UNITIL ENERGY SYSTEMS, INC.

DIRECT TESTIMONY OF

KEVIN E. SPRAGUE

New Hampshire Public Utilities Commission

Docket No. DE 16-384

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I. INTRODUCTION

Q. Mr. Sprague, would you please state your name and business address?

A. My name is Kevin E. Sprague. My business address is 6 Liberty Lane West, Hampton, New Hampshire 03842.

Q. What is your position and what are your responsibilities?

A. I am Director of Engineering for Unitil Service Corp., which is a subsidiary of Unitil Corporation ("Unitil") that provides managerial, financial, regulatory and engineering services to Unitil's principal utility subsidiaries, including Unitil Energy Systems, Inc. (hereinafter "Unitil Energy" or the "Company"). In this capacity, I manage all of the Company's engineering functions, including electric engineering, gas engineering, computer-aided design and drafting, Geographic Information Systems (GIS), and management of utility-owned land and property.

Q. Please describe your business and educational background.

A. I have been employed by Unitil Service Corp. for approximately 20 years. I was originally hired as an Associate Engineer in the Distribution Engineering group. I have held the positions of Engineer, Distribution Engineer and Manager of Distribution Engineering. I accepted the Director of Engineering position in November of 2007. I hold a Bachelor of Science in Electric Power Engineering from Rensselaer Polytechnic Institute and a Master of Business Administration from the University of New Hampshire.

Q. Do you have any licenses that qualify you to speak to issues related to engineering?

A. Yes. I am a registered Professional Engineer in the State of New Hampshire and the Commonwealth of Massachusetts.

Q. Have you previously testified before the Commission, or other regulatory agencies?

A. Yes, I have testified on previous occasions before the Commission, the ME PUC and the MA DPU. Most recently, I have testified in several of the Company's annual Reliability Enhancement Program (REP) and Vegetation Management Program (VMP) filings as well as participating many of the technical sessions related to the most recent amendment to the PUC 300 Rules.

Q. What is Unitil's overriding objective for the operation of its electric system?

A. The Company's primary objective is the provision of safe and reliable service for our customers in the most economical manner. We accomplish this objective, in part, with a rigorous annual planning and budgeting process with a focus on the reliability of our system. The costs of projects to improve or maintain reliability, including investment needed to replace aging electric infrastructure, affect other important objectives, such as the Company's efforts to minimize or mitigate electric-rate increases to customers.

Q. What is the purpose of your testimony and how is it organized?

A. The purpose of my testimony is to describe, the Company's annual planning and capital budgeting process and the positive effect this approach has had on the reliability of the electric system for our customers. My testimony begins with a description of the Company's reliability performance since the most recent base rate case. Section III describes the Company's approach to capital spending and investment planning including the planning and budgeting process, authorization and control of capital spending and the five year capital budget. Lastly, Section IV includes a description of the two system supply substation additions that are currently under construction.

II. RELIABILITY PERFORMANCE

Q. Please provide a summary of the Reliability Enhancement and Vegetation Management Program the Company has been implementing since the most recent base rate case.

A. The Settlement Agreement in DE10-055 provided that Unitil Energy implement a REP beginning in calendar year 2011 and allowed the Companyto spend a target amount of $1,750,000 annually subject to a cap of $2,000,000 on REP capital spending in any given year. The May 1 Step Adjustments for REP capital spending were limited to the years 2012, 2013, and 2014 to recover the revenue requirements attributable to REP capital expenditures of the preceding calendar year. The Company also increased its annual REP operation and maintenance expense by $300,000 effective May 1, 2012. The Settlement Agreement also provided that Unitil Energy implement an augmented VMP (as discussed in the testimony of Sara Sankowich).

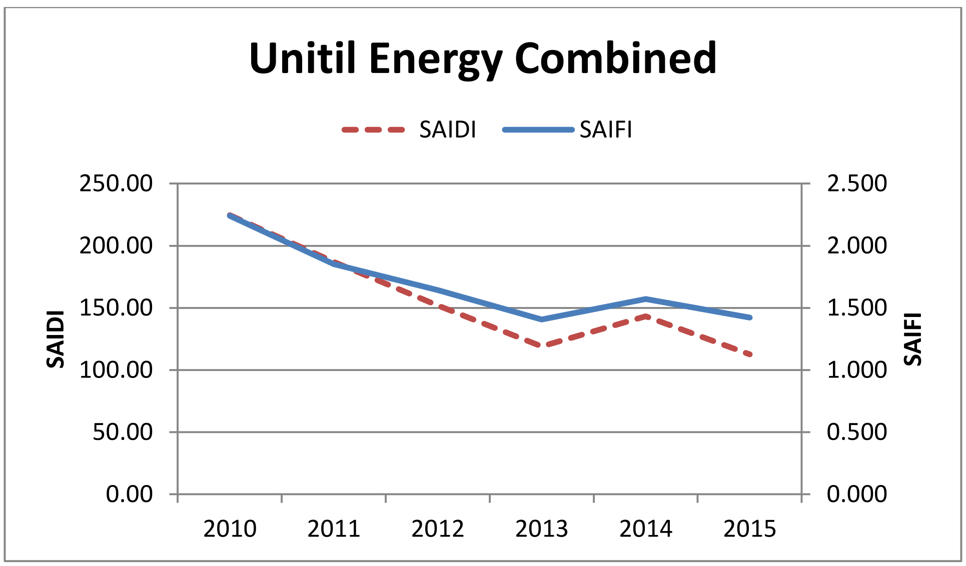
Q. What kinds of activities or projects were included in the REP?

A. The REP covers capital and O&M activities and projects intended to maintain or improve the reliability of the electric system including: (1) system hardening measures, i.e., equipment upgrades; installation of additional fuses, sectionalizers and reclosers; SCADA and automation projects; improvements to lightning protection; installation of animal guards; and other activities to mitigate the specific causes of outages; (2) enhanced tree trimming, i.e., aggressive trimming and clearing involving an expanded trim zone or more aggressive removal beyond what is normally included in maintenance trimming, typically in localized areas of poor reliability; (3) asset replacement, which targets aging electrical components at increased risk of failure, including porcelain cutouts and insulators, transformers, circuit breakers, underground cable, wood poles and other equipment, and includes conductor replacement and reconductoring of select mainlines with spacer cable; and (4) reliability-based inspections and maintenance, which will include enhanced inspection methods to detect and mitigate outage causes before they occur, including surveys using new or improved technology such as thermography (IR) and radiofrequency (RF) sensor technology to identify and mitigate failing electrical equipment, as well as software applications to better manage inspection, maintenance, and reliability programs and data.

Q. Please describe the reliability performance of the Company since the most recent rate case?

A. In conjunction with the REP program, the Company has developed an aggressive approach to reliability planning which includes daily, weekly, monthly and annual reliability analysis designed to address overall reliability performance. Since 2010 the Company's reliability has been showing an improving trend. This is in contrast to the worsening trend in reliability that was identified before the start of the REP program.

Chart 1. Unitil Energy Reliability Performance



Q. Is the Company proposing to continue the REP program?

A. The Company is proposing to continue to implement the same reliability based analysis and capital improvements as it has done under the REP. However, as described in the testimony of Mr. Chong, the Company is recommending a different recovery mechanism associated with the capital investments. The Company is also concerned that the impending Grid Modernization docket IR 15-296 will result in different types of reliability investments than the REP is designed to cover. The Company would like to reserve greater flexibility to implement projects that might be identified through the development of a Grid Modernization Plan and discontinue the REP capital spending plan.

Q. Is the Company proposing to continue the VMP program?

A. Yes. The Company is proposing to continue the VMP Program as is described in the testimony of Ms. Sara Sankowich.

Q. Is the Company proposing to continue with the REP reliability inspection and maintenance program?

A. Yes. The Company will continue the inspection and survey program. It completed a third survey of all our overhead, three-phase circuitry, or a total of 419 pole miles of line. We believe this methodology provides the greatest impact to customers as a failure of equipment along these circuits would affect the greatest amount of customers and therefore have the greatest impact on system reliability, i.e. SAIDI. The circuit surveys transformers, insulators, lightning arrestors, bushings, and cutouts which are showing signs of failure. The Company has taken an aggressive approach to replacing the identified equipment. These replacements avoided over 48 SAIDI minutes over the years 2014 and 2015. The Company is continuing the Exacter® preventative maintenance program in 2016. This is the last year of our three year contract with the vendor. We will continue to perform an annual survey of all three-phase circuit miles of the distribution system, as failures of this equipment has the greatest impact on customer interruptions. The estimated cost to perform the annual survey and provide the analytics is $220,000, and the cost to replace the identified equipment is expected to be approximately $50,000 annually. Given the potential impact on system SAIDI, the company believes these expenditures are prudent and beneficial to customers. See the testimony of Mr. David Chong for how the Company expects to collect and reconcile these REP costs.

III. CAPITAL SPENDING AND INVESTMENT PLANNING

A. PLANNING AND BUDGETING PROCESS

Q. How does the Company plan for needed investments?

A. The annual planning process starts with engineering studies performed by the Company's engineering group. This includes: system studies (34.5kV off road distribution which is used to serve distribution substations and circuits) performed using load flow analysis; joint system planning with Eversource; circuit studies performed using circuit analysis software and protection studies; and area reliability studies. These studies are updated annually with the latest load forecasts at the circuit level and at the transmission level and are employed to identify both short term and long term needs. Engineering planning studies are the first and most important input into the capital planning process.

Q. Please describe the Joint Planning process between Unitil Energy and Eversource.

A. The goal of the Joint System Planning between the Company and Eversource is to develop the most cost effective alternatives for the combined Unitil Energy and

Eversource system. Absent this process, the Company and Eversource customers may be subject to more expensive system enhancements due to duplication of facilities between Unitil Energy and Eversource. This process is intended to promote coordinated planning efforts between Unitil Energy and Eversource to develop a single "best for all" plan that potentially affects both companies. The objective is to provide a consistent approach for the planning of safe, reliable, cost effective, and efficient expansion and enhancements to each other's local area systems while meeting regulatory and contractual requirements.

By agreement, this process establishes a Joint Planning Committee of Eversource and Company representatives. This committee meets several times on an annual schedule to bring all parties together to coordinate each company's individual plans. The committee considers the application of consistent planning criteria using agreed upon system data; the total cost of planned additions, including internal costs of each utility; the reliability impact of planned additions and modifications; operational considerations, system losses, and maintenance costs; technical considerations for standardized designs and equipment; and the intent of the wholesale supply contract.

Q. Please describe the annual budget process and explain how needs are identified and prioritized as part of this process.

A. As described above, the engineering group identifies the need for system improvement and reliability projects. Operations personnel identify the need for condition replacements based on inspection and maintenance programs. Budgets are constructed using a "bottom up" process each year with input from dozens of engineering and operations employees. Technical and managerial personnel with responsibility for planning, designing, operating and maintaining the electric delivery system are responsible for identifying needs and developing cost-effective solutions. A multistep process is used to budget hundreds of individual projects, and to then prioritize needs and determine which projects are essential to meet our objective of safe and reliable service for our customers. Projects are also proposed that may not be essential, but which represent an improvement or enhancement to existing systems or capabilities, including projects to improve reliability, replace old or obsolete equipment, and projects with a defined economic payback.

Q. How does the Company ensure projects are appropriately specified, estimated and prioritized?

A. In advance of the budget cycle each year, instructions are provided to all budget managers and other contributors that define expectations for the proper development and justification of projects. These instructions ensure that individual budget items are well defined, estimated and justified, and ensure accurate and consistent entry into the budget system. Comparative analysis of competing project costs is completed to identify the most economical solution. The goal of this process is to streamline the review and approval process. Specifically, each submitted project is expected to meet the following requirements:

- Each project must have a well-defined project scope, which fully describes the project and the extent of work to be undertaken.
- Each project must also have a detailed justification that describes the need for the project, including quantitative analysis where possible.

In general, only projects that are well-defined and appropriately justified are included in the budget. Project entries intended to be "place holders" for undefined plans or needs are not accepted. This allows management to efficiently and effectively review priorities and spending, and ensure an appropriate level of funding for important projects.

Q. Please describe how individual projects are categorized within the budget.

A. First of all, the Company's capital budget is separated by operating location: Unitil Energy Capital and Unitil Energy Seacoast. This provides an additional level of detail used during the management review of the budget. In addition, each project is classified into one of seven categories, which include substation, distribution, annual requirements, transportation, structures and general equipment. Each category is further broken down into subcategories such as overhead extensions, underground extensions, street light projects, telephone company requests, line relocations (highway projects), and reliability projects. Blanket authorizations for annual requirements are broken down into subcategories for T&D improvements, new customer additions, outdoor lighting, emergency & storm restoration, billable work, transformers, meters, and water heater replacements.

Q. How are projects prioritized within the budget?

A. In addition to being appropriately categorized, and having a well-defined scope, justification and cost estimate, all projects in the capital budget are also assigned one of three priorities, defined as follows:

Priority 1: Essential for the Company to meet its service obligation to customers, including the provision of safe and reliable service. Included are projects to address critical constraints such as load and voltage where they jeopardize the Company's ability to distribute electricity, activities to restore service during following emergencies, and construction required to serve new customer load. All projects in this category are considered non-discretionary.

Priority 2: Includes projects that are essential for the Company to perform business activities in the required manner including regulatory or legal requirements, intercompany operating agreements, and supporting facilities, equipment, and vehicles. These projects and activities are also considered to be non-discretionary, though there may be discretion as to timing.

Priority 3: Includes projects and activities that are considered an improvement or enhancement to existing systems or capabilities. These projects are considered to varying degrees to be discretionary.

Q. How is all this information reviewed and validated in developing a final budget compilation?

A. As budgets are compiled and submitted for review and approval, the budgets are reviewed project-by-project, line-by-line, and category-by-category in a series of meetings held with all applicable budget managers and contributors. Each project is reviewed to ensure that it has been appropriately categorized and prioritized within the budget, and to ensure complete documentation of scope, justification and cost estimates have been provided. Categories of spending, including annual requirements, are scrutinized to ensure the budgeted spending levels are appropriate based on historic spending levels and current assumptions, and adjustments (if needed) are made to ensure budgeted spending levels are appropriate. Priorities are reviewed to ensure all projects have complete justification. Projects without adequate justification are removed or deferred as appropriate. Once a well-prepared budget has been validated and fully vetted, it is advanced through the formal review process for final approval.

Q. How does the Company optimize cost-to-benefit decisions with regard to replacement of aging facilities?

A. The capital planning and budgeting process provides the structure and discipline to carefully evaluate, prioritize and approve those projects that offer the most cost-effective solutions to improve reliability or address significant risks, while also identifying and addressing aging or obsolete facilities. Budgets are established through a "bottom-up" process each year, with input from dozens of engineering and operations employees. Hundreds of individual projects are scoped, estimated, justified and then prioritized to determine which projects are required to ensure a safe and reliable system for our customers.

B. AUTHORIZATION AND CONTROL OF CAPITAL SPENDING

Q. How does the Company approve, authorize and control spending to ensure the reasonableness and prudence of capital additions?

A. There are several layers of controls on spending. First, and perhaps most important, is the budget process. The capital budget represents the culmination of a lengthy planning process to identify and prioritize important needs, while ensuring that projects submitted for approval are the most cost effective solutions to address those needs and are estimated appropriately. The budget proceeds through several rounds of review at multiple levels of the organization before concluding with review and approval by executive management, and by the Company's Board of Directors.

Q. Are there other controls over budgeted spending on capital additions?

A. Yes. After the budget is approved, each project within the budget must be further authorized before spending can occur. This is a second step in the approval process, and occurs on a project-by-project basis. A construction authorization must be prepared and submitted for approval for each planned expenditure and each project in the budget, even though the budget has already been approved. Each authorization must be fully approved prior to the commencement of any work, except where an unforeseen emergency occurs that requires the work to be completed to ensure public safety or restore service to customers, in which case the authorization can be completed immediately following the work.

C. FIVE YEAR CAPITAL BUDGET

Q. Has the Company completed the capital planning and budgeting process for 2016 through 2020?

A. Yes. The Table 1 below is the Company's most recent five-year budget for electric projects over the period 2016 to 2020.

Table 1 – 2016-2020 Capital Budget Forecast

Annual Requirements Blankets	**2016**	**2017**	**2018**	**2019**	**2020**
T&D Improvements	2,638,062	2,873,435	3,113,019	3,552,638	3,213,071
New Customer Additions	811,954	903,229	989,942	1,160,210	1,048,665

Outdoor Lighting	388,038	426,019	454,958	534,631	463,448
Emergency & Storm Restoration	1,022,430	1,239,592	1,347,522	1,381,109	1,390,983
Billable work	673,970	735,184	804,958	918,638	837,914
Transformers	1,973,778	2,580,115	2,814,787	2,749,222	2,345,054
Meters	557,302	614,473	677,429	772,072	723,085
Sub-Totals:	**$8,065,534**	**$9,372,047**	**$10,202,615**	**$11,068,520**	**$10,022,220**
Distribution					
Overhead Line Extensions	170,831	202,634	231,935	273,762	242,652
Underground Line Extensions	685,938	776,986	872,379	1,037,888	922,271
Street Light Projects	57,177	42,361	45,719	52,609	46,805
Telephone Company Requests	343,770	274,033	46,240	52,988	47,392
Highway Projects	641,989	243,368	205,823	235,345	211,759
Distribution Pole Replacements	1,217,080	1,417,581	1,470,673	1,683,758	1,518,478
Specific Projects: Distribution	3,137,864	3,224,239	2,576,248	1,676,719	3,455,046
Sub-Totals:	**$6,254,649**	**$6,181,202**	**$5,449,017**	**$5,013,069**	**$6,444,403**
Substation					
Specific Projects: Substation	9,688,760	5,812,195	2,870,690	902,393	3,265,796
Sub-Totals:	**$9,688,760**	**$5,812,195**	**$2,870,690**	**$902,393**	**$3,265,796**
Communications	**71,221**	**164,262**	**107,217**	**230,287**	**206,976**
Tools, Shop, Garage	**86,550**	**109,250**	**104,500**	**111,500**	**114,000**
Laboratory	**14,000**	**69,500**	**14,000**	**14,000**	**14,000**
Office	**9,500**	**6,000**	**7,000**	**7,000**	**7,000**
Structures	**112,000**	**114,000**	**102,500**	**77,500**	**30,000**
Distribution Totals:	**$24,302,214**	**$21,828,456**	**$18,857,539**	**$17,424,269**	**$20,104,395**

Q. What is included in the category for “Annual Requirements Blankets”?

A. This category includes blanket authorizations for categories of projects where each individual project is small in value (under $20,000) except for small equipment and general purchases (which are under $4k) and cannot be individually anticipated at budget time. As I previously explained, these projects budgeted and authorized under a single blanket authorization representing the anticipated aggregate level of spending. The categories are generally self-explanatory. For example, distribution improvements include: minor upgrades and replacements and repairs to the distribution system; new customer additions consist of new customer requests for service including new services and small line extensions; outdoor lighting includes repairs and replacements of existing street lights and customer lighting fixtures; emergency and storm restoration includes capital repairs and replacements required to restore service to customers following storms or outages; billable work includes customer projects, pole accidents, cable TV projects and other projects where all or a portion of the work is billable; and, lastly, transformer and meters are for the purchase of transformers and meters.

Q. What is in the category for "Distribution"?

A. These projects are individually authorized projects involving capital additions where the value of the project exceeds the maximum threshold allowed under blanket authorizations. The projects are generally self-explanatory. For example, overhead and underground line extensions are new extensions of primary facilities required to provide service to customers; street light projects are new projects to add street lighting; telephone company requests include pole replacements and relocations required under our intercompany agreements with Fairpoint; highway projects are typically line relocations driven by state or municipal roadway projects; distribution and sub-transmission poles replacements include costs associated with replacing poles that failed inspection during the Company's 10-year pole inspection program; and, specific projects are all other projects in excess of $20,000 that are identified by engineering or others that are needed to meet service obligations.

Q. What is included under the category "Substations"?

A. These are individually-authorized projects involving projects and capital additions to distribution substations. Each project is individually budgeted and authorized. The projects are typically identified by engineering, though the projects may also be identified as the result of inspection and maintenance activities.

Q. What are included under the remaining categories?

A. Communications includes additions and replacements of communication-related equipment such as Supervisory Control and Data Acquisition (SCADA), radio systems for field communications, and communication equipment for the Company's Advanced Metering Infrastructure (AMI) system; tools, shop, and garage includes most tools and test equipment used by electrical workers in the performance of their job; laboratory includes test equipment used to test meters and other devices; office includes furniture and office equipment, including normal additions and replacements; and structures includes upgrades and improvements to the Company's buildings, including the Company's operations center building.

Q. Can you explain where the company expects to invest most of its capital spending in the subsequent five years?

A. Yes. Table 2 below categorizes the five-year capital budget (in dollars) into two primary categories: Customer Expansion (addition of new customers and new load) and Non-Customer Expansion (no new load added to support the investment).

Table 2 – Forecast Customer Expansion and
Non-Customer Expansion Capital Spending 2016 - 2020

	Forecast Spending (000's)				
Electric Category	**2016**	**2017**	**2018**	**2019**	**2020**
Customer Expansion					
Customer Additions	3,801	4,224	4,669	5,382	4,934
Subtotal Customer Expansion	3,801	4,224	4,669	5,382	4,934
Non-Customer Expansion					
Reliability	610	750	750	750	750
Maintenance Replacement	6,576	7,728	8,354	9,377	9,154
Mandated	986	517	252	288	259
System Improvement	11,923	7,532	3,665	284	1,370
Other	407	1,077	1,168	1,343	3,638
Subtotal Non-Growth	20,501	17,604	14,189	12,042	15,171
Total	**$24,302**	**$21,828**	**$18,858**	**$17,424**	**$20,104**

% Customer Expansion	16%	19%	25%	31%	25%
% Non-Customer Expansion	84%	81%	75%	69%	75%

Q. Please describe the way in which you have categorized this capital budget?

A. The table above has been categorized into customer expansion (addition of new customers resulting in revenue producing projects) and non-customer expansion (non-revenue producing) projects.

First, I will describe the types of projects which have been categorized in the customer expansion category. These projects include: new customer services, new customer transformer purchases, new customer meter purchases, overhead line extensions and underground line extensions. These projects are directly related to adding new customers and new load to the system.

The non-customer expansion related category is broken down into reliability, maintenance replacement, mandated, system improvements and other projects. I can explain the types of projects that make up these categories:

Reliability – Projects where the primary justification is to improve reliability (i.e. reduce customer minutes of outage time and/or reduce customer interruptions) such as: distribution automation, recloser additions, spacer cable, adding fusing locations, circuit reconfiguration to reduce outage size, circuit ties, etc.

Maintenance Replacement – Normal replacement of aged equipment such as: distribution pole replacement, distribution improvements, outdoor lighting, emergency and storm restoration, billable work, meter replacements, underground cable replacement, equipment replacement, etc.

Mandated – Projects necessary to perform assigned business functions in required manner including regulator or legal requirements, intercompany operating agreements and related facilities such as: highway relocation projects, telephone company requests, third party attachments, etc.

System Improvement – Projects required to address engineering planning constraints such as overloads and voltage problems which violate planning criteria such as: new system supply substations, transformer replacements, voltage regulation projects, reconductoring, stepdown transformer replacements, etc.

Other – All other projects that do not fit into the categories above such as: equipment and tools, communication projects, office furniture, structure projects, SCADA, software, substation modifications, etc.

Q. Can you provide the same table as provided in Table 2 but for actual spending from 2010-2015?

A. Yes. Table 3 below categorizes actual spending from 2010-2015.

Table 3 – Actual Customer Expansion and
Non-Customer Expansion Capital Spending 2010 – 2015

	Actual Spending (000's)					
Electric Category	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Customer Expansion						
Customer Additions (C)	2,928	3,198	3,600	3,754	4,227	3,612
Subtotal Growth	2,928	3,198	3,600	3,754	4,227	3,612
Non-Customer Expansion						
Reliability (R)	485	316	821	595	137	609
Maintenance Replacement (M)	6,707	6,587	3,960	6,491	7,063	7,307
Mandated (H)	-87	828	410	31	252	1,015
System Improvement (I)	2,115	3,216	2,103	4,509	5,627	9,596
Other (O)	1,291	2,396	2,073	792	2,224	1,267
Subtotal Non-Growth	10,511	13,343	9,367	12,418	15,303	19,794
Total	**$13,439**	**$16,541**	**$12,966**	**$16,172**	**$19,530**	**$23,406**

% Customer Expansion	22%	19%	28%	23%	22%	15%
% Non-Customer Expansion	78%	81%	72%	77%	78%	85%

Q. Can you describe the breakdown between customer expansion related and non-customer expansion related capital spending?

A. Yes. As shown in tables 2 and 3 above, the average annual percentage of spending on customer expansion is virtually identical over both the historic 6-year period (22% average) and the future 5-year period (23% average). Individual historical years where the customer expansion percentage was low relative to the annual average was due to the heavy spending on the Kingston and Broken Ground substations. Individual future years where the Company expects little spending on

Kingston and Broken Ground (as shown by 2019), the percentage of customer expansion spending is high relative to the annual average.

Q. Can you describe why you have selected to categorize Tables 2 and 3 into Customer Expansion and non- Customer Expansion categories?

A. In times of higher customer expansion, the electric system benefits from renewal of aged equipment during the projects which are designed to increase the capacity of the system. When the number of new customer projects slows the Company's facilities are not benefitting from this customer expansion related renewal and, as a result, it becomes much more challenging to address all of the periodic replacement that would be optimal for the distribution system. Over the next five years, the Company is forecasting that on average 77% of its capital investment will be on projects that will not result in any increase in system load or revenue.

IV. SYSTEM SUPPLY SUBSTATION ADDITIONS

Q. Please describe the Company's two large system supply substation projects.

A. The Company currently has two major substation projects underway. Kingston substation is located in Kingston, NH and serves the southwestern portion of the Unitil Energy Seacoast territory. Broken Ground substation is located in Concord, NH and will serve the eastern portion of the Unitil Energy Capital service territory.

Q. Can you describe the justification for Kingston Substation?

A. Yes. Based upon the Company's load projections, the existing Kingston substation transformer will exceed its basecase and extreme peak rating by the summer of 2016. This configuration assumes as much load has been moved to Timber Swamp as possible. In addition, the Great Bay transformer will exceed its base case and extreme peak rating by the summer of 2016. The addition of a new system supply in the Kingston area allows load to be shifted away from Timber Swamp and will allow some Great Bay load to be served from Timber Swamp.

Q. Is there further justification for the addition of Kingston Substation?

A. Yes. As described above, the Company and Eversource complete a Joint Planning process each year. Through the Joint Planning process, Eversource identified the need to serve an additional 15MW of its load normally served out of Chester from the Eversource Kingston Substation once the Unitil Energy load is removed from the Eversource transformer. The Joint Planning process evaluated two alternatives for the Kingston supply: 1) add a second transformer to the existing Eversource Kingston Substation and 2) Unitil Energy construct a new Kingston Substation. Each of the options assumed that Eversource would create a new distribution circuit to serve their load from this substation. The first option provides only an incremental step towards meeting the long term planning needs of the Unitil Energy system and does not provide sufficient capacity to support loading following the loss of transformer resulting in approximately 60MW to remain out of service. The second option provides the necessary capacity and meets all planning criteria for the loss of a single element.

Q. Is this the same Kingston Substation that the Company described in its most recent rate case DE 10-055?

A. Yes. At the time of the most recent rate case, the Company re-evaluated its load forecast and implemented other system configuration changes to delay the need date of Kingston substation until the summer of 2016. In addition, the Company worked closely with the expert hired by the Commission to review the need and timing for Kingston Substation.

Q. What portion of Unitil Energy's territory does Kingston substation serve?

A Four 34.5kV sub-transmission lines supply various distribution substations, which in turn provide service to the towns of Atkinson, Plaistow, Newton, Kingston, Danville, East Kingston, and portions of Exeter, Kensington, Hampton Falls and South Hampton. This substation also provides backup distribution service to a PSNH distribution circuit.

Q. Please describe the Kingston Substation project.

A. The Kingston substation project consists of two parts. One portion of the project includes a second 5 mile 115kV transmission line installed from the Kingston tap to the new 115kV Peaselee substation both of which are owned and operated by Eversource. Eversource will supply the Unitil Energy Kingston Substation (as well as the Eversource Kingston Substation) with 115kV taps. Unitil Energy is constructing a substation with three 115-34.5kV 60 MVA transformers with three 34.5kV bus sections.

Q. What are the projected costs of the Unitil Energy Kingston substation project?

A. I have prepared Table 4, which lists the Kingston substation project activities and estimated costs.

Table 4. Kingston Substation Costs

Year	Project Activities	Capital Cost
2013 – April 2016	Site evaluation, permitting, engineering design, site clearing and preparation, foundations, civil work and equipment purchases, electrical construction, civil work and equipment purchases, control house and control wiring installation, electrical connections, commissioning	$ 9,880,166
2016 Remaining	Spare transformer delivery and post in-service construction to remove existing facilities	$ 1,874,800
	Total Project Spending	$11,754,966

Q. Will the Kingston modifications enhance reliability to Unitil Energy customers?

A. Yes. Presently during the summer months, Unitil Energy must reconfigure its 34.5 kV sub-transmission system, creating an abnormal operating configuration, to remove load from this substation to avoid exceeding planning criteria loading limits. This results in load in Kingston being served from lines originating in Hampton, increasing the line exposure to the customers who are normally fed from Kingston. The time has come that shifting that amount of load is not enough to address the basecase loading on the existing Kingston substation transformer. When this project is complete, there will no longer be the need to reconfigure the system to alleviate summer loading concerns.

Q. Can you describe the justification for Broken Ground Substation?

A. Yes. Based upon the Company and Eversource's load projections, the Company's system load will exceed the rating of the Eversource Garvin's and Oak Hill substation transformers by the summer of 2017 for a loss of any one transformer or any one of the lines serving Oak Hill or Hollis. In addition, Eversource rebuilt its 317 Line and is serving an additional 15MW from Oak Hill substation. The Joint Planning process considered several different alternative approaches to address this need including upgrades in earlier years such as: 1) reconductor the Eversource 318 line and service Hollis load from Oak Hill and 2) reconfigure the Unitil Energy Capital system including the Hollis area. None of the options considered eliminated the need for a new substation at Broken Ground. In addition, if Broken Ground is installed, the other upgrades are no longer necessary and would only increase the overall costs. The installation of Broken Ground is the least cost alternative and provides the best system benefits and meets all planning guidelines.

Q. What portion of the Company's territory will the Broken Ground substation serve?

A Broken Ground substation will serve portions of Concord, Chichester and Epsom New Hampshire in addition to providing backup to other portions of the system.

Q. Please describe the Broken Ground Substation project.

A Broken Ground substation is also a two phase project. The first phase includes a short 115kV tap into Eversource's new 115kV Curtisville substation. Eversource will supply the Broken Ground substation with short 115kV taps. Unitil Energy is constructing a substation with two 115-34.5kV 60 MVA transformers with two 34.5kV bus sections.

Q. What are the projected costs of the Broken Ground substation project?

A. I have prepared Table 5, which lists the Broken Ground substation project activities and estimated costs.

Table 5. Broken Ground Substation Costs

Year	Project Activities	Capital Cost
2014	Survey, Soil and Geo-Tech Testing, Permitting, Design, Equipment Purchases	$ 898,700
2015	Additional survey and permitting, Design, Forestry, Site work, equipment purchases	$2,498,200
2016	Civil Construction, Electrical Construction, Major Equipment delivery and installation, control house delivery installation	$6,182,400
2017	Final construction, and Commissioning	$3,040,700
	Total Project Spending	$12,620,000

Q. Will the Broken Ground substation enhance reliability to the Company's customers?

A. Yes. Broken Ground substation will reduce the amount of load being served from Garvins and Oak Hill substation which will eliminate the overload conditions. In addition, the Hollis substation load that will be served from Broken Ground is currently served from Garvins substation. This will reduce the line exposure to this load and provide the opportunity to reduce the overall size of the circuits.

V. CONCLUSION

Q. Please summarize your testimony.

A. I have provided testimony supporting the Company's a) the reliability performance of the system since the most recent rate case, b) capital spending and investment planning process including spending projects used to support rate making proposal submitted in Mr. Chong's testimony and c) a description of two large capital intensive system supply substation additions. In addition, this approach will continue improve service to customers by accomplishing the following objectives:

- Continue construction and maintenance activities aimed at preventing interruptions in service in order to reverse the current declining trend in reliability performance.
- Provide flexibility to implement projects identified through the grid modernization plan development process.
- Continue to improving reliability performance to levels better aligned with today's customers' expectations in the modern information age.
- Striving to equalize the level of service reliability experienced by customers, thereby ensuring a more uniform level of service to all customers.
- Supporting capital investments at two system supply substations to greatly expand capacity while providing additional reliability benefits to thousands of customers.

Q. Does this conclude your testimony?

A. Yes, it does.