 34,347,591**	**$ (4,101,777)**	**13.56%**	**5.6%**	**0.88**	**1.00**

Table 1 presents the revenue deficiency/excess for each rate class and the class rate of return on the net rate base at present rates. Regarding rate class revenue levels, the ACOSS results show that the Residential (RD-1 and RD-2), Small General (GD-1), and Outdoor Lighting (SD and SDC) rate classes are being charged rates that recover less than their indicated costs of service. In contrast, rates for Regular General (GD-2, GD-4, and GD-5) and Large General (GD-3) rate classes provide for recovery of more than the indicated costs of serving these other rate classes. Exhibit Unitil-JDT-3 further summarizes the results of the ACOSS and presents the resulting allocation by customer class of the

Company's proposed revenue requirement based strictly on the results of the computations included in the ACOSS. Further, this schedule summarizes the costs allocated to the customer classes on a functionalized (*e.g.,* by distribution, secondary, metering) and classified (*i.e.,* by demand and customer) basis. The customer-related and demand-related costs are of interest, which support the proposed levels of Customer Charges and Demand Charges. Next, I explain how these ACOSS results guided the Company's determination of the revenues by rate class and the proposed rate levels.

V. PRINCIPLES OF SOUND RATE DESIGN

Q. Please identify the rate design principles utilized in developing rate design proposals.

A. Several rate design principles or objectives find broad acceptance in utility regulatory and policy literature. These include:

1. Efficiency;
2. Cost of Service;
3. Value of Service;
4. Stability;
5. Non-Discrimination;
6. Administrative Simplicity; and
7. Balanced Budget.

These rate design principles draw heavily upon the "Attributes of a Sound Rate Structure" developed by James Bonbright in Principles of Public Utility Rates. Each of these principles plays an important role in analyzing the rate design proposals of Unitil.

Q. Can the objectives inherent in these principles compete with each other at times?

A. Yes, these principles can compete with each other, and this tension requires further judgment to strike the right balance between the principles. Detailed evaluation of rate design recommendations must recognize the potential and actual competition between these principles. Indeed, Bonbright discusses this tension in detail. Rate design recommendations must deal effectively with such tension. There are tensions between cost and value of service principles as well as efficiency and simplicity. Potential conflicts exist between simplicity and non-discrimination and between the value of service and non-discrimination. Other potential conflicts arise where utilities face unique circumstances that must be considered as part of the rate design process.

Q. Please summarize Bonbright's three primary criteria for sound rate design.

A. Bonbright identifies the three primary criteria for sound rate design as follows: (1) Capital Attraction, (2) Consumer Rationing, and (3) Fairness to Ratepayers. These three criteria are essentially a subset of the above principles list and emphasize fundamental considerations in designing public utility rates. Capital attraction is a combination of an equitable rate of return on rate base and the reasonable opportunity to earn the allowed rate of return. Consumer rationing requires that rates discourage wasteful use and promote all economically efficient use. Fairness to ratepayers reflects avoidance of undue discrimination and equity principles.

Q. How are these principles translated into the design of electric distribution rates?

A. The overall rate design process, which includes the apportionment of the revenues to be recovered among customer classes and the determination of rate structures within customer classes, consists of finding a reasonable balance between the above-described criteria or guidelines related to the design of utility rates. Economic, regulatory, historical, and social factors enter the process. In other words, both quantitative and qualitative information is evaluated before reaching a final rate design determination. Out of necessity, the rate design process has to be partly influenced by judgmental evaluations.

VI. ALLOCATION OF THE REVENUE INCREASE

Q. How does the Company propose to allocate the distribution rate increase in this proceeding?

A. As described above, the apportionment of revenues among customer classes consists of deriving a reasonable balance between various criteria or guidelines relating to utility rate design. The various criteria that were considered in the process included: (1) cost of service; (2) class contribution to present revenue levels; and (3) customer impact considerations. Based on the existing deficiencies in Table 1 and the desire to move toward full parity over time, Unitil proposes the following revenue apportionment method. First, the Company proposes to limit the increase to each class to be no more than 150% of the overall system increase of 13.56%, which results in a cap of 20.34% increase to distribution revenues to each class. Second, Unitil is not proposing any decreases to customer classes who are providing

revenues above their cost to serve. Third, the proposed increases are below the 10% cap on total revenues by class required by previous Department mandates. Since the 150% cap limited RD-1/RD-2 and GD-1 increases, and Outdoor Lighting (SD and SDC) increases were limited by the 150% cap and the 10% cap, there was an additional $334 thousand in revenue that needed to be reallocated to the classes. After accounting for the increase in special contract revenue due to changes in GD-3 rate components, this additional revenue was allocated to the remaining classes based on the revenue at the equalized rate of returns. The results of this process are presented in Schedule 1 of Exhibit Unitil-JDT-4 and summarized in Table 2.

Table 2 – Proposed Change in Distribution Margin Revenue by Rate

Customer Classes	Current Revenues	Proposed Revenue	Proposed Revenue Change	Proposed Percentage Change	Proposed Rate of Return	Proposed Revenue to Cost Ratio	Proposed Parity Ratio
RD-1, RD-2: Residential	$ 17,394,497	$ 20,932,921	$ 3,538,424	20.34%	5.8%	0.93	0.93
GD-1: Small General	823,494	991,011	167,517	20.34%	-0.7%	0.70	0.70
GD-2, GD-4, GD-5: Regular General	6,161,847	6,297,010	135,163	2.19%	19.6%	1.41	1.41
GD-3: Large General	4,134,127	4,251,227	117,100	2.83%	11.1%	1.11	1.11
SD: Outdoor Lighting - Company Owned	266,880	319,068	52,187	19.55%	2.2%	0.78	0.78
SDC: Outdoor Lighting - Customer Owned	46,203	55,601	9,399	20.34%	-18.2%	0.51	0.51
Other Revenues	1,418,766	1,500,753	81,987	5.78%			
Total System	**$ 30,245,814**	**$ 34,347,591**	**$ 4,101,777**	**13.56%**	**8.0%**	**1.00**	**1.00**

Q. Does the Company's proposal result in the full elimination of subsidies across rate classes?

A. No. In order to move all classes to their cost-to-serve, decreases would be required for GD-2, GD-3, GD-4, and GD-5. In order to provide these classes decreases, the other classes would experience increases above the 150% cap on the overall system increase. The Department has requested that Massachusetts Electric Distribution Companies ("EDCs") provide a proposal to eliminate subsidies over time. The Company has made

movements towards removing subsidies across classes in this base rate proceeding and plans to continue to do so in future base rate proceedings.

VII. UNITIL'S RATE DESIGN PROPOSALS

Q. Please summarize the rate design changes Unitil has proposed in this rate proceeding.

A. Unitil has proposed to incrementally move the demand and customer charges closer to the customer and demand charges for all classes.[1] The method employed utilized two steps of logic. First, increase the fixed customer and demand charges by 150% of the overall system increase of 13.56% (a 20.34% increase). Second, if the 20.34% increase did not produce a customer or demand rate that recovered at least 25% of the unit cost in the ACOSS then the rate should be set at 25% of the ACOSS unit cost. The exception to this is Unitil is only proposing to increase GD-2's demand charge to $10.00 and only increase GD-3's customer charge to $338.75, which are both close to the unit costs. In all cases, the customer and demand charges were rounded to the nearest quarter dollar.

Q. Is this an appropriate level of customer charges?

A. Yes. The distribution costs incurred by Unitil do not vary based on the amount of energy consumed. They vary based on the demand placed on the system and the number of customers the Company serves. The ACOSS only classified direct customer costs such as services, meters, billing, and customer service costs as customer related. As discussed

[1] In D.P.U. 22-22 the Department directed all EDCs to address the merits of demand ratcheted rates in their next base distribution rate filings, and, if warranted, to include a proposal or plan to eliminate the use of ratcheted rates. Unitil does not have demand ratchets.

earlier in this testimony, portions of the distribution system upstream from the service drop have the dual purpose of meeting the system's demand and to attach customers to the system. A portion of these local facilities varies with the number of customers and can appropriately be included in a flat fixed monthly charge, a local facilities charge, a basic service charge, or a customer charge. As such, the ACOSS provides a conservative estimate of fixed costs that vary with the number of customers on the system.

Q. What new Light Emitting Diode ("LED") outdoor lighting rates are being proposed?

A. The Company is proposing the following changes to its Outdoor Lighting service: The Company will no longer offer sodium vapor and metal halide luminaires. As these legacy fixtures need replacement, they will be replaced with LED fixtures, and there will be no special charges to the customer for this replacement. If, however, a customer requests a conversion of a legacy fixture, or multiple fixtures, to LED service in advance of its actual needed requirement for replacement, or Company planned servicing, the Company may require the customer to pay all or a portion of the costs of the conversions, including labor, material, traffic control, and overheads. Conversions are contingent upon the availability of Company personnel and/or other resources necessary to perform the conversion. Customers wanting to purchase their own LED fixtures will still have that option under Schedule SDC.

Q. Will new LED Luminaire charges be offered?

A. The new LED Luminaire charges are specified in Exhibit Unitil-JDT-4. To accommodate the evolution of LED lighting fixtures, the Company proposes to offer luminaire charges encompassing a range of fixtures as opposed to the exact specifications of each individual fixture available on the market today, as provided in the proposed tariff. In addition, lighting fixtures other than that specified in the tariff will be provided only at prices and for a contract term to be mutually agreed upon between the Company and the customer.

Q. Can you please describe how you designed the rates for outdoor lighting service?

A. The first step in designing the rates for the outdoor lighting service was to map the LED lights currently within special agreements to their equivalent range of fixtures within the new proposed tariff structure. The existing special agreement rates were then compared to the monthly costs of providing an LED fixture for various ranges of fixtures based on updated cost details from the ACOSS. New rates were set for the proposed range of fixtures based on considerations of bill impacts for those existing special agreement customers. For instance, a current special agreement rate for a 28 watt LED is $7.58, which maps to the 20 to 30 watt fixture range. While the cost analysis of providing the equipment and ongoing service to a 30 watt LED is $15.81, the rate was set to $9.50, representing a 25% increase for these special agreement customers. Once the new LED rates were set and multiplied by the count of fixtures, the remaining revenue requirement was spread to all existing mercury vapor and high-pressure sodium fixtures.

Q. Have you provided a schedule that depicts the proposed rates for all classes of service and corresponding revenues to show that Unitil's proposed rates generate the total distribution revenue and total revenue increase it has proposed in this proceeding?

A. Yes. Exhibit Unitil-JDT-4 shows the derivation of each rate component for each of the Company's tariff schedules and the corresponding revenues generated from those proposed rates.

Q. What are the corresponding bill comparisons for Unitil's customers served under its various rate schedules?

A. A presentation of the bill impacts based on class average presented in deciles of usage is provided for all rate schedules in Exhibit Unitil-JDT-5.

Q. Did the Company examine rate designs for all-electric buildings to align with the Commonwealth's electrification policies as directed in D.P.U. 22-22?

A. Yes. The Company and Atrium met on several occasions to discuss rate designs for all-electric buildings. In particular, we evaluated the merits of an optional rate for all-electric commercial buildings with a higher monthly fixed rate to reflect the higher load factors expected of these customers. One challenge with an optional rate that is end technology specific is the requirement to verify that a building is all electric. This creates an additional administrative responsibility for the Company. More significant is the self-selection bias inherent in an optional rate with a high fixed monthly charge. Customers with higher than average usage would benefit from moving to the optional rate, which may not incentivize smart electrification of buildings but rather inefficient uses (*i.e.*, baseboard heating as

opposed to central air with a heat pump). To mitigate the self-selection bias and additional administrative costs of overseeing an end-use-specific rate, the Company is proposing changes to its existing rate schedules to address all-electric buildings. The proposal is to move towards cost-based rates, which provide the appropriate price signal for customers to choose between fuel sources. As discussed above, the Company is proposing an increase to the customer and demand charges for all rate classes which moves all rates closer to their unit costs.

Q. Why is Unitil proposing a residential heat pump rate in this filing?

A. As indicated in the testimony of Company witness Robert Hevert, Unitil appreciates that strategic electrification is a key component of the Commonwealth's strategy to meet the net-zero emissions target in 2050, including the Company's 2022-2024 Energy Efficiency Plan and future energy efficiency plans. As part of the 2022-2024 Energy Efficiency Plan, Unitil is actively promoting customer adoption of heat pump technology.

Q. How were the rates developed for the proposed Residential Heat Pump and how do they compare to the Residential RD-1 rate class?

A. The normal use per customer for the Company's gas heating customers (Rate R-3) was converted to an equivalent kWh usage based on the efficiency of heat pumps. This provided an estimate of the additional kWh a residential customer would use after the installation of a heat pump as a replacement for gas heating. The customer charge and the summer volumetric charge was set to the same levels as the Residential RD-1 rate and the winter volumetric charge was set to recover the same level of total fixed costs in order to

make the rate design revenue neutral. The resulting winter volumetric charge for the heat pump rate is 36 percent of the volumetric rate for the Residential RD-1.

Q. Has the Company filed a residential heat pump tariff?

A. Yes, as explained in the testimony of Company witnesses Christopher Goulding and Daniel Nawazelksi, the Company has included its proposed tariff Residential Heat Pump Service, Schedule HP-RES and HP-RES-LI, with all of its proposed tariffs with the transmittal letter to this filing.

Q. When does the Company plan to implement the proposed residential heat pump rate?

A. If the rate structure is approved as filed, the Company anticipates it will need six to nine months after the order is issued to complete system design, testing, and bill print. The Company may need additional time if an alternative rate structure is approved.

Q. Please describe the Company's proposed rate annualization for its residential EV rate.

A. The Company currently has seasonal time differentiated EV rates for residential customers. The basis of the rate design used the Company's Basic Service rate period which ran from June through November and December through May. Recently, the Company's Basic Service rate period changed to run from August through January and February through July. This change, along with the initial seasonal aspect of the rate design coupled with normally scheduled rate changes, results in numerous rate changes for this class throughout the year. In addition, upon closer examination, the seasonal differences are small. To reduce the administrative burden and provide simplicity for customers, the Company

proposes to annualize the rates. This will result in all changes in the residential EV rate aligning with changes in the Residential Rates RD-1.

Q. How was the annualization calculated?

A. As shown on Page 1 of Exhibit Unitil-JDT-7, the Company simply used the seasonal amounts that were approved in D.P.U. 21-92 and summed the peak, off-peak, and mid-peak amounts by season and divided by the annual units to arrive at annual time differentiated rates. On page 2, I have provided the proposed rates for effect September 1, 2023.

Q. Have you prepared a workpaper that calculates the Company's Demand Charge Alternative rates consistent with the proposed rate design for GD-2 and GD-3 rate classes?

A. Yes, the workpaper is included in Exhibit Unitil-JDT-8.

Q. Have you developed the class revenue targets for the Company's revenue decoupling mechanism?

A. Yes, the class revenue targets are provided on Exhibit Unitil-JDT-9. As shown, the revenue targets are from the final proposed revenue apportionment on Exhibit Unitil-JDT-9. Exhibit Unitil-JDT-9 also provides the Company's revised Distribution Revenue Allocator ("DRA") which is used in the derivation of certain reconciling mechanisms, including the Revenue Decoupling Adjustment Factors. Consistent with the current DRA, outdoor lighting plant is removed in the calculation to provide a better allocation based on distribution system costs.

Q. Have you provided a set of workpapers supporting the rate design?

A. Yes. I have provided my workpapers supporting the rate design in Exhibit Unitil-JDT-11.

VIII. CONCLUSION

Q. Does this conclude your direct testimony?

A. Yes.