STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

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LIBERTY UTILITIES (GRANITE STATE ELECTRIC) CORP d/b/a LIBERTY
2021 LEAST COST INTERGRATED RESOURCE PLAN

DIRECT JOINT TESTIMONY OF

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I. INTRODUCTION AND QUALIFICATIONS

Q. Mr. Dudley, please state your full name and business address.

A. My name is Jay E. Dudley. My business address is 21 South Fruit Street, Suite 10, Concord, NH 03301.

Q. Please state your employer and your position.

A. I am employed by the New Hampshire Department of Energy ("DOE" or the "Department") as a Utility Analyst for the Regulatory Support Division.

Q. Please describe your professional background.

A. I started at the New Hampshire Public Utilities Commission ("Commission" or "PUC") in June of 2015 as a Utility Analyst in the Electric Division. Effective July 1, 2021, the Electric Division was transferred to, and became part of, the newly created New Hampshire Department of Energy and I am presently employed by that agency. Before joining the Commission, I was employed at the Vermont Public Service Board (now known as the Vermont Public Utilities Commission, "VT-PUC") for seven years as a Utility Analyst and Hearing Officer. In that position I was primarily responsible for the analysis of financing and accounting order requests filed by all Vermont utilities, including review of auditor's reports, financial projections, and securities analysis. As Hearing Officer, I managed and adjudicated cases involving a broad range of utility-related issues including rate investigations, construction projects, energy efficiency, consumer complaints, utility finance, condemnations, and telecommunications. Prior to working for the VT-PUC, I worked in the commercial banking sector in Vermont for twenty years where I held various management and administrative positions. My most

recent role was as Vice President and Chief Credit Officer for Lyndon Bank in Lyndonville, Vermont, where I was responsible for directing and administering the analysis and credit risk management of the bank's loan portfolio, including internal loan review, regulatory compliance, audit, and coordinating periodic bank examinations by state and federal regulators.

Q. Please describe your educational background?

A. I received my Bachelor of Arts degree in Political Science from St. Michael's College. Throughout my career in banking, I took advantage of numerous Continuing Professional Education (CPE) opportunities involving college level coursework in the areas of accounting, financial analysis, real estate and banking law, economics, and regulatory compliance. Also, during my tenure with the VT-PUC I took advantage of various CPE opportunities including the Regulatory Studies Program at Michigan State University (sponsored by the National Association of Regulatory Utility Commissioners "NARUC"), Utility Finance & Accounting for Financial Professionals at the Financial Accounting Institute, Standard & Poor's seminars on credit ratings for public utilities, and Scott Hempling seminars on Electric Utility Law and Public Utility Regulation.

Q. Have you previously testified before the Commission?

A. Yes. I previously submitted Staff testimony to the Commission in Docket No. DE 14-238, Public Service Company of New Hampshire Generation Assets; Docket No. DE 15-137, Energy Efficiency Resource Standard; Docket No. DE 16-383, Liberty Utilities Request for Change in Rates; Docket No. DE 17-136, 2018-2020 NH Energy Efficiency Plan; Docket No. DE 19-064, Liberty Utilities Request for Change in Rates; Docket No. DE 19-057 Public Service Company of New Hampshire for Change in Rates; Docket No.

DE 20-092, 2021-2023 Triennial Energy Efficiency Plan; Docket No. DE 21-030 Unitil Energy Systems, Inc. Request for Change in Rates; and Docket No. DE 22-026 Unitil Energy Systems, Inc. Petition for Approval of Step Adjustment Filing.

Q. Mr. Willoughby, please state your full name and business address.

A. My name is Ronald D. Willoughby. My business address is 1007 Wolfs Bane Drive, Apex, NC 27539.

Q. Please state your employer and your position.

A. I am employed by Willoughby Consultant as its Owner. I am performing this engagement as a subcontractor to River Consulting Group, Inc.

Q. Are you registered as a Professional Engineer?

A. Yes, I hold a license as a Professional Engineer in Pennsylvania.

Q. Do you hold any patents in power engineering?

A. Yes, I hold a U.S. Software Patent for improving the reliability of electrical distribution networks.

Q. Please summarize your educational and professional background.

A. I received a Bachelor of Science in Electrical Engineering from the University of Missouri-Rolla and a Master of Science in Electrical Engineering (Power Engineering) from Carnegie-Mellon University.

I am a senior life member of the IEEE (Institute of Electrical and Electronics Engineers); a senior member of the IEEE Power Engineering Society; a senior member of the IEEE Industrial Applications Society; and a member of the honorary societies Phi Kappa Phi, Eta Kappa Nu, Tau Beta Phi and Kappa Kappa Psi.

I have published over 60 articles relating to electric power systems analysis and operation.

Q. Please summarize your consulting and employment experience.

A. I have been actively engaged in the utility industry for over 45 years, during which I have had extensive experience in the following areas:

- Transmission and Distribution Planning – I have led engineering, procurement and construction (EPC), and turnkey solutions for electric distribution automation, medium voltage modular substations (distribution centers), and wind farm distribution systems (from base of turbine towers through interconnection to utility grid). I have also led distribution grid modernization planning efforts, focused on systematic and incremental addition of smart grid devices, with technology, performance, and cost central to the planning process.
- Distribution Substation Design and Specification Review – I managed an engineering group that designed modular distribution substations and specified all corresponding equipment.
- Advanced Protection, Automation & Control – I co-chaired (with the Director of R&D at We-Energies) Distribution Vision 2010 LLC (DV2010), a consortium of Investor-Owned Utility (IOU) companies to advance distribution automation and equipment design.
- Distribution Grid Modernization Planning – I was principal engineer on distribution automation and volt-var optimization projects, with an emphasis on conservation voltage reduction (CVR).

- Renewable Energy Integration and the Impact on the Utility Grid - I was involved in electric power system impact studies related to distributed energy resource integration, including energy storage specification and integration, and related impact studies.
- Conservation Voltage Reduction – I was the Project Manager and Technical Lead for a major midwestern electric utility's feasibility study to quantify energy and demand savings using distribution Voltage Optimization techniques. Objectives: 1) Minimize cost by initiating feeder upgrades to achieve minimum performance thresholds. 2) Maximize energy savings by optimizing performance while staying within Total Resource Cost (TRC) constraints. I also was the Co-founder of a CVR Industry Consortium to guide CVR research, work with industry groups, develop policy recommendations, promote implementation strategies, and document the results.

I have participated in various international programs including:

- Invited by CEOs of Wind-2-Power-Systems (W2PS) and Hudson Energy to represent the United States for a conference in Madrid to cover PV integration, grid integration, energy storage, and DC infrastructure issues.
- Invited by CARILEC to chair two sessions on Transforming the Electricity Grid at the Renewable Energy Forum, St Thomas, U.S. Virgin Islands.
- Invited by Prime Minister of Curacao to represent United States in 1st Annual Durable Energy Conference to address renewables integration issues for the transmission and distribution system.

- Conducted comprehensive seminar on electric power systems for the Ministry of Water and Power in Peking, China.
- Led projects sponsored by the Pacific Power Association (PPA) for power system energy analysis and loss reduction on 20 islands in the South Pacific, 10 with U.S.-style power systems, and 10 with European-style power systems.
- Performed international power systems studies on power flow, transient stability, shunt compensation, load shedding, motor starting, loss formula development, short circuit, and protective device coordination.
- Taught Westinghouse's Advanced School on Power System Stability.
- Managed commissioning and public relations for comprehensive distribution line installation in the city of Smolensk, Russia.

Q. Have you included a more detailed description of your qualifications?

A. Yes. More detailed descriptions of my experience and qualifications are included as Attachments RDW-1 and RDW-2.

Q. Have you previously testified before the Commission?

A. No.

Q. Mr. DeVirgilio, please state your full name and business address.

A. My name is Joseph J. DeVirgilio, Jr. My business address is 201 Vicenza Way, North Venice, FL 34275.

Q. Please state your employer and your position.

A. I am employed by Suncoast Management Consultants, LLC as its Owner. I am performing this engagement as a subcontractor to River Consulting Group, Inc.

Q. Are you registered as a Professional Engineer?

A. Yes, I hold an inactive license as a Professional Engineer in New York.

Q. Please summarize your educational and professional background.

A. I received a Bachelor of Engineering from Stevens Institute of Technology and a Master of Engineering in Electrical Power Engineering from Rensselaer Polytechnic Institute (RPI).

Q. Please summarize your consulting experience.

A. I have 12 years of experience as a utility consultant. I have been part of consulting teams performing capital spending reviews, operations improvement initiatives, management audits, and reviews of emergency plans. I have participated in broad management audits for regulatory commissions and led the study teams in the subject areas of HR, IT, Call Center Operations, Collections, Billing, Meter Reading, Field Operations, and others for clients including Southern Connecticut Gas, Management Audit, 2016; Connecticut Natural Gas, Management Audit, 2016; and Yankee Gas, Connecticut, Management Audit, 2014-2015.

Q. Please summarize your employment experience.

A. I have been actively engaged in the utility industry for over 49 years. I am a retired senior utility executive (Central Hudson Gas & Electric Corporation). My experience spans a wide variety of consulting and executive responsibilities in both the regulated electric T&D business and natural gas and the unregulated energy business, including natural gas and electric T&D operations, construction and maintenance, work management planning, and reporting, process re-engineering, H/R, and I/T. I have been responsible for distribution, substation and meter engineering, I/T, meter testing, T&D

operations and construction, O&M and capital budgeting, process re-engineering, work management, emergency response, security, strategic planning, purchasing, stores and transportation and human resources and labor relations, staffing and human capital effectiveness assessments, executive and management compensation programs. I have 15+ years of experience as a T&D engineer, supervisor, and senior manager for the company-wide T & D operations. For 20+ years I also held the CIO role and lead the Utility I/T Steering Committee including the review and approval of all outsourcing contracts, hardware, software, outage management and SCADA software and the associated capital and expense annual budgets. Additionally, I have been a member of the Corporate Executive Capital Allocation and Review Committee responsible for the review of all proposed capital projects and the post completion review of actuals to estimates. I have 25 plus years of experience as a H/R executive with responsibility for all aspects of the function, including employment, employee and labor relations, employee safety, and employee benefits, and executive and employee compensation. Additionally, as the chief staffing officer I was responsible for the annual corporate staffing budgets, identification and implementation of technology driven staffing reduction initiatives, productivity improvement initiatives, enterprise-wide staffing and use of non-traditional employees, employee/contractor mix analysis, staffing and turn-over analysis and resulting changes to employment and employee development processes. I have training in mentoring and mediation.

Q. Please describe your T&D utility related experiences.

A. I have 15 plus years of experience as a T&D engineer, supervisor, and senior manager for the company-wide T&D operations and reliability, construction, maintenance, and

support, process re-engineering, Q/P implementations and benchmarking. My process re-engineering experience has included all parts of the T&D operations and customer services organizations, including meter reading, capital construction, T&D maintenance and reliability planning, use of contractors, tree trimming process and call center improvements.

Q. Please summarize your relevant utility experience.

A. I have had extensive experience in the following areas:

- Electric T&D Operations, Engineering, and Management – I have 13 plus years of experience performing hands-on design and installation management of electric T&D systems and O&M management, including reliability improvement plans and assessments of tree trimming impact on reliability.
- Capital Projects & Programs Evaluations – I have participated in an in-depth evaluation of a major midwestern, urban electric utility's CapEx processes and planning efforts. The utility, at the time, had planned a multi-year, multi-billion dollar capital program to build new transmission and upgrade its distribution system to improve overall reliability and position it to accept distributed energy resources.
- Capital & O&M Budgeting – I have had more than 25 years of operations support services responsibility, including supply chain, stores, transportation, security, and building services and maintenance. Additionally, I have had more than five years of P&L business responsibility and 30+ years of capital and O&M budget development and execution responsibility for the various management and executive areas of a utility business. I have extensive labor management experience and the impact of labor/contractor decision management on budget outcomes.

- Performance & Result Management – I have 10+ years of experience as the lead executive responsible for utility performance improvement and the work management system.
- Management Audits –I have 20+ years of experience in participation, planning, preparation, and execution of the utility side of management audits in both general and subject-specific audits. I was the executive responsible for the utility's audit response for over 15 years.
- Human Resources – I have 25 plus years of experience as a H/R executive responsible for staffing, labor and employee relations, executive and salaried employee compensation and benefits, and safety. I was the plan administrator for the pension and 401k plans. I have selected and implemented third-party providers for both plans. I have implemented a new executive incentive plan and had administered it since its inception. I have put in place and implemented EEO/AAP plans. I have identified and implemented a "high potential employee" (HPE) selection and development program including executive mentoring.
- Corporate Mission, Objectives, Goals, and Planning – I have been a member of a corporate Strategic Planning Committee and have several years of experience developing a strategic plan and ensuring goal alignment throughout the utility and other business unit organizations.
- I/T – I have had over 20+ years of experience as a utility CIO and the Chair of the utility I/T Steering Committee responsible to review and approve the 5-year I/T strategic plan, all I/T projects, the annual capital and expense budgets, and expenditure reviews.

Q. Have you included a more detailed description of your qualifications?

A. Yes. More detailed descriptions of my experience and qualifications are included as Attachment JJD-1.

Q. Have you previously testified before this Commission or any other Commission?

A. I have testified before the New York State Public Service Commission as an executive for Central Hudson Gas & Electric Corporation in a rate case proceeding involving gas employee staffing and productivity. I have not testified before the New Hampshire Public Utilities Commission.

II. SUMMARY OF TESTIMONY

Q. Please describe the purpose of your testimony today.

A. The purpose of our testimony is to provide the results of the Department's review and evaluation of Liberty Utilities (Granite State Electric) Corp d/b/a Liberty ("Liberty" or "the Company") 2021 Least Cost Integrated Resource Plan ("LCIRP or the Plan") and related reports. This review and evaluation will assess whether Liberty's LCIRP is consistent with the provisions of New Hampshire RSA 378:37, :38, and :39.

Q. What is your general conclusion involving Liberty's LCIRP?

A. We have concluded that the Company's 2021 LCIRP generally meets the requirements set out in RSA 378:37 and RSA 378:38, but that Liberty's Plan did not specifically address several elements listed in RSA 378:39 that the Commission shall consider when reviewing the Plan. We also found that significant new projected load capacity from Salem, approximately 177 MVA,[1] was not considered or analyzed in the Plan, and that consideration of planned system investments was lacking in sufficient detail.

Consequently, as discussed below, we recommend that Liberty provide a supplemental filing addressing the criteria in RSA 378:39, the impacts of the new load projected for Salem, and additional details about its planned investments. The Department also makes several additional recommendations which are detailed at the end of our testimony.

III. REVIEW AND ANALYSIS OF LIBERTY 2020 LCIRP

Q. What does RSA 378:37 require Liberty to include in its LCIRP?

A. RSA 378:37 declares that New Hampshire Energy Policy is to meet "the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; to maximize the use of cost effective energy efficiency and other demand side resources; and to protect the safety and health of the citizens, the physical environment of the state, and the future supplies of resources, with consideration of the financial stability of the state's utilities."

Q. What does RSA 378:38 require Liberty to include in its LCIRP?

A. New Hampshire utilities must demonstrate compliance with these energy policies through their planning process and the content of their least cost integrated resource plans. Specifically, RSA 378:38 requires LCIRPs to include, *as applicable*, the following:

I. A forecast of future demand for the utility's service area.

II. An assessment of demand-side energy management programs, including conservation, efficiency, and load management programs.

III. An assessment of supply options including owned capacity, market procurements, renewable energy, and distributed energy resources.

[1] *See* Salem Area Study 2020 at Bates 40, filed with the Commission at: https://www.puc.nh.gov/Regulatory/Docketbk/2019/19-064/MOTIONS-OBJECTIONS/19-064_2020-09-02_GSEC_SALEM_STUDY.PDF

IV. An assessment of distribution and transmission requirements, including an assessment of the benefits and costs of "smart grid" technologies, and the institution or extension of electric utility programs designed to ensure a more reliable and resilient grid to prevent or minimize power outages, including but not limited to, infrastructure automation and technologies.

V. An assessment of plan integration and impact on state compliance with the Clean Air Act of 1990, as amended, and other environmental laws that may impact a utility's assets or customers.

VI. An assessment of the plan's long- and short-term environmental, economic, and energy price and supply impact on the state.

VII. An assessment of plan integration and consistency with the state energy strategy under RSA 12-P.

Q. Are all of these requirements applicable to Liberty, which is a distribution-only company?

A. The statute requires utilities to address items such as the environmental impact of various resource options and compliance with the 1990 Clean Air act, but we believe that the analysis of these factors for a distribution-only utility is far less significant than for an electric utility that owns generation facilities. We read the statute as recognizing the differing applicability of certain least cost planning elements to distribution-only utilities by stating “Each such plan shall include, but not be limited to, the [above enumerated factors], *as applicable*.” RSA 378:38 (emphasis added).

Q. Did Liberty consider the applicability of RSA 378:39 as part of its 2020 LCIRP?

A. The Company's LCIRP only touches briefly upon the RSA 378.39 elements of environmental, economic, and health related impacts as those areas relate to Liberty's energy efficiency programs, distribution planning, participation in renewable energy procurement, grid modernization, and non-wires solutions, but does not provide sufficient detail to assess whether or how significantly these elements factored into Liberty's planning process and consideration of options. Thus, we recommend that the Company provide a supplemental filing that complies RSA 378:39, such that the Commission can assess whether the Plan sufficiently encompasses potential environmental, economic, and health-related impacts, that allows the Commission to make an adequate assessment of those criteria.

Q. Does the Company's 2020 LCIRP comply with the requirements set out in the Settlement Agreement in Docket No. DE 19-120 and approved in the PUC's Order No. 26,408 dated September 23, 2020?

A. Yes. As discussed further below, the LCRIP, taken together with Liberty's June 1, 2022 Report on Wires and Non-Wire Solutions to Address Reliability in the Bellows Falls Area, addresses the directives provided in the Settlement Agreement and the Order related to non-wire solutions ("NWS"), access to Liberty's distribution operating procedures manuals, capital project candidates for NWS, a planning process associated with assessment of NWS, and risk analysis and evaluation of NWS.[2] However, as referenced below, the Department continues to have concerns involving the robustness of the Company's deployment of NWS.

RSA 378:38, I – Demand Forecast

Q. Does Liberty's LCIRP include a forecast of future demand for the utility's service area?

A. Yes. According to the Company's Plan, Liberty's system planning is a 20-year timeframe forecast using historical peak load to establish a correlation for future forecasting. An econometric model evaluates historical peak demand as a function of peak day weather conditions and the economy. The econometric model utilizes two different weather variables, normal weather conditions and extreme weather conditions, in forecasting summer peak demand and includes consideration of cooling degree days. The first scenario of the forecast assumes normal weather conditions, which are based off the most recent 20-year period.[3] Liberty produces a 50/50 and a 90/10 peak demand forecast. The 50/50 forecast is based off normal 20-year weather and has a 50 percent chance of being exceeded. The second scenario of the forecast which is the 90/10 forecast is the extreme weather scenario that has a 10 percent chance of being exceeded. Other variables considered by the econometric model include historical and forecasted economic conditions at the county level, historical peak demand data for each service area, and a forecast of weather conditions based on historical data obtained from a weather station located in Concord, NH. [4]

Once the forecast is developed, Liberty makes what it describes as "certain out of model adjustments" to account for known future loads or generation. Specifically, those adjustments are made for new load greater than 300 kW interconnecting to Liberty's distribution system in the near future, or distributed generation greater than 1,000 kW

[2] LCIRP at Bates 7-8.
[3] *Id.* Appendix B at Bates 166-171.

that is expected to interconnect. Growth rates are applied to each of the substations and feeders within each of Liberty's service areas, then the forecasts are adjusted for specific substations and feeders to account for spot loads and any planned load transfers. Liberty uses the extreme weather scenario for forecasted peak loads for each substation and feeder to perform planning studies and to determine if thermal and contingency capacities are adequate.[5]

Liberty also divides its seasonal peak forecasts between its Eastern and Western jurisdictions (each designated as a planning study area or PSA) and incorporates sales information from each town along with the 2021 summer and winter coincident peak percentage contributions from each region.[6] Separate annual forecasts are then produced for each of the nineteen towns within Liberty's service territory using a regression model to predict kWh load for each forecast year.

The peak demand forecast for each area also includes historic energy efficiency savings resulting from installed energy efficiency measures under the NH Saves programs, and the impact of installed distributed generation (largely behind-the-meter solar PV growth). Liberty has also developed a demand forecast that includes the growth in electric vehicle charging.[7]

Q. What were the results of Liberty's forecast modeling?

A. The Company's modeling projects an increase in summer peak demand from a weather adjusted 188.5 MW in 2021 to 202.6 MW in 2037 resulting in an average annual increase

[4] *Id.* at Bates 13-16.
[5] *Id.*
[6] *Id.* at Bates 17, footnote 8. The Eastern PSA includes the towns of Derry, Pelham, Salem, and Windham. The Western PSA includes the towns of Acworth, Alstead, Bath, Canaan, Charlestown, Cornish, Enfield, Grafton, Hanover, Langdon, Lebanon, Lyme, Marlow, Monroe, Orange, Plainfield, Surry, and Walpole.
[7] *Id.* at Bates 15. Also see Appendix B at Bates 141-165.

of 0.4 percent. Under the extreme weather scenario, Liberty forecasts an increase in summer peak demand from 188.5 MW in 2021 to 217.34 MW in 2037 resulting in an average annual increase of 0.87 percent.[8] However, in response to data request DOE TS 1-3, Liberty revised and updated these results because the weather adjusted peak demand of 188.5 MW represented in the Plan was applicable to 2020 and not 2021, and the reported percentage increased were incorrect.[9] The revised summer peak demand for 2021 under normal weather conditions is 192.2 MW increasing to 202.6 MW in 2037 resulting in an annual increase of 0.3 percent. The revised extreme weather forecast of summer peak demand for 2021 is 207 MW increasing to 217.3 MW in 2037 resulting in an annual increase of 0.3 percent.

Q. Does the Department have any concerns about Liberty's demand forecast modeling?

A. Yes. First, it is important to keep in mind that the planning process for designing a distribution system begins with an accurate load forecast based on reasonable assumptions and good data. The Department finds that Liberty's use of the 20-year historical basis for both normal weather and extreme weather demand forecasting is overly conservative and covers too long of a period for any projection of probability to be useful. By using a 20-year historical period, Liberty is planning for a peak event that has a five percent likelihood of occurring, leading Liberty to build its system to anticipate higher peaks potentially resulting in more frequent replacement and addition of transformers regardless of whether the future peaks will materialize. Both Unitil and Eversource utilize the less conservative approach of a 10-year historical period which

[8] *Id.* at Bates 17.
[9] Attachment JED/RDW/JJD-1, Data Request DOE TS 1-3.

translates to a ten percent likelihood of a peak event occurring.[10] In response to data request Staff 1-37, the Company re-worked its forecasted peak calculations in Appendix B, Tables 2 and 3 for normal weather and extreme weather, basing the calculations on the 10-year historical period instead of the 20-year period.[11] The results were that peak megawatt growth percentages were much lower than those depicted in Appendix B for the 20-year historical period. Also in the response, Liberty expressed a willingness to switch to the 10-year historical period. As a result, the Department recommends that the Commission direct Liberty to shift its load forecasting historical basis to the 10-year historical period for all future LCIRP's.

Secondly, Liberty's demand forecast does not contemplate or include approximately 177 MVA of projected "total" capacity and 142 MVA of "firm" capacity at Salem's Rockingham Substation driven largely by the Tuscan Village development.[12] The "total" capacity resides in two transformers sized such that one can back up the other if there is a transformer failure or if maintenance is required. The 142 MVA "firm" capacity is designed to support ten distribution feeders: six will be connected to satisfy near-term capacity needs, and four will be left for future growth needs.[13] Given the size and complexity of this design, combined with the fact that Salem is one of four towns identified by Liberty in the Plan as part of its Eastern PSA, and because the expected 177 MVA of new capacity is so close to the Company's overall service area peak in 2020 of 188.5 MW, it is surprising that this development was overlooked by Liberty in its Plan.

[10] *See* Docket No. DE 19-120, Liberty Utilities 2019 Least Cost Integrated Resource Plan, Exhibit 2 at Bates 10, Table 1, Load Forecasting Methodology.
[11] Attachment JED/RDW/JJD-2, Data Request Staff 1-37.
[12] *See* Salem Area Study 2020 at Bates 40, filed with the Commission at: https://www.puc.nh.gov/Regulatory/Docketbk/2019/19-064/MOTIONS-OBJECTIONS/19-064_2020-09-02_GSEC_SALEM_STUDY.PDF
[13] *Id.* at Bates 40.

This apparent omission is also true for the Company's Grid Needs Assessment provided in Section 4.15 of the LCIRP which is discussed further below. Consequently, the Department recommends that the Commission direct Liberty to file a supplement to the LCIRP that considers and incorporates the impacts of the new load both existing and forecasted for Salem on Liberty's demand forecast.

Q. Does the Department have any concerns about how the Company forecasts load on its circuits?

A. Liberty applies area growth rates to each of the substations and feeders within the PSA's. Liberty's distribution planners then adjust the forecasts for specific substations and feeders to account for known spot load additions or subtractions, as well as for any planned load transfers due to system reconfigurations. The planners use the forecasted peak loads for each feeder/substation under the extreme weather scenario to perform planning studies and to determine if the thermal and contingency capacity of its facilities is adequate.[14] Consequently, Liberty's process appears to be reasonable due to the inclusion of known additions or subtractions.

Q. What is the Department's assessment of Liberty's Plan in the areas of equipment ratings, bulk substations, interconnected feeders, non-bulk substations, and distribution circuit planning.

A. As mentioned above, Liberty divides its service territory into two PSA's: East and West.[15] The distribution planning process follows a published *Distribution Planning Process Map and Timeline*[16] that considers peak load forecast (updated annually) and asset conditions to identify system deficiencies (violations) based on the *Electric*

[14] LCIRP at Bates 16.
[15] *Id.* Appendix D, Bates 196.

Distribution Planning Criteria approved in Docket No. DE 19-064.[17] Two types of planning studies are conducted: 1) PSA area studies, and 2) interconnection studies.[18] PSA's consist of loads, substations, and distribution feeders. Interconnection studies determine facility and system upgrades to satisfy capacity and planning criteria constraints.[19] Each PSA operates independently, i.e., there is no interconnection between them.[20]

Both traditional and non-wire solutions (NWSs) are investigated for each PSA to develop and prioritize feasible solution alternatives based on cost, violation resolution, strategic goals, budget constraints, and schedule. Capital projects are then proposed from these prioritized solutions and submitted for approval. Prioritization of system deficiencies is based on the following measures: Customers affected, loadings, safety & environment, and overall impact, with a "low likelihood (1 in 100 years)" to "high likelihood (each year)".[21]

System performance is modeled using industry-accepted engineering analysis software.[22] To maintain data integrity (key to any modeling effort), Liberty extracts data from their Graphical Information System (GIS) and Customer Information System (customer demand histories) to update the load flow models.[23]

Industry references in support of equipment rating guidelines/applications are included in Appendix D of the LCIRP (e.g., IEEE, ANSI, NESC, Doble). A summary of equipment rating criteria (Normal-continuous, LTE-24 hours, STE-as needed) and details in support

[16] *Id.* Appendix C, Bates 176.
[17] *Id.* Appendix D, Bates 182-183
[18] *Id.* Appendix D, Bates 198
[19] *Id.* Appendix D, Bates 198
[20] Based on information obtained from Liberty witnesses at the April 15, 2022 Technical Session.
[21] LCIRP, Appendix C, Bates 178.
[22] *Id.* at Bates 41, Figure 4.4, and Appendix D at Bates 198.

of each rating are provided and correlated to equipment types, e.g., transformers, breakers, reclosers, regulators, switches, and lines.[24]

Other than what is included with the LCIRP, it is not clear what other in-house design standards/tools (e.g., application guidelines, line designs, substation designs, system protection) are available for use by in-house staff and external contractors (e.g., engineering firms conducting system studies). However, Liberty's process is similar to that of other utilities and appears to be reasonable.

Q. What is the Department's assessment of Liberty's distribution system planning criteria?

A. Liberty updated its Distribution Planning Criteria (from 2016 to 2020) as part of settlement agreement Docket No. DE 19-064.[25] Changes were made to move Liberty's criteria closer to that of other utilities in the region, in particular, National Grid.[26]

A summary of these changes is tabulated in Attachment B of Appendix D of the LCIRP.[27] Under normal operating conditions, the approved changes reflect increased operational risk, i.e., ratings for distribution feeders, sub-transmission lines, and transformers were increased before violations are flagged, which potentially reduces the number of replacements and capital projects. If reliability performance remains within agreed-to limits, these changes should result in acceptable system performance.

Under contingency (N-1) conditions, similar actions have been taken, e.g., moving from 36 MWhrs to 120 MWhrs of load at risk, or from 2.5 MW to 10 MVA (10 MW if power factor = 1) for loss of a sub-transmission supply line; or 60 MWhrs load at risk to 180

[23] *Id.* at Bates 40.
[24] *Id.* Appendix D at Bates 184-191.
[25] *Id.* at Bates 28.
[26] *Id.* Appendix D at Bates 199.

MWhrs for loss of a transformer larger than 10 MVA. As with the above normal operating conditions, these contingency criteria changes should result in acceptable system performance if reliability remains within agreed-to limits.

With the caveats stated above, the Department believes the updated and approved planning criteria are reasonable.

Q. Is the Company planning any further revisions to its planning procedures?

A. The Department is not aware of any further revisions to Liberty's planning procedures.

RSA 378:38, II – Demand Side Management

Q. Does Liberty's LCIRP include a discussion of demand-side energy management programs, including conservation, efficiency, and load management programs?

A. The Company states that it has offered energy efficiency ("EE") and other demand side management ("DSM") programs to its customers for the past twenty years. Since 2002, Liberty has collaborated with the other New Hampshire utilities to deliver coordinated energy efficiency solutions to customers, residential, municipal, commercial and industrial throughout the state. These programs are offered under the NHSaves™ Programs ("NHSaves Programs") brand. In 2016, Liberty was a party to a settlement agreement filed with the Commission in Docket DE 15-137 that lead to the establishment of the state's Energy Efficiency Resource Standard ("EERS").[28] In 2020, Liberty was also a party to the settlement agreement filed in Docket DE 20-092 involving the 2021-2023 New Hampshire Statewide Energy Efficiency Plan based on the EERS. The EERS is the framework within which the NHSaves Programs have been implemented since 2018. In 2022, HB 549 amended the statute applicable to energy efficiency making the

[27] *Id.* Appendix D at Bates 201.
[28] *Id.* at Bates 93-94.

framework based on specific system benefit charge rates instead of the EERS being the driving element of EE. Since 2002, Liberty reports that its energy efficiency programs have delivered total lifetime savings of 1.3 million kWh equating to customer savings of approximately $140 million.[29] Liberty estimates the average cost of a saved lifetime kWh under its programs to be 3.36 cents. In the current LCIRP submittal, Liberty has provided extensive information regarding the Company's ratepayer funded EE programs and new initiatives including a description of a load curtailment proposal for 2021-2023 in the form of an Active Demand Reduction ("ADR") program based on the design of pilot programs offered by Eversource and Unitil, potentially serving 162 participants and generating an average of 5,293 kW summer-peak savings per year.[30] Liberty also references a plan to undertake an energy optimization ("EO") pilot that seeks to minimize energy usage across all energy sources by emphasizing the deployment of cold climate heat pumps to displace the use of fossil fuels for residential heating.[31] The estimated energy impact of the EO Program is summarized in Table 6.7, page 115 (Bates 118) of the LCIRP. However, both proposals were subsequently dropped from the final version of the 2021-2023 Triennial Energy Efficiency Plan approved by the Commission in Order No. 26,621 on April 29, 2022, in Docket No. DE 20-092, and the status of both programs is unknown at this time.

As discussed below, Liberty has also incorporated and implemented a NWS and Non-Wires Alternative ("NWA") evaluation process screening tool for system planning and for certain customers based on location and customer type.[32]

[29] *Id.* at Bates 96.
[30] *Id.* at Bates 109.
[31] *Id.* at Bates 108-117.
[32] *Id.* at Bates 42-48.

Q. What is the Department's assessment of Liberty's DSM and NWA efforts?

A. The following metrics are evaluated by Liberty when investigating traditional and NWS solution alternatives: Cost, reliability, feasibility, performance, and environment.[33]

For potential NWS solutions, Liberty considers the following technologies: Energy efficiency, demand response & load control, energy storage, and distributed generation (e.g., wind, solar).[34] Liberty's goal for NWS is to defer or eliminate the need for upgrades to transmission and/or distribution systems.

NWS screening guidelines utilized by Liberty's system planners to identify potential NWS candidates are as follows: 1) when the identified need is at least 24 months in the future to allow time to develop NWS; 2) when the need is not based on asset conditions; or 3) when traditional solutions will cost more than $500,000.[35] Project-specific exceptions are possible if they can be justified. Liberty also uses an NWS Analysis Workbook[36] to compare and rank alternatives.

Solution alternatives are scored based on the following weighted factors: 1) cost (30%); 2) reliability risk (20%); 3) feasibility risk (20%) of addressing the identified needs including operational complexity and flexibility; 4) performance risk (20%); and 5) environmental risk (10%). A total assessment score is calculated for each alternative based on a scoring system of from 1 (lowest or worst) to 4 (highest or best). The alternative with the highest total assessment score is then chosen as the preferred alternative.[37]

[33] *Id.* Appendix D, DAS-16 Non-Wires Solutions, December 2020, at Bates 314.
[34] *Id.* at Bates 38.
[35] *Id.* Appendix D, DAS-16 Non-Wires Solutions, December 2020, at Bates 317.
[36] *Id.* Appendix D at Bates 319-321
[37] *Id.* Appendix D at Bates 318 and Appendix F Bates 426-428.

As part of the requirements of the approved Settlement Agreements in Docket Nos. DE 17-136, DE 17-189, and DE 19-120, Liberty agreed to provide a grid needs assessment for projects with potential NWS whereby traditional solutions would be $500,000 or greater. This assessment was provided in Table 18, Bates 406, of Appendix F of the LCIRP.[38] The number of traditional projects having potential NWS solutions were identified as follows: 2023 – five projects; 2024 – three projects; and 2025 – six projects. The LCIRP included the *Bellows Falls Area System Planning Study 2020* to illustrate the process for investigating traditional and NWS solution alternatives.[39] Four alternatives were developed based on meeting capacity needs: 2 traditional solutions (system upgrades); and 2 NWS (solar + battery storage) solutions. Total assessment scores fell within a very small range: 2.48 (traditional) to 2.82 (NWS) on the 4-point scale (4 = best). The LCIRP details each of the four alternatives.

This was followed by *a Report on Wires and Non-Wire Solutions to Address Reliability in the Bellows Falls Area – 2022* where six alternatives were developed (three traditional and three NWS) based on meeting reliability needs.[40] Two of the NWS alternatives were rejected for being too expensive, leaving one NWS alternative (solar + battery storage) and three traditional alternatives (system upgrades). The same scoring process was used as in the earlier study. Total assessment scores fell within a larger range: 1.93 (NWS) to 3.42 (traditional) on a 4-point scale (4 = best solution), same system (Bellows Falls), but two different objectives and two different results.

[38] *Id.* Appendix F at Bates 406.
[39] *Id.* Appendix F, *Bellows Falls Area System Planning Summary 2020*, at Bates 386-428.
[40] https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-004/LETTERS-MEMOS-TARIFFS/21-004_2022-06-02_GSEC_REPORT-WIRES-NONWIRES-RELIABILITY-BELLOWS-FALLS.PDF

Liberty has a process in place[41] to ensure potential NWS solutions are an integral part of the planning process that includes the use of data-driven NWS Analysis Workbooks.[42] They are also actively investigating/promoting behind-the-meter technologies an example of which is their Battery Storage Pilot Program where up to 200 Tesla Powerwall 2 batteries were installed at the customer premises during Phase 1 with the potential for an additional amount to be installed if approved for Phase2.[43] Pilot project objectives were to reduce peak load, provide backup power to participating customers, and learn more about customer behavior through time-of-use rates. Consideration of alternatives was not an objective, and as a result, were not developed.[44]

Liberty's project evaluation flow chart clearly shows NWS evaluations being integral to the distribution planning process.[45] Yet, other than the Battery Storage Pilot Program, no other NWS solutions have been implemented in Liberty's territory. According to Liberty, when evaluated against traditional solutions (poles & wires, tree trimming & removal), NWS solutions tend to cost more than traditional.[46] It has been Liberty's experience that NWS solutions are often found to be infeasible or noncompetitive when traditional solutions address asset condition along with other issues.[47]

As a result, the Department believes that Liberty's current approach to NWS is not sufficiently robust. A more aggressive stance (e.g., hybrid solutions) could be taken when evaluating NWS alternatives against traditional solutions, including modifying NWS selection guidelines to make them more competitive. For example, it might be

[41] LCIRP Appendix D at Bates 315.
[42] *Id.* Appendix C at Bates 038; and Appendix D at Bates 315 and 318.
[43] Docket No. DE 17-189, Petition to Approve Battery Storage Pilot Program, Order No. 26,209, January 17, 2019.
[44] Attachment JED/RDW/JJD-3 Data Request DOE 8-4.
[45] LCIRP Appendix D at Bates 315.
[46] Based on information obtained from Liberty witnesses at the April 15, 2022 Technical Session.
[47] LCIRP at Bates 39.

worth considering if the "24 months in the future" and/or the above $500,000 threshold guidelines are too restrictive.

RSA 378:38, III – Supply Options

Q. Does Liberty's LCIRP include an assessment of supply options including owned capacity, market procurements, renewable energy, and distributed energy resources?

A. As stated earlier, New Hampshire restructured its retail electricity market in 1998, severing generation from distribution. As a result, Liberty, along with all other New Hampshire electric distribution companies presently do not own any generating assets. Liberty obtains its electricity supply every six months through a solicitation process that is reviewed and approved by the Commission. This solicitation, bid evaluation, and procurement process was first approved and established by the Commission in 2006 in Docket No. DE 05-126, and has been amended multiple times to account for changes in the wholesale market for electricity. In conjunction with this solicitation process, Liberty also solicits Renewable Energy Certificates ("REC") twice per year to meet its Renewable Portfolio Standard requirements. [48] The Company does not own any transmission assets and obtains its transmission service from National Grid. In terms of distributed energy resources ("DER"), Liberty reports that it utilizes Hosting Capacity Analysis ("HCA") to inform its distribution system planning for accommodating potential DERs in its service territory. By incorporating HCA in its system planning, Liberty states that it will be able to more efficiently plan for integration and hosting capacity for DERs at its substations. Liberty is currently developing an HCA map,

[48] *Id.* at Bates 24-26.

process, and criteria so as to better inform the decision-making process.[49] The Company plans to have a total of three percent of its system peak under a dedicated DER program by the end of 2024 and six percent by 2029.[50]

Liberty also provided a detailed discussion of the supply situation related to ISO-NE, however, this discussion is now dated since the LCIRP was submitted on January 15, 2021.[51] As Liberty points out, ISO-NE is dependent on natural gas fueled generation for approximately 40% of energy production for 2019. For 2021 ISO-NE reported that gas-powered generation provided 53%.[52] With the onset of the war in Ukraine, the global natural gas market has structurally changed with European countries increasing their natural gas imports to offset decreases in supply from Russia. New England gas supplies are exposed to the global natural gas market because LNG is a component of the natural gas supply. As "the marginal unit setting the energy market clearing price is most often a natural gas fired generator, "the energy supply future has potentially changed significantly since Liberty's January 2021 filing.[53] Consequently, the Department recommends that the Commission direct Liberty to include in its supplement to the LCIRP an updated discussion on the impacts of a more global natural gas market on price and the longer-term availability of capacity.

RSA 378:38, IV – Distribution and Transmission Requirements

Q. Does Liberty's LCIRP include an assessment of distribution and transmission

[49] *Id.* at Bates 85-86.
[50] *Id.* at Bates 92-93 and Appendix E at Bates 365 and 367.
[51] *Id.* at Bates 18-24.
[52] http://www.iso-ne.com/about/what-we-do/key-stats/resource-mix
[53] *Id.*

requirements?[54]

A. Yes. The LCIRP includes an assessment of distribution and transmission requirements as described in the summaries below.

Transmission

Liberty is a transmission customer of National Grid and as such does not directly participate in the ISO-NE planning process or the advisory role of NEPOOL. As a result, Liberty provides National Grid with electrical system information that National Grid needs to fulfil its obligations to provide service as a transmission owner. That information includes distribution system peak and off peak loads, power factor, and the actual or estimated impacts of distributed generation and demand side management efforts.[55] As a transmission owner, National Grid is a participant in ISO-NE's Regional System Plan development.

Distribution

As explained above, Liberty's distribution system is divided into two PSA's: East and West. PSA studies are performed when conditions (e.g., load additions) change within a given PSA, and are documented in a *Distribution PSA Study* report describing study assumptions, procedures, economics, conclusions, and recommendations.[56] PSAs are totally independent from each other.[57]

[54] The statute requires that the assessment should include, as applicable, an assessment of the benefits and costs of "smart grid" technologies, and the institution or extension of electric utility programs designed to ensure a more reliable and resilient grid to prevent or minimize power outages, including but not limited to, infrastructure automation and technologies. RSA 378, IV.
[55] LCIRP at Bates 26.
[56] *Id.* at Bates 180-181.
[57] *Id.* Appendix D at Bates 196.

Liberty conducts distribution PSA studies with industry-accepted third-party software and detailed system models using its latest load forecasts.[58] Studies are based on PUC approved *Electric Distribution Planning Criteria*.[59] What-if simulations identify needs and potential solutions. Before/after simulations verify solution alternatives.[60] Wires (traditional) and NWS solution alternatives are considered when developing proposed solutions.[61]

Studies are conducted to ensure reliability performance is maintained and/or improved based on specific study objectives.[62] Capacity needs, asset condition replacements/upgrades, environmental considerations, and safety are integral to the planning process.

The LCIRP included the Lebanon area study as a distribution planning example.[63] Four solution alternatives/options were developed and ranked, 2 traditional (system upgrades) and 2 NWS (solar + storage; DER for large customer). The traditional solution (option 2) scored the highest (best solution). Details are included in the study report. However, individual alternatives and "total assessment" scores for each option were not provided until compiled on the NWS evaluation worksheet included in Appendix G.1 of the report.[64] It would be helpful if the four alternatives cited as Options 1-4 on the NWA Evaluation Summary worksheet would have been explained in the body of the report or at least correlated to specific pages in the report.

[58] *Id.* Appendix D at Bates 198.
[59] *Id.* Appendix D.
[60] *Id.* Appendix C and Appendix D.
[61] Liberty 2021 LCIRP, Bates 181
[62] Liberty 2021 LCIRP, Appendix D, Bates 198
[63] Liberty 2021 LCIRP, *Lebanon Area System Planning Summary 2020*, Appendix G
[64] Liberty 2021 LCIRP, *Lebanon Area System Planning Summary 2020*, Appendix G, Bates 478

The overall process followed by Liberty in its distribution analysis appears to be reasonable and typical of how the industry conducts system planning studies.

Smart Grid Technology

Q. Has the Company invested in smart grid technology in recent years?

A. Yes. In 2019, Liberty engaged CMG Consulting to develop a grid modernization plan, the results of which were summarized in a Grid Modernization Report (updated in 2020).[65] Ten dedicated programs in four focus areas (metering, distribution automation, customer connections, and smart city) were identified. Budgets were proposed for each area along with 5-year and 10-year targets.[66]

Nine (9) pilot programs and corresponding budgets covering each of the four focus areas was proposed as the next step. Metering (AMI) and distribution operations (fault detection, load forecasting, conservation voltage reduction, asset management, islanding) were the largest budget items over a 5-year period[67] covering 2021-2025.[68] During this period, Liberty would monitor the results and adjust as needed in preparation for a subsequent five-year period covering 2025-2029.[69]

The report refers to "grid modernization" activities as being important to overall success. There is a distinction to be made between smart grid and grid modernization. Smart grid is the implementation of technologies that increase system "visibility" using enhanced communication (more sensors) and controls (more automation); e.g., distribution automation (DA). Grid modernization is the process of enhancing the grid to make it

[65] Liberty 2021 LCIRP, Appendix E, *Grid Modernization: Developing a Pathway for Liberty Utilities in New Hampshire*, December 2020, CMG Consulting
[66] Ibid, Bates 328
[67] Ibid, Bates 354
[68] Ibid, Bates 364
[69] Ibid, Bates 366

more reliable, energy efficient, and resilient through a series of systematic upgrades that can include technology, equipment, and controls that communicate and work together. Smart grid is a subset of grid modernization. How far smart grid and grid modernization programs are taken depends on a company's strategic objectives, physical constraints, regulatory constraints, and budget.

Liberty, like most electric utility companies, invests in system upgrades that can be classified as grid modernization activities and in upgrades that can be classified as smart grid activities that involve enhanced communication between devices that provide system operators with more actionable information (e.g., Liberty's recloser program).

According to Liberty, the highest ranked net present value grid modernization opportunity to be implemented within the next five years (out of the ten proposed grid modernization programs listed in the LCIRP) is conservation voltage reduction (CVR).[70] However, no progress has been reported.[71] Therefore, the Department recommends the Commission direct Liberty to in its supplement to the LCIRP an update on each of the ten proposed grid modernization programs, with a focus on the top three net present value opportunities.

Planned Investments

Q. Did the Department conduct a review of the planned distribution investments described in the LCIRP?

A. Yes. Unlike a rate case, specific rate proposals and revenue requirements are not at issue in an LCIRP proceeding, therefore the review of capital investments for least cost planning is not considered to be sufficiently rigorous or specific to support an

[70] *Id.* at Bates 089, 091
[71] Attachment JED/RDW/JJD-3 DOE TS 1-8.

independent finding of prudence. As the Commission stated in its Order No. 26,362 in Docket No. DE 19-139, an LCIRP "provides a regular snapshot of the factors supporting a utility's investment decisions, which can be helpful in a later rate case when the Commission determines whether the costs of an investment were prudently incurred."[72] As such, the Commission's approval of the LCIRP does not represent a finding of prudence with respect to any particular capital investment described in the Plan. However, in order to complete a review of these planned investments, the utility must provide sufficient detail of those capital projects in the proposed LCIRP. According to Liberty's Plan, the Company's five-year budget totals $124 million with spending on its mandated and growth projects comprising 41 percent of the budget and spending on discretionary programs comprising 59 percent of the budget.[73] One of the major deficiencies of the current Plan is that Liberty discusses these planned investments in very general terms and at a high level, and provides little or no detail on investments or projects that are currently underway.[74] Although Appendix H does provide a listing of capacity and reliability related improvements, there is no mention of Liberty's many business-as-usual blanket projects, growth projects, and discretionary projects that typically constitute some of the Company's largest investments. As a result, no evaluations of specific planned capital investments or potential least cost alternatives were included or available for the Department's review in this proceeding. This is especially true for Liberty's ongoing investments in the Town of Salem largely associated with the Tuscan Village development. Due to these omissions, DOE had to obtain

[72] Docket DE 19-139, Eversource Energy 2019 Least Cost Integrated Resource Plan, Order No. 26,362 dated June 3, 2020 at 8.
[73] LCIRP at Bates 10.
[74] *Id.* at Bates 55-57.

additional information through discovery. In response to discovery request Staff 1-12, Liberty provided its 5-year capital budget which included mandated, growth, and discretionary projects totaling $124 million.[75] Liberty also updated Figure 4-10 of the LCIRP in data response Staff 1-1 to include the project costs for each the planned investments listed.[76] Also, in response to data request Staff 1-25, the Company provided a list of needed projects which had been inadvertently excluded from the Plan because they were related to resolving asset condition issues.[77]

The Department appreciates the Company's submission of additional project information, however, Liberty did not submit specific project documentation (i.e. Business Cases) to support those investments as part of its LCIRP filing.[78] This is in sharp contrast with Eversource's LCIRP filing in Docket No. DE 20-161 where Eversource included its project authorization forms in Appendix L of that filing describing numerous projects that were in progress or planned to commence at the time of the LCIRP submission. This is also in contrast to PUC Staff's (now DOE's) prior understanding from Docket No. DE 19-120 where the Commission recognized Staff's recommendation that Liberty's "January 2021 LCIRP provide a level of detail regarding planned capital projects, circuit level load forecasts, and system visibility consistent with Unitil's 2016 LCIRP filing,"[79] meaning that sufficient detail should be provided to allow "Staff to evaluate how the Company reviews alternate solutions and other issues related to decisions on capital

[75] Attachment JED/RDW/JJD-4, Data Request Staff 1-12.
[76] Attachment JED/RDW/JJD-5, Data Request Staff 1-1.
[77] Attachment JED/RDW/JJD-6, Data Request Staff 1-25.
[78] Attachment JED/RDW/JJD-7, Data Request Staff 1-21.
[79] Docket No. DE 19-120, Liberty Utilities 2019 Least Cost Integrated Resource Plan, Order No. 26,408 dated September 23, 2020 at 4.

investment."[80] Consequently, DOE believes that ongoing projects impacting load growth, grid needs, and reliability, in particular those projects associated with Tuscan Village, should have been included in the LCIRP to provide sufficient documentary support for the purposes of allowing DOE, and other interested parties, to conduct a thorough review of the Plan.

In terms of Salem and the related Tuscan Village projects, the Department (and previously PUC Staff) have continuing concerns involving Liberty's planning and management of that development dating back to the Company's two most recent rate cases, Docket Nos. DE 16-383 and DE 19-064, and associated step adjustment requests. DOE's primary issues continue to be as follows:

- The project as a whole has been predicated on speculative load that has yet to materialize as planned. Liberty's original total load projection was 14 to 17 MW and was recently updated to 25.8 MW. To date, only 6.7 MW of verifiable load has been installed.[81]
- Developers who are the source of new load, and receive the primary benefits of this system expansion, have contributed little thus far ($334,781) in terms of contributions in aid of construction for various connections and installed infrastructure (approximately $35 million) to serve the Tuscan Village development, meaning that Liberty will have to spread virtually all of those costs among all of Liberty's ratepayers.[82]

[80] Docket No. DE 16-463, Unitil Energy Systems, Inc. 2016 Least Cost Integrated Resource Plan, Order No. 26,098 at 6.
[81] Attachment JED/RDW/JJD-8, Data Request DOE TS 2-1
[82] *Id.*

- The Company chose the highest cost option of $35 million out of a total six possible alternatives for serving load at Tuscan Village.[83]
- Opting to build out the overall project based on 115kV supply as opposed to 23kV would likely result in significant over-build if the forecasted loads do not materialize.
- Liberty has a history of incurring significant cost overruns for larger, more complex projects.[84]
- Liberty's planning process for the Salem area failed to take into consideration simulations to determine overall costs to fully upgrade either Baron Avenue or Salem Depot substations, of both, to satisfy criteria violations and resolve asset condition concerns. To provide a more complete comparison of project alternatives/plans, we believe the following additional simulations could have been investigated: 1) How can Salem Depot and/or Barron Avenue Substations be upgraded to solve all contingency conditions and asset condition concerns if near-by property was not available for purchase and cost is not a constraint? 2) How can Salem Depot and/or Barron Avenue Substations be upgraded to solve all contingency conditions and asset condition concerns if near-by property was available for purchase and cost is not a constraint?

The Department provides the above overview for the edification of the Commission based on the Commission's previously expressed desire for a "snapshot" of factors affecting the Company's investment decisions as it relates to the LCIRP and for

[83] Attachment JED/RDW/JJD-9, Data Request DOE 5-3. Liberty's total cost for the Tuscan Village development was recently updated to $36.8 million.

consideration in a future rate case.[85] The Department intends to revisit these issues at that time.

In light of the issues raised above, the Department recommends that Liberty rework and update the sections in the LCIRP on planned system investments and grid needs assessment as part of the supplement to describe and address the impacts of the ongoing system build out in Salem and Tuscan Village, and any other ongoing or near-term projects (in excess of $250,000) that have been initiated or are about to be initiated.

Q. Were any of the planned investments included in the LCIRP also included in the Company's third step adjustment request in Docket No. DE 22-035?

A. As discussed above, Liberty provided no specific details on the planned investments included in the Plan. However, all of the projects listed in Liberty's third step adjustment filing appeared to be completed in 2021 and were supported by testimony and project documentation. In that Docket, the Department recommended removal and deferral of two growth projects from the step adjustment, both projects related to Tuscan Village, in the amount of $1.2 million. The Commission concurred with the Department's recommendation.[86]

RSA 378:38, V – Environmental Compliance

Q. Does the Eversource LCIRP include an assessment of plan integration and impact on state compliance with the Clean Air Act of 1990, as amended, and other environmental laws that may impact a utility's assets or customers?

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[84] *See* Docket No. DE 16-383, Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities Request for Change in Rates, Exhibit 11, Testimony of Jay Dudley; and Docket No. DE 19-064, Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities Request for Change in Rates, Exhibit 21, Testimony of Jay Dudley.
[85] Docket DE 19-139, Eversource Energy 2019 Least Cost Integrated Resource Plan, Order No. 26,362 dated June 3, 2020 at 8.
[86] See Docket DE 20-035, Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty, Petition for Approval of Step Adjustment, Order No. 26,661 dated July 29, 2022 at 4-5.

A. As stated earlier, the Department believes that the significance of this criteria is reduced for Liberty as compared to a utility that owns electric generation. Liberty does provide limited consideration of environmental impacts as they relate to its capital investment planning, procurement of REC's, and the Company's compliance with environmental regulation.[87]

RSA 378:38, VI – Environmental, Economic, and Energy Price and Supply Impact

Q. Does the Liberty LCIRP include an assessment of the plan's long- and short-term environmental, economic, and energy price and supply impact on the state?

A. As referenced above, Liberty's system and project planning process includes the use of econometric modeling to consider demand, reliability, feasibility, cost, DER options, and value-added benefits involving planned investments and alternatives. Environmental impacts and risks are also assessed in the capital project planning process, when applicable.

RSA 378:38, VII Consistency with State Energy Strategy

Q. Does the Liberty LCIRP include an assessment of plan integration and consistency with the state energy strategy under RSA 12-P?

A. Yes. In our assessment, Liberty's 2021 LCIRP is generally consistent with the state energy strategy then in effect at the time of the Company's filing on January 15, 2021. Since that time, the Department released a new and revised state energy strategy in July 2022. The policy goals and objectives outlined in the new state energy strategy are not significantly different from those provided in the prior strategy; therefore, we find that Liberty's 2021 LCIRP still remains consistent with the state energy strategy.

[87] LCIRP at Bates 11-20,33,36-38

IV. BELLOWS FALLS RELIABILITY REPORT

Q. In a letter to the Commission dated February 28, 2022, Liberty reported what it characterized as a "dire reliability picture" in the Charlestown/Bellows Falls service area. Has Liberty assessed the Bellows Falls area system's reliability?

A. Yes. Liberty has provided assessments in their Bellows Falls Reliability Report 2022, ("Report") filed with the Commission on May 2, 2022,[88] and in their "Reliability Review 2020", Appendix H of Liberty's LCIRP.

Q. Did the Department review the Bellows Falls Reliability Report 2022, and what were your conclusions?

A. Yes. The Report's data for the Bellows Falls area reflected that the 43-12L1 ("12L1") circuit serves 2,471 customers and is 128 miles long. The 43-12L2 ("12L2") circuit serves 1,286 customers and is 60 miles long.[89] The Report also reflects that these two circuits serve 8% of the customer base but account for 20.87% of SAIFI and 40.86% of SAIDI system outage statistics. [90] Liberty attributes the low reliability to tree issues and an inability to switch load due to a lack of circuit ties.[91] The Department found the Report's data and findings consistent with the "Reliability Review 2020," Appendix H of Liberty's LCIRP. Based on the data presented in the Report, the Department concluded that Liberty's reliability data and assessment support the conclusion that the 12L1 and 12L2 distribution circuits have the worst reliability performance in Liberty's system over

[88] https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-004/LETTERS-MEMOS-TARIFFS/21-004_2022-05-02_GSEC_BELLOWS-FALLS-RELIABILITY-RPT.PDF
[89] *Id.* Table 1, at 3.
[90] *Id.* at 3.
[91] *Id.* at 12.

the past five years as measured by circuit-related duration (CKAIDI) and circuit related frequency (CKAIFI) measures.[92]

The Report provided reliability data that identified the primary causes of the poor reliability on the distribution circuits 12L1 and 12L2. "Fallen Trees" and "Tree-Broken Limbs" categories represent the significant causes of service interruption on 12L1 and 12L2, representing "62% of total incidents and 74% of total customer minutes interrupted".[93] Based upon the data provided, the Department believes mechanical damages to the distribution circuit facilities from "Fallen Trees" and "Tree-Broken Limbs" were the major contributing factors to the service interruptions. Outages from tree limbs "touching" the circuits were insignificant in comparison, as evidenced by the "Tree Growth" category data provided in the Report. Generally, mechanical damage to distribution circuit facilities includes conditions such as downed wires, broken poles, broken crossarms, or broken pole hardware.

The Report identifies Liberty's action plan for improving reliability on the 12L2 circuit. However, the 12L1 circuit is not addressed. The Report offers vegetation management and reconductoring as the two solutions to address the reliability issues on the 12L2 circuit.

Q. Do you agree with the recommended solutions in the Report?

A. No. The Department does not agree that the solutions presented in the report would directly address these mechanical damage causes and effects. Also, the Report did not include the use of, or identify any value added from, the installation of automatic reclosing protection devices, such as reclosers or trip-savers. Additionally, Liberty has

[92] *Id.* at 8.
[93] *Id.* at 6.

not demonstrated that a significant improvement in reliability would result once one of its solutions is implemented.

Liberty's tree trimming program for distribution circuits is on a 4-year cycle. 12L1 was last trimmed in 2018 (4 years ago), and 12L2 was last trimmed in 2017 (5 years ago). This suggests that Liberty did not follow its 4-year trim policy in this area.

In reviewing plots of CKAIDI (circuit outage duration),[94] 12L1 is experiencing significantly more tree-only related outage interruptions than 12L2. Outages occur from tree-related equipment failure or damage. Additionally, the plots of CKAIFI (circuit outage frequency)[95] show that tree-only outage frequency is significantly greater for 12L1 than for 12L2. From the reliability performance statistics provided in the Report, addressing tree-only issues for circuit 12L1 would have the most impact and should be addressed first, starting with the 2022 tree trimming on 12L1. However, since the reliability on 12L1 is still not in an acceptable range, the tree trimming approach may need re-evaluation.

The Report reflects that the 12L2 circuit was last trimmed in 2017 and is already one year behind Liberty's stated 4-year normal trimming cycle. A parallel accelerated trimming effort may need to be made on the 12L2 circuit to bring it back on the trimming cycle schedule. In addition, danger tree removal or off-cycle trimming of overhanging danger limbs may be part of the solution. This practice of supplemental hot-spot trimming based on routine field inspection by Liberty crews and contractors is consistent with good industry practices. Spot and danger tree/limb trimming may be accommodated within

[94] *Id.* at 9.
[95] *Id.* at 10.

existing vegetation management budgets by increasing the length of the routine trimming cycle in areas with less outage impact from vegetation encroachment.

The Report presented reconductoring with spacer cable as the second potential solution for the reliability improvement on the 12L2 circuit where the bare conductor is prone to tree-related outages. Specifically, Liberty proposes to replace 1.5 miles of bare wires with spacer cable on the 12L2 circuit along Watkins Hill Road in Walpole, which Liberty considered a pocket of poor performance. [96]

The proposed reconductoring solutions for 12L1 and 12L2 circuits were also included in both the *"Reliability Review 2020", Appendix H of Liberty's LCIRP*" as part of Liberty's Enhanced Bare Conductor Replacement Program[97] and the *"Bellows Falls Area System Planning Summary 2020"* as part of their Grid Needs Assessment for Potential Non-Wires Solutions.[98] A portion of the 12L2, Watkins Hills Phase 3, was proposed for 2023 at an estimated cost of $550,000; and 12L1 was proposed for 2024 at an estimated cost of $790,000. The resulting reliability improvement on the 12L2 circuit is expected to be an 8% reduction in frequency and a 4% reduction in duration.[99]

Q. Does the Department have concerns with this proposed reconductoring solution?

A. Yes. As discussed previously, the Report has stated that most of the outages on both circuits were caused by trees/limbs falling on the lines and not limbs making incidental contact. Therefore, the Department believes that based on the data provided by Liberty, reconductoring portions of 12L2 with covered wire along the same route may have a minimal outage-reduction impact.

[96] *Id.* at 11-12.
[97] Liberty 2021 Least Cost Integrated Resource Plan, Appendix H, Table 19 and 20, at Bates 502-503.
[98] *Id.* Appendix F, Table 18, at Bates 406.
[99] Attachment JED/RDW/JJD-10 Data Request No. DOE 7-11.

Q. What are the Department's conclusions regarding the reliability solutions presented in the Report?

A. Based upon the information provided by Liberty, the Department believes the solution to most of the reliability issues occurring on distribution circuits 12L1 and 12L2 could be tree trimming focused and may include a combination of routine tree trimming, hot-spot tree trimming, and danger-tree management focused on actual field observed conditions. Liberty could also consider using reclosing protection devices in tree-affected areas. Additionally, based on the reliability improvement data contained in the Report, there appears to be limited reliability value on mitigating the impact of falling danger trees by reconductoring with spacer cable.

V. CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize your recommendations.

A. The Company's LCRIP and related reports such as the NWS Report provide the outlines of how the Company will evaluate and plan its distribution system in the future. To review and understand this information, the Department engaged Liberty through numerous data requests and several technical sessions. We reviewed the Company's standards in the context of the expectations of a modern customer. We recognize that the LCIRP process does not pre-approve any planned investments and that projects evolve or change over time. As we stated above, for any particular project, the prudence review occurs when the Company requests its inclusion in rate base during a rate case or step adjustment proceeding. However, during the course of this review, we discovered a lack of detail and omissions of some information, in terms of Liberty's planned investments.

We detected several deficiencies in the Plan that we recommend should be addressed by the Company. Therefore, the Department makes the following recommendations:

- Liberty should provide a supplemental filing that addresses the following areas:
    1. Specific reporting on each of the criteria in RSA 378:39, to be supported by written testimony, as set out in the Commission's Order No. 26,225 in Docket No. DG 17-152.
    2. The impacts of existing and new projected load in the Salem service area on Liberty's demand forecasting, planned capital investments, and grid needs forecast.
    3. Rework and update the sections in the LCIRP involving planned system investments and grid needs assessment to include project descriptions, projected costs, and any alternatives considered related to the ongoing system build out in Salem and Tuscan Village, and any other ongoing or near-term projects (i.e. over the next 2-year period in excess of $250,000) that have been initiated or are about to be initiated.
    4. Update on the criteria in RSA 378:38 III-Supply Options. The supplement should address the substantial impacts of the current global natural gas market on electric rates and the longer-term availability of capacity.
    5. Provide an update on each of the ten proposed grid modernization programs, with a focus on the top three net present value opportunities.
- Liberty should continue its participation in the processes set forth by the Commission's "guidance" in Docket IR 15-296, Order No. 26,575, to develop its next

LCIRP, and that the substance of that LCIRP should align with the expectations expressed by the Commission in that Order.

- Liberty should adopt a more aggressive stance (e.g., hybrid solutions) when evaluating NWS alternatives against traditional solutions, including modifying NWS selection guidelines to make them more competitive. For example, it might be worth considering if the "24 months in the future" and/or the above $500,000 threshold guidelines are too restrictive.
- Liberty should consider that the solution to most of the reliability issues occurring on problem distribution circuits (e.g. Charlestown/Bellows Falls) could be focused tree trimming and may include a combination of routine tree trimming, hot-spot tree trimming, and danger-tree management focused on actual field observed conditions. Liberty should also consider using reclosing protection devices in tree-affected areas. Additionally, based on the reliability improvement data contained in the reports provided, there appears to be limited reliability value on mitigating the impact of falling danger trees by reconductoring with spacer cable.

Q. Does that conclude your testimony?

A. Yes, it does.

Ronald D. Willoughby, PE

Position:	**Executive Consultant**
Years' Experience:	45+
Education:	Honorary Professional Degree of EE – University of Missouri-Rolla (MO Univ. of Science & Tech)(MS&T) Post Graduate Studies – Carnegie-Mellon Univ (CMU) MSEE Power Engineering – Carnegie-Mellon Univ. BSEE – University of Missouri-Rolla (UMR) Professional Engineer (PE) License – Pennsylvania

Key Qualifications:

Distribution Grid Modernization Planning: Systematic/incremental addition of smart grid devices; with technology, performance, and cost central to the planning process.

Renewables Integration and Impact on Utility Grid: Power system analysis/operation, architecture, configurations, distributed generation strategies, market analysis, portfolio analysis, wind power and PV integration.

Conservation Voltage Reduction (CVR): Using smart grid data points and controllable VAR sources to regulate distribution voltages in near real time to reduce demand, lower peaks (kW), and save energy (kWh).

Transmission & Distribution Planning: Power flows; reliability analysis; transient & long-term stability; load shedding; reconfiguration schemes; contingency analysis; root cause analysis; distributed generation; energy storage strategies; protection/coordination; systematic replacement/upgrade strategies; and special protection systems (SPS).

Advanced Protection, Automation & Control: Sensor, communication, sectionalizing, controllable VAR sources, voltage control, expert systems, demand, and energy reduction application strategies.

Distribution Substation Design and Specifications Review: Modular Integrated Transportable Substation (MITS) application, design, specification, and implementation; renewables integration; volt/VAR control; substation upgrades; and distribution automation/protection strategies.

Patents & Publications

Earned U.S. Software Patent 6549880 for *Improving Reliability of Electrical Distribution Networks* (2003).

More than 60 publications relating to electric power systems analysis and operation.

Project Types

Distribution Grid Modernization Planning: Systematic/incremental addition of smart grid devices; with technology, performance, and cost central to the planning process.

Conservation Voltage Reduction (CVR): Using smart grid data points and controllable VAR sources to regulate distribution voltages in near real time to reduce demand, lower peaks (kW), and save energy (kWh).

Renewables Integration: Main substation, collector systems, protection and control.

Power System Energy Use: Technical and non-technical loss evaluation and improvement measures; with specific expertise in island power systems.

Power System Automation: Application of sensor/communication packages, sectionalizing equipment, and SCADA systems to achieve performance targets.

Power System Reliability: Preventive actions and sectionalizing strategies to achieve reliability performance targets.

Power System Protection: Protection/coordination; systematic replacement/upgrade strategies.

Root Cause Analysis (RCA): For unexplained electric power system events.

Knowledge Management: Use cases for technical procedures associated with power system analysis/operation, expert systems, architecture, and configurations.

Project Management: Transmission analysis, distribution analysis, system protection, and reliability improvement.

Training: Power system design, reliability, protection, stability, and operation.

Representative Project Experience

Conservation Voltage Reduction (CVR)

- Project Manager and Technical Lead for Commonwealth Edison Company (ComEd) feasibility study to quantify energy and demand savings using distribution Voltage Optimization techniques. Objectives: 1) Minimize cost by initiating feeder upgrades to achieve minimum performance thresholds. 2) Maximize energy savings by optimizing performance while staying within Total Resource Cost (TRC) constraints.
- Co-Instructor of CVR workshop customized to meet specific ComEd engineering and energy efficiency department needs.
- Co-founder of a CVR Industry Consortium to guide CVR research, work with industry groups, develop policy recommendations, promote implementation strategies, and document the results.
- Technical lead for project commissioned by DOE to conduct a comprehensive study across the USA on CVR, including deployment strategies, costs, benefits, barriers, and potential solutions, through a broad market outreach effort.

Advanced Protection, Automation, & Control for Transmission & Distribution

- Co-Chaired (with the Director of R&D at We-Energies) Distribution Vision 2010 LLC (DV2010), a consortium of Investor Owned Utility (IOU) companies. Mission: To create and execute a roadmap of equipment and service requirements important to cost-effectively operating a reliable electric distribution system; 2002-2006. DV2010 was accountable to CEOs and CFOs of member utilities.
- Led EPC and turnkey solutions in support of electric utility companies for electrical distribution automation, medium voltage modular substations (distribution centers), and wind farm electrical distribution systems (from the base of the turbine towers through interconnection to the utility grid); 1985-1988.
- Invited by the Director of Power & Energy Initiative at the University of Pittsburgh to be an Instructor for a graduate course on Smart Grid Technologies & Applications. Subject: Substation Automation and Protective Relaying; on-going.
- Participated in U.S./Canada Power Outage Task Force led by the Department of Energy (DOE), Natural Resources Canada, and the North American Electric Reliability Council (NERC) created to study the blackout of August 14, 2003, the largest electrical outage event in U.S. history.
- Led comprehensive Root Cause Analysis (RCA) for PJM executive management in response to a July 1999 low voltage condition stemming from record peak loading conditions on the bulk transmission system. Proactive corrective measures prevented future occurrences.

Renewables Integration and Impact on Transmission & Distribution Systems

- Invited by Prime Minister of Curacao to represent USA in 1st Annual Durable Energy Conference in Curacao to address renewables integration issues for the transmission and distribution system; March 2012.
- Invited by CEOs of Wind-2-Power-Systems (W2PS) and Hudson Energy to represent USA for conference in Madrid to cover PV integration, grid integration, energy storage, and DC infrastructure issues; February 2012.
- Invited by CARILEC to chair two sessions on Transforming the Electricity Grid at the Renewable Energy Forum, St Thomas, U.S. Virgin Islands; September 2011. CARILEC represents CEOs, COOs, and CFOs for 33 island utilities in the Caribbean.

Transmission & Distribution Planning

- Led distribution grid modernization planning efforts, focused on systematic and incremental addition of smart grid devices, with technology, performance, and cost central to the planning process
- Led EPC and turnkey solutions for electric distribution automation, medium voltage modular substations (distribution centers), and wind farm distribution systems (from base of turbine towers through interconnection to utility grid). Accountable for success of these focused areas when measured against sales and margin goals, internal and

external budget constraints, and overall customer satisfaction. Routinely augmented internal direct staff with external resources according to project needs. Matrix managed project teams to effectively utilize project resources.

- Co-founder of industry-wide consortium focused on strategic, business, regulatory, and technical issues associated with Conservation Voltage Reduction/Regulation (CVR) at investor-owned utilities, electric cooperatives, and municipals.
- Managed commissioning and public relations for comprehensive distribution line installation in the city of Smolensk, Russia. Project was collaborative effort between U.S. Trade & Development Agency (TDA) and Cooper Power Systems (CPS); 2002-2004.
- Developed distributed CVR measures to conserve energy and reduce overall losses without compromising end-user reliability or power quality.
- Developed emergency generation integration strategies for major industrial complexes in the USA.
- Conducted comprehensive seminar on electric power systems for the Ministry of Water and Power in Peking, China; 1984.
- Performed international power systems studies on power flow, transient stability, shunt compensation, load shedding, motor starting, loss formula development, short circuit, and protective device coordination; 1974-2000. Interfaced with Engineering Planning Managers.
- Led projects sponsored by the Pacific Power Association (PPA) for power system energy analysis and loss reduction on 20 islands in the South Pacific, 10 with U.S.-style power systems, and 10 with European-style power systems. Interfaced directly with CEOs and PPA throughout study.
- Taught Westinghouse Advanced School on Power System Stability; 1980-1988.

Professional Development Activities

NERC Compliance; IEC 61850; DMVP (DMEDI) Process Improvement; Professional Development Seminars on Management (Management Grid, Management Techniques, Team Building); Interpersonal Skills; Time Management; Managing the Software Project; Sales Techniques; SPIN Sales Training; Pricing Strategies; Finances; Technical Writing; Safety; Problem Solving & Decision Making; IEEE Seminars on Relay Coordination and Reactive Power Control; Root Cause Analysis; Reliability Analysis; Intellectual Property; Environmental Compliance; Corporate Ethics; Toastmasters International.

Company Affiliations

Willoughby Consulting, Raleigh, NC (2012 to Present)
Executive Consultant, Electric Power Systems Planning & Operation - Owner

Modular distribution substation application, specification, and implementation. Quantifiable Conservation Voltage Reduction (CVR) assessments for energy efficiency energy savings (kWh) and peak power reduction (kW); CVR application strategies. Emergency backup

power supply needs assessment and solution strategies for large industrial/commercial facilities. Portfolio analysis, go-to-market strategies, and operations support related to electric power systems. Specific service areas include transmission and distribution planning, renewables integration strategies, energy efficiency measures, system protection strategies, distribution automation schemes, data management, and business plan development.

River Consulting Group (RCG), Clayton, GA (2018 to Present)
Executive Consultant - Contract

Advisory services related to distribution grid modernization planning efforts involving systematic and incremental addition of smart grid devices, with technology, performance, and cost central to process.

ABB, Inc. (ABB), Raleigh, NC (2016 to 2017)
Executive Consultant - Contract

Advisory services related to distribution grid modernization planning efforts involving systematic and incremental addition of smart grid devices, with technology, performance, and cost central to process.

Advanced Microgrid Solutions (AMS), San Francisco, CA (2015 to 2017)
Executive Consultant - Contract

Advisory services regarding business strategy, competitive intelligence, and energy services pricing strategies related to the company's business development efforts.

Applied Energy Group (AEG), New Brunswick, NJ (2012 to 2015)
Principal, Executive Consultant - Contract

Energy efficiency (savings) analysis methods, project procurement, and project execution. Innovative applications of existing technologies to advance the art. Industry-wide investigations. Direct responsibility for project teams, including subcontractors.

Dell Innovation Services, Peoria, IL (2012 to 2014)
Vice President, Electricity Transmission & Distribution - Contract

Design and apply substations (including modular) for emergency power supply. Develop electrical site one-line diagrams and associated loading profiles. Conduct power demand audits.

KEMA, Raleigh, NC (2006 to 2012)
Vice President, Electricity Transmission & Distribution

Strategic leadership of the U.S. technical T&D practice in North America, focusing on client issues related to electric power system T&D planning, asset management, protection and reliability, advanced technology applications, and future power systems. Direct responsibility for team of 30 professionals.

Cooper Power Systems, Franksville, WI (1989 to 2006)
Director, Industrial Development & Technical Services Marketing; Manager, Systems Integration Solutions; Director, Thomas A. Edison Technical Center; Manager, Systems Engineering Group

Technical solution development for electrical distribution automation, substations, distribution operating centers, and wind farm integration. Accountable for sales, margins, budget, and customer objectives. Directed project teams to matrix manage overall resources (which included marketing, sales, and engineering staffs) to promote services, identify

opportunities, and secure business. Participated in strategic alliances and acquisitions. Managed high power laboratory (500 MVA short circuit generator), high voltage laboratory (2 million volts), and full materials laboratory, with direct responsibility for a team of 110 professionals. Managed group responsible for Modular Integrated Transportable Substation (MITS) application, design, specifications, implementation, and support (69 kV and below) (10 MVA and below).

Westinghouse Advanced Systems Technology, Pittsburgh, PA (1974 to 1988)
Manager, Transmission Planning Section; Manager, T&D Software Services

Responsible for a staff of 8 involved in the application of technical transmission and distribution software, including marketing and customer service.

Black & Veatch Consulting Engineers, Kansas City, MO (1971 to 1974)
Coop student while with the University of Missouri - Rolla

Professional Memberships

- IEEE – Life Senior Member
- IEEE Power Engineering Society – Senior Member
- IEEE Industrial Applications Society – Senior Member
- Phi Kappa Phi – Member
- Eta Kappa Nu – Member
- Tau Beta Pi – Member
- Kappa Kappa Psi – Member
- Wake County NC – Precinct Election Official (2017-2019)

Professional Recognition

2016 Achieved **Life Member** status for the Institute of Electrical and Electronics Engineers (**IEEE**).

2012-14 Invited **Instructor** for **University of Pittsburgh** graduate course on *Smart Grid Technologies & Applications*. Subject: *Substation Automation and Protective Relaying*.

2013 Co-Founder of an industry-wide ***CVR Consortium*** focused on increasing energy savings by resolving strategic, business, and technical issues preventing more wide-spread deployment by electric utility companies.

2012 Earned ***Order of the May*** honors recognition from Carnegie-Mellon University for more than 10 years of continous and consistent support. Citation includes these words: “This special order honors those who embody all the best characteristics for which the society was originally founded in 1947.”

2011 Invited **Chairman**, 2 Sessions, *Transforming the Electricity Grid*, **Carilec Renewable Energy Forum**, September 20-21, St. Thomas, U.S. Virgin Islands.

2003 Awarded ***Honorary Professional Degree of Electrical Engineering***, Univ of MO-Rolla (UMR), based on "outstanding professional and personal achievements"

2003 Elected **President**, *Academy of Electrical & Computer Engineers*, UMR

2001 Elected VP, *Academy of Electrical & Computer Engineers*, University of Missouri-Rolla

2001 Co-Chair, Steering Committee to develop **Distribution Vision 2010 LLC (DV2010)**, consortium of Investor Owned Utility (IOU) companies

2001 Appointed **Chairman**, Technical Paper Committee, USA National Committee, **CIRED**

2000 Appointed to ***Industry Advisory Council***, Rensselaer Polytechnic Institute (RPI), NY

1998 Appointed to ***Industrial Liason Council (ILC)*** for the College of Engineering and Applied Science, University of Wisconsin-Milwaukee

1997 Elected to ***Academy of Electrical & Computer Engineers***, University of Missouri-Rolla for "outstanding contributions to the profession of electrical engineering and for leadership in the community and profession." Requires minimum 20 years experience to qualify.

1991 Selected for **USA Trade Mission** on Electric Power to East Germany. Represented USA distribution equipment technologies. [E & W Berlin concrete wall fell Nov 1989]

1989 Appointed to ***Industry Advisory Council***, University of Missouri-Rolla (UMR).

1985 *Westinghouse* ***Engineering Achievement Award*** for "high level technical contribution to the development and implementation of profitable engineering courses in the Electric Utility and Industrial markets."

1985 ***Senior Member*** status for Institute of Electrical & Electronics Engineers (**IEEE**).

1984 Elected *Chairman* of the only **Quality Circle** in operation at Westinghouse Advanced Systems Technology (AST)

1982 Appointed to first ***Engineering Advisory Council*** for Westinghouse AST

1978 Earned ***PROFESSIONAL ENGINEER (PE) License*** from the Commonwealth of Pennsylvania

1972 Received *Outstanding Bandsman* award from Kappa Kappa Psi band fraternity

1969 **Valedictorian** and **Student Council President**, Grandview Senior High School

Publications

Ronald Dean Willoughby, PE

Willoughby, Ronald D, Bob Grant, and George Fandos. "Unbiased 360-Degree DER Evaluations and Assistance," EnergyCentral - Utility Professionals Group, April 20, 2020.

Willoughby, Ronald D. "Why Do It?," *EnergyPulse* from Energy Central – Intelligent Utility, March 21, 2018.

Willoughby, R., S. K. Gill, E, Zhang, J. Silvers. "Distributed Energy Resources Supporting Power Grid Reliability," CIGRE US National Committee, 2016 Grid of the Future Symposium, November 2016.

Willoughby, Ronald D. "Grid Modernization is Like Remodeling a House," Energy Central - Electric Power Systems Planning & Operation, July 20, 2016.

Willoughby, Ronald D. "The Power of Incrementalism," *EnergyPulse* from Energy Central - Communications & Security, February 10, 2016.

Willoughby, Ronald D. "Aging Workforce Presents Knowledge Management Opportunities," *EnergyPulse* from Energy Central - Human Resources, November 13, 2015.

Willoughby, Ronald D. "SEPB CVR Proposal Response Review," Report for AEG for TVA on behalf of SEPB, PO 916082, June 8, 2015.

Willoughby, Ronald D. "Distribution Automation and Conservation Voltage Reduction," *EnergyPulse* from Energy Central - Grid Operations; April 17, 2015.

Willoughby, Ronald D. "CVR Fundamentals," White Paper, January 5, 2015.

Willoughby, Ronald D., et al. "Final Report - Voltage Optimization (VO) Feasibility Study," AEG for ComEd VO Study, Contract No. 01146430, January 6, 2015.

Willoughby, Ronald D. "Order of the 9's," *EnergyPulse* from Energy Central - Grid Operations, June 2, 2014.

Willoughby, Ronald D. "Analysis Paralysis," *EnergyPulse* from Energy Central - Business Corporate, January 16, 2014.

Willoughby, Ronald D. "CVR and the Lost Revenue Conundrum," *EnergyPulse* from Energy Central, August 9, 2013.

Willoughby, Ronald D. "Time to Take a Second Look at Conservation Voltage Regulation?" *Intelligent Utility Update*, June 4, 2013.

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Willoughby, Ron, Kellogg Warner. "Conservation Voltage Regulation: An Energy Efficiency Resource," IEEE *Smart Grid Newsletter*, April 10, 2013.

Willoughby, Ronald D. "Thinking Through Grid Modernization: It's a Chinese Puzzle – Moving Each Piece Moves Another," article written by Phil Carson of *Intelligent Utility Daily* after an exclusive interview with Mr. Willoughby, June 17, 2012.

Willoughby, Ronald D. "Power System Automation Drives Need for Data Acquisition," *Distributed Energy* Magazine, April 2012.

Willoughby, Ronald D. and Juan Gers. "IEC 61850 Primer," DNV KEMA *TECH Notes*, April 2012.

Willoughby, Ronald D. "Power System Automation Drives the Need for Smart Grid," DNV KEMA *Sherpa* Web Site, December 1, 2011.

Willoughby, Ronald D. "System Automation Drives Need for Data Acquisition," *Electric Light & Power* Magazine, November 2011.

Willoughby, Ronald D. "System Automation Drives Need for Data Acquisition," *PowerGrid International* Magazine, September 2011, pp 52-56.

Willoughby, Ronald D. "The 'Next Big Thing,'" article written by Phil Carson of *Intelligent Utility Daily* after an exclusive interview with Mr. Willoughby, April 21, 2010.

Willoughby, R. D., S. French Smith, S. Varadan. "A Knowledge Framework for Sustaining Business Growth and Success," Panel Session Submission 2010TD0574, IEEE T&D World Conference & Exposition, April 2010, New Orleans.

Willoughby, R. D. (Contributing Expert). *Utility of the Future*, Volume 2, *The Promise of Energy Storage*, KEMA, December 2009.

Willoughby, R. D. "The Evolving Convergence of Distribution Automation and Advanced Metering Infrastructure," KEMA Automation Insight, June 2007.

Willoughby, R. D. and L. A. Kojovic. "Integration of Distributed Generation In A Typical USA Distribution System," CIRED 2001, Amsterdam Netherlands, June 2001.

Willoughby, R. D. "Order of the 9's," Cooper Power Systems *SETUP* Newsletter, Summer 2000 Edition.

Willoughby, R. D., P. Avery, et al. "Economic Solutions To Power Quality and Reliability Problems," American Power Conference *Proceedings*, Chicago, IL, April 10-12, 2000.

Willoughby, R. D. and L. A. Kojovic. "Digital Models Simulate Physical Test Facilities," *IEEE Computer Applications in Power* Magazine, April 1995.

Willoughby, R. D., C. A. McCarthy, et al. "Power Quality and Reliability Services," Electric Power '99 Conference *Proceedings*, Baltimore MD, April 1999.

Willoughby, R. D., C. Gilker, and E. Strauss. "Education Highway for the Practicing Engineer: What Next in the Age of Deregulation?" Systems Engineering Group Bulletin SE9901, February 1999.

Willoughby, R. D. and S. R. Mendis. "Harmonic Filters Provide The Key To Plant Reliability," PPE Magazine, April 1996.

Willoughby, R. D. and L. A. Kojovic. "Computer Methods for Simulations of Power Lab Tests & Electrical Apparatus Operations in Power Systems," TESLA II Millennium, Belgrade, Yugoslavia, October 1996.

Willoughby, R. D., C. Gilker, et al. "Training for TODAY'S Practicing Electrical Distribution Engineer," Systems Engineering Group Bulletin SE9402, Cooper Power Systems, August 1994.

Willoughby, R. D. and K. Argiropoulos. "Hybrid Surge Arrester Technology," US Technology for the Production, Transmission, & Distribution of Electric Power Seminar, Berlin, Germany, October 1991.

Willoughby, R. D. and K. Argiropoulos. "Overcurrent Protection Devices for Overhead Distribution Systems," US Technology for the Production, Transmission, & Distribution of Electric Power Seminar, Berlin, Germany, October 1991.

Willoughby, R. D. and K. Argiropoulos. "Voltage Regulation Equipment for Overhead Distribution Systems," US Technology for the Production, Transmission, & Distribution of Electric Power Seminar, Berlin, Germany, October 1991.

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Willoughby, R. D. , et al. "A Key to Plant Reliability: System Studies," Pakistan Electrical Conference, February 1987.

Willoughby, R. D., and S. Rubino. "Power Systems Studies can P4redict and Resolve Harmonic Resonance Problems in Industrial Planrs," IEEE Petroleum and Chemical (PCIC) *Conference Record*, September 1985.

Willoughby, R. D., J. A. Juves, and A. Batenburg. "Utility Survey of Methods for Minimizing the Number and Severity of System Separations," *Final Report*, Electric Power Research Institute, EPRI EL-3437, Project 1952-1, March 1984.

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Willoughby, R. D., J. A. Juves and S. S. Waters. "A Streamlined Procedure fro Obtaining Regulatory Approval for New Transmission Lines," *Final Report*, Electric Power Research Institute, EPRI EL-1404, Contract TPS-733, December 1982.

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Joseph J. DeVirgilio, Jr. Owner, Suncoast Management Consultants, LLC

Education:

B.E./1973/Electrical Engineering/Stevens Institute of Technology, Hoboken, NJ

M.E./1981/ Electric Power Engineering/RPI, Troy, NY

Professional Experience:

2013 – Present Sarasota Memorial Healthcare System: Board member, former Chairman

2011 - Present Suncoast Management Consultants, LLC: Owner

2010 United Way of Dutchess County: CEO

1973 - 2010 CH ENERGY GROUP, INC.
CENTRAL HUDSON GAS & ELECTRIC CORPORATION
CENTRAL HUDSON ENTERPRISES CORPORATION (CHEC)
284 South Avenue, Poughkeepsie, NY 12601

1/05 -12/10 Executive Vice President - Corporate Services and Administration
Senior Corporate Officer and member of the Executive Team of CH Energy Group, Inc. Director of Central Hudson Gas & Electric Corp ("Central Hudson") and Central Hudson Enterprises Corp ("CHEC")

Executive Responsibility for Griffith Energy Services, Inc., a wholly-owned fuel oil distribution subsidiary.

Executive responsible for establishing and executing corporate policy and objectives and associated implementation of the related processes for the following areas of responsibility for Central Hudson:

Information Technology; Corporate Communications, Media Relations, Governmental Affairs, and Economic Development; Human Resources Purchasing & Stores; Fleet Management; Office Services; Facility Operation & Maintenance; and Corporate Quality and Process Re-engineering.

Corporate Executive Committee membership: Chairperson: I/T Steering Committee. Member of the Capital Resource Allocation Committee.

03/05 -12/10 Director, Central Hudson Gas & Electric Corp

03/02 -12/10	Director and Executive Vice President – CHEC, Griffith Energy Services and SCASCO
11/98 -12/24	Senior Vice President - Corporate Services and Administration Corporate Executive Committee membership: Chairperson: I/T Steering Committee and the Retirement Income, 401K, and VEBA Plans Administrative Committees. Member of the Capital Resource Committee.
5/88 -11/98	Vice President -- Human Resources and Administration
4/86 - 5/88	Assistant Vice President – Gas & Electric Customer Services & T&D Operation
3/84 - 4/86	Manager – Corporate Services & I/T
3/82 - 3/84	Manager – Gas & Electric Customer Services Field and Call Center Operation
3/79 - 3/82	District Superintendent – Catskill Gas & Electric T&D Operation
6/73 - 3/79	Engineering Assignments – Gas and Electric Field Engineering, Gas Meter Engineer, and Gas Testing facility supervisor

Professional Affiliations:

3/80 – 12/11	Professional Engineer, New York State, License No. 057637
1994 - 2000	Marketing Executives Conference -- member 1994; Executive Committee 1995; Program Chairperson 1997.
1993 -2004	Council of Industry of Southeastern New York -- Board of Directors.
1988 -1999	New York State Regional Utility Group -- Central Hudson's Representative
1982-1998	American Gas Association (AGA) -- Central Hudson Gas & Electric's Representative; Customer Services Committee (1982-1988); Human Resources Committee (1988 to 1998).

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
2021 Least Cost Integrated Resource Plan

Department of Energy Technical Session Data Requests - Set 1

Date Request Received: 4/27/22 | Date of Response: 5/11/22
Request No. DOE TS 1-3 | Respondent: Carmen Liron-Espana

REQUEST:

Reference Liberty LCIRP January 14, 2021 at Bates 017. Please update the paragraph beginning on line 6 to reflect the differences (or a revised definition) to indicate whether the 2020 value provided (188.5 MW) is an actual value or a weather adjusted value and whether the 2037 forecast value (217.34 MW) is a1-in-10 weather scenario.

RESPONSE:

The 2020 value provided of 188.5 MW is a weather adjusted value. Please see Table 1 at Bates 128.

For consistency, the Company would like to revise the paragraphs starting on line 2 and line 6 at Bates 017 as follows:

(On line 2): *The forecast model projects, under normal weather conditions, an increase in Liberty's summer peak demand from 192.459 megawatts ("MW") in 2021 to 202.6 MW in 2037. This results in an average annual increase of 0.3% prior to any "out of model adjustments" for new load greater than 300 kW.*

(On line 6)*: The Company developed an "extreme weather" forecast of summer peak demands based on a 1-in-10 weather scenario. The extreme weather forecast model projects an increase from 206.994 MW in 2021 to 217.34 MW in 2037. This results in an average annual increase of 0.3%.*

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
Least Cost Integrated Resource Plan

Staff Data Requests - Set 1

Date Request Received: 4/1/21
Request No. Staff 1-37

Date of Response: 4/15/21
Respondent: Carmen Liron-Espana
Joel Rivera

REQUEST:

Reference Liberty LCIRP, at Bates 14, stating "The extreme weather scenario takes the weather conditions associated with the highest peak day over a 20-year history and applies these extreme conditions to all future years of the forecast. Based on the historical experience, there is only a ten percent probability that actual peak-producing weather will be equal to or more extreme than the extreme weather scenario. That is, the extreme weather forecast is a "1 in 10" case."

a. In the earlier LCIRP submittal, DE 19-120, Attachment 2, Bates 162, Section 8.1 states "As shown in Figure 1 above, the planning process for designing the Distribution System begins with the load forecast. The PSA load forecast is updated annually. The load forecast at the system level is based on econometric models, and is developed on both a weather-normalized and weather-probabilistic basis. Currently, the Liberty distribution system is modeled for a "peak hour" load level that has a 5% probability of occurrence such that those weather conditions are expected to occur once in 20 years. Specific major known or planned load additions are factored into the load forecast." An additional description of Forecasting Methodology and Application for Planning Criteria is described in DE 19-120, Liberty response to Staff Data Request 1-3, as follows "The econometric model is used to simulate the historical and forecasted peak demand for each PSA under normal and extreme weather conditions. The normal weather simulation assumes average weather conditions for each year of the forecast. Normal weather conditions are determined by averaging the weather for the highest peak day of a 20-year historical period. As an average of historical weather, the normal weather forecast becomes a "50/50" case with a 50% probability that actual weather is greater than or less than the forecasted conditions. The extreme weather scenario takes the weather conditions associated with the highest peak day over a 20-year history and applies these conditions to all future years of the forecast. Based on the historical experience, there is only a five percent probability that actual peak-producing weather will be equal to or more extreme than the extreme weather scenario. That is, the extreme weather forecast is a "1 in 20" case."

    i. Please explain why the Company samples the peak days over 20 years and determines that it is a "1 in 10 forecast" or 90/10, rather than follow the methodology of obtaining peak forecasts over a 10 year period (1 in 10).

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ii. Please explain whether the Company has used the "historical experience" in the forecasting methodology before as it relates to timeframe in a probabilistic forecast methodology. If not, please explain why it has chosen to do so in this case.
iii. Why does the Company label the 1 in 10 year forecast an "extreme forecast" when, in previous years, the extreme forecast was reserved for a 95/5 or 1 in 20 year forecast?
iv. Utilizing the similar methodology as the 95/5 in the previous 2019 LCIRP (DE 19-120) forecast, please provide the 90/10 or "1 in 10 year".
v. Please provide all communications relating to the forecast submission in this LCIRP between the forecast consultant/vendor and Liberty or its representative

RESPONSE:

a. See the responses below:

i. See Attachment Staff 1-37.a.i.xls for the Company's updated forecast which samples the peak days over 10 years rather than 20 years. Moving forward, Liberty could model its distribution system for a "peak hour" load level that has a 10% probability of occurrence such that those weather conditions are expected to occur once in 10 years. This change was made as part of Docket No. DE 16-383.

ii. The Company calculated its normal and extreme weather scenarios based on historical weather experience in our system territory in the last 20 years.

iii. See the Company's response to i.

iv. See the Company's response to i.

v. See the Company's response to Staff 1-30.a.

Forecasted Peaks Normal Weather

year	Summer month	Peak Mw	Growth	Winter month	Peak Mw	Growth
2021	7	195.853	3.87%	1	149.116	6.66%
2022	7	196.242	0.20%	1	149.169	0.04%
2023	7	196.698	0.23%	1	149.325	0.10%
2024	7	197.184	0.25%	1	149.517	0.13%
2025	7	197.681	0.25%	1	149.733	0.14%
2026	7	198.17	0.25%	1	149.948	0.14%
2027	7	198.647	0.24%	1	150.149	0.13%
2028	7	199.111	0.23%	1	150.339	0.13%
2029	7	199.564	0.23%	1	150.515	0.12%
2030	7	200.008	0.22%	1	150.682	0.11%
2031	7	200.441	0.22%	1	150.841	0.11%
2032	7	200.86	0.21%	1	150.987	0.10%
2033	7	201.266	0.20%	1	151.116	0.09%
2034	7	201.656	0.19%	1	151.235	0.08%
2035	7	202.037	0.19%	1	151.337	0.07%
2036	7	202.415	0.19%	1	151.435	0.06%
2037	7	202.783	0.18%	1	151.529	0.06%

based on October 2010-September 2020 Average Weather

Forecasted Peaks Normal Weather

year	Summer month	Peak Mw	Growth	Winter month	Peak Mw	Growth
2021	7	192.548	2.11%	1	148.685	6.35%
2022	7	192.934	0.20%	1	148.738	0.04%
2023	7	193.387	0.23%	1	148.894	0.10%
2024	7	193.871	0.25%	1	149.087	0.13%
2025	7	194.365	0.25%	1	149.302	0.14%
2026	7	194.851	0.25%	1	149.517	0.14%
2027	7	195.326	0.24%	1	149.718	0.13%
2028	7	195.787	0.24%	1	149.908	0.13%
2029	7	196.237	0.23%	1	150.084	0.12%
2030	7	196.679	0.23%	1	150.252	0.11%
2031	7	197.11	0.22%	1	150.41	0.11%
2032	7	197.526	0.21%	1	150.556	0.10%
2033	7	197.929	0.20%	1	150.685	0.09%
2034	7	198.317	0.20%	1	150.805	0.08%
2035	7	198.695	0.19%	1	150.906	0.07%
2036	7	199.071	0.19%	1	151.004	0.06%
2037	7	199.435	0.18%	1	151.099	0.06%

based on October 2000-September 2020 Average Weather

Forecasted Peaks Extreme Weather

year	Summer month	Peak Mw	Growth	Winter month	Peak Mw	Growth
2021	7	211.995		1	152.254	
2022	7	212.397	0.19%	1	152.307	0.03%
2023	7	212.865	0.22%	1	152.463	0.10%
2024	7	213.364	0.23%	1	152.656	0.13%
2025	7	213.874	0.24%	1	152.871	0.14%
2026	7	214.376	0.23%	1	153.086	0.14%
2027	7	214.866	0.23%	1	153.287	0.13%
2028	7	215.343	0.22%	1	153.477	0.12%
2029	7	215.809	0.22%	1	153.653	0.11%
2030	7	216.265	0.21%	1	153.821	0.11%
2031	7	216.712	0.21%	1	153.979	0.10%
2032	7	217.143	0.20%	1	154.125	0.09%
2033	7	217.562	0.19%	1	154.254	0.08%
2034	7	217.966	0.19%	1	154.374	0.08%
2035	7	218.359	0.18%	1	154.475	0.07%
2036	7	218.75	0.18%	1	154.573	0.06%
2037	7	219.131	0.17%	1	154.668	0.06%

based on peak weather conditions over the past 10 years

Forecasted Peaks Extreme Weather

year	Summer month	Peak Mw	Growth	Winter month	Peak Mw	Growth
2021	7	207.083		1	151.821	
2022	7	207.481	0.19%	1	151.874	0.03%
2023	7	207.946	0.22%	1	152.029	0.10%
2024	7	208.441	0.24%	1	152.222	0.13%
2025	7	208.947	0.24%	1	152.437	0.14%
2026	7	209.445	0.24%	1	152.653	0.14%
2027	7	209.931	0.23%	1	152.853	0.13%
2028	7	210.404	0.23%	1	153.044	0.12%
2029	7	210.865	0.22%	1	153.22	0.11%
2030	7	211.318	0.21%	1	153.387	0.11%
2031	7	211.761	0.21%	1	153.545	0.10%
2032	7	212.188	0.20%	1	153.691	0.10%
2033	7	212.603	0.20%	1	153.821	0.08%
2034	7	213.003	0.19%	1	153.94	0.08%
2035	7	213.393	0.18%	1	154.041	0.07%
2036	7	213.78	0.18%	1	154.14	0.06%
2037	7	214.156	0.18%	1	154.234	0.06%

based on the average of the 2 peak weather conditions over the past 20 years

	Weather Values Used in Forecast			
Month	Normal WTHI	Extreme WTHI	Normal HDD	Extreme HDD
January	27.3775	21.9	37.99	46.1
February	34.4825	26.995	29.65	37.6
March	39.3305	30.86	22.57	32.6
April	57.135	74.86	7.33	25.1
May	76.588	80.485	0	0
June	80.0975	82.75	0	0
July	82.6875	86.475	0	0
August	80.683	84.61	0	0
September	78.768	81.655	0	0
October	70.5465	73.96	0	0
November	43.767	36.29	17.21	26.4
December	34.989	21.37	29.06	46.4

based on October 2010-September 2020 Weather

	Weather Values Used in Forecast			
Month	Normal WTHI	Extreme WTHI	Normal HDD	Extreme HDD
January	30.0403	22.1275	35.085	45.55
February	34.3413	27.9425	29.605	37.85
March	39.6418	31.185	22.395	32.3
April	61.4713	77.35	5.7	20.9
May	75.941	81.205	0	0
June	80.2715	84.5175	0	0
July	81.912	85.3225	0	0
August	80.98	84.565	0	0
September	77.978	82.0725	0	0
October	67.549	74.4975	1.305	10
November	47.1588	37.4675	13.435	25.75
December	37.221	26	26.18	41

based on October 2000-September 2020 Weather

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
2021 Least Cost Integrated Resource Plan

Department of Energy Data Requests - Set 8

Date Request Received: 7/8/22
Request No. DOE 8-4

Date of Response: 7/22/22
Respondent: Heather Tebbetts

REQUEST:

Reference Liberty DOE 7-13. Please provide summary documentation of the Tesla Powerwall pilot project including budget, technical specifications, application procedure, ownership, customer contract terms including cost of maintenance, salvage/removal at end-of-life, service arrangements including potential impact to customers for instances of extended system/component outages, and operating experience. What alternatives were considered for the project?

RESPONSE:

Please see Docket No. DE 17-189 Petition to Approve Battery Storage Pilot Program on the Public Utilities Commission's website for all information requested on the battery storage pilot. https://www.puc.nh.gov/Regulatory/Docketbk/2017/17-189.html

The pilot project objectives were to reduce peak load, provide backup power to customers participating, and learn more about customer behavior through time-of-use rates. Consideration of alternatives was not part of the pilot objectives.

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
Least Cost Integrated Resource Plan

Staff Data Requests - Set 1

Date Request Received: 4/1/21
Request No. Staff 1-12

Date of Response: 4/15/21
Respondent: Heather Tebbetts
Melissa Samenfeld

REQUEST:

Reference Liberty LCIRP, at Bates 9, stating "The Company develops solutions to the deficiencies in the form of individual project proposals, which are then included in the Company's five-year capital budget based on their priority level and cost considerations."

a. Please provide the aforementioned five year capital budget, and each individual project proposal.

RESPONSE:

a. Please see Attachment Staff 1-12.xlsx.

Project Description	Priority	FY2022	FY2023	FY2024	FY2025	FY2026	2022 - 2026 Filter
GSE-Dist-Land/Land Rights Blanket	2. Mandated	2,000	2,060	2,060	2,122	2,122	10,364
GSE-Dist-Telecomm Blanket	2. Mandated	2,500	2,575	2,575	2,652	2,652	12,955
GSE-Dist-Meter Blanket	2. Mandated	5,000	5,150	5,150	5,305	5,305	25,909
Dist-Transf/Capac Install Blanket	2. Mandated	5,000	5,150	5,150	5,305	5,305	25,909
Security Conversion GSE	2. Mandated	25,000	25,000		25,000	25,000	100,000
01737 GSE-Dist-Subs Blanket	2. Mandated	25,750	26,523	26,523	27,318	27,318	133,431
Distribution Feeder Power Factor Correction	2. Mandated	25,000	50,000	50,000	50,000	50,000	225,000
NN D-Line Work Found by Insp.	2. Mandated	50,000	50,000	50,000	50,000	50,000	250,000
GSE Distributed Generation Blanket	2. Mandated	50,000	50,000	50,000	50,000	50,000	250,000
GSE-Dist-Water Heater Blanket	2. Mandated	-	82,400	82,400	82,400	82,400	329,600
Lebanon Area Low Voltage Mitigation	2. Mandated	175,000	100,000	150,000	100,000	100,000	625,000
GSE-Dist-Load Relief Blanket	2. Mandated	100,000	103,000	103,000	106,090	109,273	521,363
GSE-Dist-St Light Blanket	2. Mandated	125,000	125,000	125,000	128,750	132,613	636,363
GSE-Dist-3rd Party Attach Blanket	2. Mandated	128,750	132,613	132,613	136,591	140,689	671,254
01659 Granite St Meter Purchases	2. Mandated	257,500	265,225	265,225	273,182	281,377	1,342,509
01663 GS Storm Program Proj	2. Mandated	300,000	300,000	300,000	309,000	318,270	1,527,270
GSE-Dist-Asset Replace Blanket	2. Mandated	412,000	424,360	424,360	437,091	450,204	2,148,014
01660 Granite St Transformer Purchases	2. Mandated	432,600	445,578	445,578	458,945	472,714	2,255,415
GSE-Dist-Public Require Blanket	2. Mandated	535,600	551,668	551,668	568,218	585,265	2,792,419
GSE-Dist-Reliability Blanket	2. Mandated	655,636	675,305	675,305	695,564	716,431	3,418,243
Dist-Damage&Failure Blanket	2. Mandated	1,000,000	1,000,000	1,000,000	1,125,509	1,159,274	5,284,783
GSE-Dist-New Bus-Resid Blanket	3. Growth	1,969,640	2,028,730	2,028,730	2,089,592	2,152,279	10,268,970
GSE-Dist-New Bus-Comm Blanket	3. Growth	1,575,712	1,622,984	1,622,984	1,671,673	1,721,823	8,215,176
Golden Rock Substation	3. Growth	-	-	-	50,000	-	50,000
Rockingham Substation	3. Growth	600,000	-				600,000
Rockingham Substation Transmission Supply	3. Growth	6,000,000					6,000,000
Rockingham Distribution Feeders	3. Growth	800,000					800,000
Install 39L4 Feeder Position Slayton Hill	3. Growth			75,000	450,000	-	525,000
Install 39L4 Distribution Slayton Hilll	3. Growth			25,000	290,000	-	315,000
IE - NN Recloser Installations	3. Growth	50,000	50,000	50,000	50,000	50,000	250,000
Install 13L2-9L3 Feeder Tie	3. Growth	-	-				-
Reserve for New Business Residential	3. Growth	-	159,135	159,135	159,135	159,135	636,540

Reserve for New Business Commercial Unident specific & SC	3. Growth	-	159,135	159,135	159,135	159,135	636,540
Install Vilas Bridge 12L1-12L2 Feeder Tie	5. Discretionary	-	-	-			-
Reserve for Substation Load Relief Specifics	5. Discretionary	-	-	-	-	-	-
NN ERR/Pockets of Poor Perf	5. Discretionary	225,000	550,000	-	-	-	775,000
Install Lebanon 1L2 Feeder Tie - Plainfield	5. Discretionary	-	-	10,000	1,400,000	-	1,410,000
NH ARP Relay & related	5. Discretionary	20,000	20,000	20,000	20,000	20,000	100,000
Pelham-New 14L5 Fdr Distribution Line	5. Discretionary	-	-	25,000	700,000	-	725,000
NH ARP Batts/Chargers Repl Prog	5. Discretionary	25,750	26,523	50,000	50,000	50,000	202,273
23kV Cable Inspection and Replacement Program	5. Discretionary	-	50,000	50,000	50,000	50,000	200,000
IT Systems Allocations - Corporate	5. Discretionary	50,000	50,000	50,000	50,000	50,000	250,000
Reserve for Sub Asset Repl Specifics	5. Discretionary	-	51,500	51,500	51,500	51,500	206,000
GSE-Dist-Genl Equip Blanket	5. Discretionary	50,000	51,500	51,500	53,045	54,636	260,681
Pelham-New 14L5 Fdr Breaker Position	5. Discretionary	-	-	75,000	700,000	-	775,000
IE-NN Dist Transformer upgrades	5. Discretionary	76,500	76,500	76,500	76,500	76,500	382,500
Reserve for Unidenfified Discretionary Projects	5. Discretionary	50,000	100,000	100,000	100,000	100,000	450,000
SCADA Data center upgrades	5. Discretionary	100,000	100,000	100,000	-	-	300,000
Amerductor replacement program	5. Discretionary	100,000	100,000	100,000	100,000	100,000	500,000
PS&I Activity - New Hampshire	5. Discretionary	100,000	100,000	100,000	100,000	100,000	500,000
Substation Security	5. Discretionary		100,000	100,000	100,000	250,000	550,000
Remove 1303 Line - Wilder Junction to Sachem Jct.	5. Discretionary	-		100,000	-	-	100,000
Reserve for Reliability Unidentified Specifics	5. Discretionary	-	103,000	103,000	103,000	103,000	412,000
Reserve for Load Relief Unidentified Specifics	5. Discretionary	-	106,090	106,090	106,090	106,090	424,360
Reserve for Public Requirements Unidentified Specifics	5. Discretionary	-	106,090	106,090	106,090	106,090	424,360
Reserve for Damage/Failure Unidentified Specifics &	5. Discretionary	103,000	106,090	106,090	106,090	106,090	527,360
IT Systems & Equipment Blanket	5. Discretionary	125,000	125,000	125,000	128,750	132,613	636,363
IE-NN UG Structures and Equipment	5. Discretionary	50,000	50,000	150,000	150,000	150,000	550,000
Air Break Switch Upgrade Program	5. Discretionary	150,000	150,000	150,000	150,000	150,000	750,000
Animal Guarding	5. Discretionary		150,000	150,000	150,000	250,000	700,000
Aging Equipment	5. Discretionary		250,000	150,000	150,000	1,000,000	1,550,000
Regulator Repl- NE North NH	5. Discretionary			150,000	150,000	150,000	450,000
Install Lebanon 1L2-1L3 Feeder Tie	5. Discretionary	-		200,000	-	-	200,000
SCADA and Distribution Automation	5. Discretionary	360,000	320,000	220,000	200,000	200,000	1,300,000
Underperforming Feeder Program	5. Discretionary	103,000	225,000	250,000	195,000	195,000	968,000
Feeder Getaway Cable Replacement	5. Discretionary		250,000	375,000	250,000	250,000	1,125,000

01757 NN ARP Breakers & Reclosers	5. Discretionary	100,000	375,000	375,000	375,000	375,000	1,600,000
Enhanced Bare Conductor Replacement	5. Discretionary	750,000	590,000	790,000	375,000	375,000	2,880,000
Bare Conductor Replacement Program	5. Discretionary	750,000	1,215,000	1,130,000	1,021,023	1,000,000	5,116,023
Rebuild Lockhaven Rd Enfield	5. Discretionary	-	-	1,400,000			1,400,000
IE-NN URD Cable Replacement	5. Discretionary	1,200,000	1,350,000	1,500,000	550,000	1,500,000	6,100,000
Grid Modernization Program	5. Discretionary	287,523	1,569,851	2,619,851	2,619,851	1,041,928	8,139,004
AMI Placeholder - GSE	5. Discretionary		3,175,286	3,167,603	3,167,603	-	9,510,493
GIS & OMS Electric Upgrade	5. Discretionary	1,278,804	-				1,278,804
Rebuild Lockhaven Rd Enfield Phase 1	5. Discretionary		-				-
Barron Ave#10 Retirement	5. Discretionary	50,000	50,000				100,000
NEN-NH Electric Fence FY10	5. Discretionary		50,000				50,000
Salem Depot#9 Retirement	5. Discretionary	-	100,000				100,000
GSE Facilities Capital Improvements	5. Discretionary	130,000	178,714			130,000	438,714
Purchase and Rennovate New Building - Walpole	5. Discretionary	500,000	515,000				1,015,000
Transportation Fleet & Equip. Blanket	5. Discretionary	100,000	550,000		-	-	650,000
16L1 - 6L3 Goodfellow Rd	5. Discretionary		1,200,000				1,200,000
SAP Placeholder - GSE	5. Discretionary	15,476,633					15,476,633
Rockingham 21L4 Feeder	5. Discretionary				550,000	-	550,000
		37,618,899	**22,677,732**	**22,949,814**	**23,713,118**	**17,232,029**	**124,191,592**

Row Labels	Sum of 2022 - 2026 Filter	
2. Mandated	$	22,585,799.54
3. Growth	$	28,297,226.83
5. Discretionary	$	73,308,565.77
Grand Total	**$**	**124,191,592.14**

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
Least Cost Integrated Resource Plan

Staff Data Requests - Set 1

Date Request Received: 4/1/21
Request No. Staff 1-1

Date of Response: 4/15/21
Respondent: Joel Rivera

REQUEST:

Reference Grid Needs Assessment Supplemental Filing. Please provide a column in the assessment that includes the projected cost of each planned investment.

RESPONSE:

The table below includes the projected cost of each planned investment. The red text indicates information that was edited or added.

Facility/ Location (1)	System Granularity of Grid Need (1)	Capacity/ Reliability/ Resiliency (2)	Anticipated season or date by which distribution upgrade must be installed (3)	Equipment Rating (4)	Forecasted percentage deficiency above the existing facility/equipment rating 2025 (5)	Additional information:
14L2 Burns Rd, Pelham	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2021	N/A	N/A	Project estimate - $1,000,000
7L1 Route 4, Enfield	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2022	N/A	N/A	Project estimate - $750,000
14L1 Bridge St, Pelham	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2024	N/A	N/A	Project estimate - $600,000
18L3 S Policy St, Salem	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2025	N/A	N/A	Project estimate - $450,000
18L2 S Policy St, Salem	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2023	N/A	N/A	Project estimate - $485,000
14L2 Marsh Rd, Pelham	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2023	N/A	N/A	Project estimate - $430,000
1L3 Mascoma St, Lebanon	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2023	N/A	N/A	Project estimate - $300,000
12L2 Watkins Hill Rd Phase 1, Walpole	Reconductor bare conductors with 1/0 Al. Spacer Cable	Reliability	2022	N/A	N/A	Project estimate - $860,000

Docket No. DE 21-004 Request No. Staff 1-1

Facility/ Location (1)	System Granularity of Grid Need (1)	Capacity/ Reliability/ Resiliency (2)	Anticipated season or date by which distribution upgrade must be installed (3)	Equipment Rating (4)	Forecasted percentage deficiency above the existing facility/equipment rating 2025 (5)	Additional information:
12L2 Watkins Hill Rd Phase 2, Walpole	Reconductor bare conductors with 1/0 Al. Spacer Cable	Reliability	2023	N/A	N/A	Project estimate - $590,000
12L2 Watkins Hill Rd Phase 3, Walpole	Reconductor bare conductors with 1/0 Al. Spacer Cable	Reliability	2024	N/A	N/A	Project estimate - $550,000
9L3 Range Rd - W Shore Rd, Windham	Reconductor bare conductors with 1/0 Al. Spacer Cable	Reliability	2023	N/A	N/A	Project estimate - $590,000
12L1 Rt. 123A, Alstead	Reconductor bare conductors with 1/0 Al. Spacer Cable	Reliability	2024	N/A	N/A	Project estimate - $790,000
39L2 Plainfield Rd Phase 1, Lebanon	Reconductor bare conductors with 1/0 Al. Spacer Cable	Reliability	2025	N/A	N/A	Project estimate - $375,000
6L3 S Main St, Hanover	Reconductor bare conductors with 477 Al. Spacer Cable	Reliability	2024	N/A	N/A	Project estimate - $530,000
1L2 Meriden Rd Phase 2, Plainfield	Reconductor bare conductors with 477 Al. Spacer Cable, create feeder tie and implement DA	Reliability	2025	N/A	N/A	Project estimate - $1,400,000
16L1-6L3 Goodfellow Rd Tie, Hanover	Construct circuit tie 16L1 to 6L3 and implement DA	Reliability / Resiliency	2023	N/A	N/A	Project estimate - $1,200,000
7L1-7L2 Lockehaven Rd Tie, Enfield	Construct circuit tie 7L1 to 7L2 and implement DA	Reliability / Resiliency	2024	N/A	N/A	Project estimate - $1,400,000
21L4 New Feeder, Salem	Construct new 21L4 and implement DA	Reliability / Resiliency	2025	N/A	N/A	Project estimate - $550,000
14L5 New Feeder, Salem	Construct new 14L5 and implement DA	Reliability / Resiliency	2025	N/A	N/A	Project estimate - $1,300,000
12L1 Transformer, Walpole	Construct new 40L2 and circuit tie with 12L1 to mitigate contingency loss of 12L2 feeder	Reliability / Resiliency / Capacity	2025	9.6 MVA	133%	Project estimate - $10,000,000 (investment grade)
12L1 Transformer, Walpole	Add 2nd Transformer and 115 kV T-Line at Michael Ave Station to mitigate contingency loss of Michael Ave Transf #1 (NGrid Owned)	Reliability / Resiliency / Capacity	2025	9.6 MVA	190%	Project estimate - $10,000,000 (investment grade)
16L4 Feeder, Lebanon	Construct new 16L7 to supply new customer expansion.	Resiliency / Capacity	2021	11.7 MVA	116%	Project estimate - $615,000

Docket No. DE 21-004 Request No. Staff 1-1

Facility/ Location (1)	System Granularity of Grid Need (1)	Capacity/ Reliability/ Resiliency (2)	Anticipated season or date by which distribution upgrade must be installed (3)	Equipment Rating (4)	Forecasted percentage deficiency above the existing facility/equipment rating 2025 (5)	Additional information:
11L1 Feeder, West Lebanon	Construct new 39L4 to resolve forecasted overload from new spot load addition	Resiliency / Capacity	2025	10.9 MVA	105%	Project estimate - $740,000

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
Least Cost Integrated Resource Plan

Staff Data Requests - Set 1

Date Request Received: 4/1/21
Request No. Staff 1-25

Date of Response: 4/15/21
Respondent: Joel Rivera
Heather Tebbetts

REQUEST:

Reference Liberty LCIRP, at Bates 65, describing the Grid Needs Assessment as "exclude[ing] projects that are needed due to asset condition." Please explain how the Company interprets the requirement that the assessment "shall describe all forecasted grid needs related to distribution system capital investment of $250,000 or more over a five-year planning horizon at the circuit level," as excluding planned projects needed due to "asset condition."

RESPONSE:

The Company interpreted grid needs related to distribution system capital investments as those listed in the LCIRP under section (2) at Bates 065, Lines 14 and 15, "Distribution service required: capacity, reliability, and resiliency." As such, the Company did not include projects needed due to asset condition. The Salem Area projects to be completed after 2021 were inadvertently left off the Grid Needs Assessment at Liberty LCIRP, Bates 065. These projects are needed for capacity, resiliency, and asset condition.

The Company provides the following list of additional projects, programs, or blankets that are needed due to asset condition.

Docket No. DE 21-004 Request No. Staff 1-25

Facility/ Location (1)	System Granularity of Grid Need (1)	Capacity/ Reliability/ Resiliency (2)	Anticipated season or date by which distribution upgrade must be installed (3)	Equipment Rating (4)	Forecasted percentage deficiency above the existing facility/equipment rating 2025 (5)
IE-NN URD Cable Replacement	Refer to DAS 014 - URD UCD Cable Strategy	Asset	Annual Program	N/A	N/A
GSE-Dist-Asset Replace Blanket	Blanket Program - Asset Replacement Program	Asset	Annual Program	N/A	N/A
Feeder Getaway Cable Replacement	Refer to DAS 013 - UG Getaways Program	Asset	Annual Program	N/A	N/A
01757 NN ARP Breakers & Reclosers	Breaker Replacement Program	Asset	Annual Program	N/A	N/A
Amerductor replacement program	Refer to DAS 008 - Small Wire Program	Asset	Annual Program	N/A	N/A
Rockingham Substation	Refer to Salem Area Study	Capacity / Resiliency / Asset	2021	Refer to Salem Area Study	Refer to Salem Area Study
Rockingham Substation Transmission Supply	Refer to Salem Area Study	Capacity / Resiliency / Asset	2021	Refer to Salem Area Study	Refer to Salem Area Study
Rockingham Distribution Feeders	Refer to Salem Area Study	Capacity / Resiliency / Asset	2021	Refer to Salem Area Study	Refer to Salem Area Study
Golden Rock 19L2 Distribution Feeder	Refer to Salem Area Study	Capacity / Resiliency	2022	Refer to Salem Area Study	Refer to Salem Area Study
Damage Failure Blanket	Blanket Program - Damage/Failure	Capacity / Resiliency / Asset	Annual Program	N/A	N/A

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
Least Cost Integrated Resource Plan

Staff Data Requests - Set 1

Date Request Received: 4/1/21
Request No. Staff 1-21

Date of Response: 4/15/21
Respondent: Heather Tebbetts
Melissa Samenfeld

REQUEST:

Reference Liberty LCIRP, Bates 57, Figure 4.7, Summarizing the Company's 5-Year Capital Investment Plan

a. Please provide the Company's 5-Year Capital Investment Plan, including all supporting materials and business case justifications for the proposed discretionary projects.

b. Please explain why the five year capital plan for this January 2021 LCIRP appears to address only projects filed in 2022-2026, and does not cover projects planned for 2021.

RESPONSE:

a. Please see the Company's response to Staff 1-12 for the 5-Year Capital Investment Plan. The budget is preliminary and, as such, business cases and other related materials have not yet been created. The five-year investment plan is prepared to allow the Company to plan for upcoming capital outlays, and then the more detailed annual budget process is undertaken. Business cases are created after the annual budget is approved, usually in December of the prior year. For example, the 2022 capital budget is expected to be approved in December 2021. For projects such as those guiding the increased load for Tuscan Village, the Salem Area Study provides the information for future year investments such as the second 115 kV supply line, as the in service date is in 2022.

b. The five-year capital plan does not include 2021 investments because the 2021 capital budget was approved in 2020. The Company considered that the last full LCIRP filing was made on January 15, 2016, and an order in that docket was received July 10, 2017, or 18 months after the filing. With a similar adjudicative proceeding here, the 2021 investments will likely be in service by the time this docket is completed, thus including it in the five-year capital plan would not be logical.

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
2021 Least Cost Integrated Resource Plan

Department of Energy Technical Session Data Requests - Set 2

Date Request Received: 7/29/22 | Date of Response: 8/12/22
Request No. DOE TS 2-1 | Respondent: Heather Tebbetts

REQUEST:

Please provide an updated response to Request DOE 5-1 in this proceeding.

Request DOE 5-1 asked:

> Please update CONFIDENTIAL_21-004_res_staff_2_6_att_c_i_liberty.xlsx for all current customer requests for service. For each customer listed, please include Liberty's assessment of the probability that each customer will take service at or near the projected load.

RESPONSE:

Please see Confidential Attachment DOE TS 2-1.1.xlsx for an update to Confidential Attachment DOE 5-1.xlsx. The Company has updated the revenues to reflect rates effective August 1, 2022. The Company is also including a map of the south parcel to show what has been completed, what is in construction, and what has plans pending per Tuscan Village in Confidential Attachment DOE TS 2-1.2.

Confidential Attachment DOE 5-1.xlsx included twenty-eight tabs calculating the revenues, and the update to that response now includes thirty tabs. Line 37 Central Village continues to be tab "Att 13." Tab "Att 29" is now Line 35 which breaks out Central Village building 1400 and the de-watering system from the original Central Village tab "Att 13." Tab "Att 30" is the new apartments on Line 36.

In Confidential Attachment DOE 5-1.xlsx, lines 35 through 37 were a high-level calculation of load for Tuscan. The Company has received better information recently and has made updates. These updates are found in lines 36 through 39. The breakdown to those lines encompasses the following items.

- Line 33
    a. Building 2000 Hotel – should be taking permanent power in the fall 2022
        i. Waiting for transformer delivery

Docket No. DE 21-004 Request No. DOE TS 2-1

- Line 36
    a. Building 4100 – Added to plans with four floors of apartments
- Line 37
    a. Building 1200 – Increased to three floors @ 120,000 sq ft
    b. Building 1300 – New L shape – bottom floor will have 35,000 sq ft grocery and five floors of apartments above

Confidential Attachment DOE TS 2-1.1.xlsx and Confidential Attachment DOE TS 2-1.2 contain "individual customer data … that can identify, singly or in combination, that specific customer," RSA 363:37, I, and is thus protected from disclosure by RSA 363:38 and RSA 91-A:5, IV. Therefore, pursuant to Puc 203.08(d), the Company has a good faith basis to seek confidential treatment of this information and will submit a motion seeking confidential treatment prior to the final hearing in this docket. Note that a redacted version of Confidential Attachment DOE TS 2-1.2, the map of the south parcel of Tuscan Village, is not being provided as is not feasible to redact that document.

	D	G-3	G-2
Customer Charge	$ 14.74	$ 17.03	$ 72.52
All kWh	$ 0.05857	$ 0.05283	$ 0.00234
kW			9.27

	G-1
Customer Charge	$ 435.18
On Peak kWh	$ 0.00591
Off Peak kWh	$ 0.00175
kW	$ 9.22

8/1/2022 Rates

Line	Phase	End Use	Anticipated kW Demand	Tuscan	Current Status	Load Data Info Attachment #	Revenue Attachment	CIAC	Annual Distribution Revenue
1	1	[redacted]	1216	North	Complete	1-3.b.14	14	$0	$133,011
2	1		340	North	Complete	1-3.b.1	1	$0	$53,472
3	1		96	North	Complete	1-3.b.17	17	$0	$12,735
4	1		667	North	Complete	1-3.b.21	21	$111,814	$80,466
5	1		87	North	Complete	1-3.b.16	16	$0	$8,478
6	1		80	North	Complete	1-3.b.16	16	$0	see line 5
7	1	MB Retail 3	71	North	Complete, no tenant due to COVID	1-3.b.16	16	$0	see line 5
8	1	MB Retail 4	56	North	Complete, no tenant due to COVID	1-3.b.16	16	$0	see line 5
9	1	[redacted]	53	North	Complete	1-3.b.25	25	$0	$7,097
10	1		30	North	1 Tenant, 3 storefronts without tenants	1-3.b.21	21	$0	$1,520
11	1	Restaurant 1	87	North	2023/2024 redevelopment ongoing	N/A	n/a	N/A	N/A
12	1	Restaurant 2	127	North	2023/2024 redevelopment ongoing	N/A	n/a	NA	N/A
13	N/A	[redacted]	378	North	redevelopment ongoing	N/A	n/a	N/A	N/A
14	N/A		1547	North	redevelopment ongoing	1-3.b.28	28	TBD	$185,858
15	1A		1661	South	Complete	1-3.b.18	18	$21,020	$219,921
16	1A		315	South	Complete	1-3.b.19	19	$0	$38,978
17	1A	Street Lights	10	South	Complete	1-3.b.26	26	$13,460	$2,487
18	1A	Street lights & well	16	South	Complete	1-3.b.27	27	$7,710	$4,340
19	1A	OMJ Buildings (Maintenance Buildings)	172	South	In progress, 2023	1-3.b.23	23	$0	$21,451
20	1A	[redacted]	74	South	Complete	1-3.b.24	24	$3,963	$9,684
21	1B		1233	South	*Complete*	1-3.b.22	22	*$35,866*	$155,119
22	1C		245	South	3 of 4 tenants moved in	1-3.b.2	2	$34,391	$36,478
23	1C		317	South	3 of 4 tenants moved in	1-3.b.3	3	$0	$45,861
24	1C	Building 300 (5.2)	109	South	Energized, signed tenant - move in end of 2022	1-3.b.4	4	$8,035	$13,950
25	1C	[redacted]	188	South	6 of 7 tenants moved in	1-3.b.5	5	$27,124	$23,412
26	1C		135	South	Complete	1-3.b.6	6	$8,486	$17,262
27	1C		44	South	Complete, plus level 2 EV charger	1-3.b.7	7	$11,600	$6,083
28	1C		386	South	Complete	1-3.b.8	8	$9,302	$53,938
29	1C		80	South	Complete	1-3.b.9	9	$0	$10,780
30	1C		73	South	Complete	1-3-b.10	10	$0	$14,240
31	1C		28	South	Complete	1-3.b-11	11	$15,370	$4,204
32	1C	Drive Custom Fit (Gym)	107	South	Complete	1-3.b-12	12	$0	$18,162
33	2	Hotel/Conf/Retail Building 2000	1800	South	In progress, 2022-2023	1-3.b.13	13 Hotel	$0	$244,547
34	2	[redacted]	937	South	In progress, 2022-2023	1-3.b.15	15	$0	$132,834
35	2A	Central Village Building 1400 & de-water (was within line 35)	2650	South	Redesign of Resi Village, Office Spaces, over 55+ & retail - 660,414 sf mixed use	Att 29	29	$36,640	$235,522
36	2B	[redacted]	2008	South	retail, residential and garage with solar	Att 30	30	$0	$92,023
37	2B	Central Village Building 1000-1500, 4000	4431	South	redesigned and densifying 2 buildings	Att 13	13 Central Village	TBD	$357,558
38	2C	Drug Manufacturer/Office Park/Garage/Multi Tenant	4000	South	Redesign of Resi Village, Office Spaces, over 55+ & retail - 660,414 sf mixed use	1-3.b.20	20	TBD	$736,486
~~39~~	~~2C~~	~~Parking garage~~ –moved to line 38	~~0~~	~~South~~	~~Redesign of Resi Village, Office Spaces, over 55+ & retail - 660,414 sf mixed use~~	~~TBD~~	~~n/a~~	~~TBD~~	~~TBD~~
			Total					$344,781	$2,977,957

Total North	**4,835**
Total South	**21,019**
Total Tuscan Village	**25,854**

Total Tuscan Village Completed	**6,701**
Total Tuscan Village In Progress/No Tenant	**5,614**
Total Tuscan Village not developed	**13,539**
	25,854

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
2021 Least Cost Integrated Resource Plan

Department of Energy Data Requests - Set 5

Date Request Received: 1/28/22
Request No. DOE 5-3

Date of Response: 2/11/22
Respondent: Anthony Strabone

REQUEST:

Please Update Attachment Staff 3-1. a. to show the most recent available budget, estimated, and actual costs.

RESPONSE:

Please see attachment DOE 5-3.xlxs for the most recent budget, estimated, and actual costs. The Company is providing a summary comparing Staff 3-1.a to DOE 5-3 below.

Staff 3-1.a Total	$ 39,014,827
DOE 5-3 Total	$ 36,858,827
Difference	$ 2,156,000

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty

DE 21-004
2021 Least Cost Integrated Resource Plan

Department of Energy Data Requests - Set 7

Date Request Received: 6/6/22 | Date of Response: 6/20/22
Request No. DOE 7-11 | Respondent: Michael Cooper

REQUEST:

Please identify the annual incremental changes in each reliability statistic expected from the proposed $550,000 capital expenditure on the 12L2 circuit reconductoring solution.

RESPONSE:

In Appendix F, the proposed $550,000 reconductoring project was only for Watkins Hill Phase 3, which is approximately 25% of the total project. With that, the annual incremental changes at that time with those costs, were an 8% reduction in frequency, a 4% reduction in duration, $2,999 per change in customers interrupted, and $23.50 per change in customer minutes interrupted.