

**STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION**

DOCKET NO. DE 21-004

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

DIRECT JOINT TESTIMONY OF

**Jay E. Dudley
Utilities Analyst IV
New Hampshire Department of Energy**

**Ronald D. Willoughby
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September 16, 2022

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1 **I. INTRODUCTION AND QUALIFICATIONS**

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

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

5 **Q. Please state your employer and your position.**

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

8 **Q. Please describe your professional background.**

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

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

6 **Q. Please describe your educational background?**

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

17 **Q. Have you previously testified before the Commission?**

18 A. Yes. I previously submitted Staff testimony to the Commission in Docket No. DE 14-
19 238, Public Service Company of New Hampshire Generation Assets; Docket No. DE 15-
20 137, Energy Efficiency Resource Standard; Docket No. DE 16-383, Liberty Utilities
21 Request for Change in Rates; Docket No. DE 17-136, 2018-2020 NH Energy Efficiency
22 Plan; Docket No. DE 19-064, Liberty Utilities Request for Change in Rates; Docket No.
23 DE 19-057 Public Service Company of New Hampshire for Change in Rates; Docket No.

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

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

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

7 **Q. Please state your employer and your position.**

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

10 **Q. Are you registered as a Professional Engineer?**

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

12 **Q. Do you hold any patents in power engineering?**

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

15 **Q. Please summarize your educational and professional background.**

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

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

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

3 **Q. Please summarize your consulting and employment experience.**

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

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

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

14 I have participated in various international programs including:

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

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

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

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

15 **Q. Have you previously testified before the Commission?**

16 A. No.

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

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

20 **Q. Please state your employer and your position.**

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

23

1 **Q. Are you registered as a Professional Engineer?**

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

3 **Q. Please summarize your educational and professional background.**

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

7 **Q. Please summarize your consulting experience.**

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

16 **Q. Please summarize your employment experience.**

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

1 operations and construction, O&M and capital budgeting, process re-engineering, work
2 management, emergency response, security, strategic planning, purchasing, stores and
3 transportation and human resources and labor relations, staffing and human capital
4 effectiveness assessments, executive and management compensation programs. I have
5 15+ years of experience as a T&D engineer, supervisor, and senior manager for the
6 company-wide T & D operations. For 20+ years I also held the CIO role and lead the
7 Utility I/T Steering Committee including the review and approval of all outsourcing
8 contracts, hardware, software, outage management and SCADA software and the
9 associated capital and expense annual budgets. Additionally, I have been a member of
10 the Corporate Executive Capital Allocation and Review Committee responsible for the
11 review of all proposed capital projects and the post completion review of actuals to
12 estimates. I have 25 plus years of experience as a H/R executive with responsibility for
13 all aspects of the function, including employment, employee and labor relations,
14 employee safety, and employee benefits, and executive and employee compensation.
15 Additionally, as the chief staffing officer I was responsible for the annual corporate
16 staffing budgets, identification and implementation of technology driven staffing
17 reduction initiatives, productivity improvement initiatives, enterprise-wide staffing and
18 use of non-traditional employees, employee/contractor mix analysis, staffing and turn-
19 over analysis and resulting changes to employment and employee development
20 processes. I have training in mentoring and mediation.

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

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

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

6 **Q. Please summarize your relevant utility experience.**

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

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

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

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

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

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

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

9 **II. SUMMARY OF TESTIMONY**

10 **Q. Please describe the purpose of your testimony today.**

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

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

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

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

5 **III. REVIEW AND ANALYSIS OF LIBERTY 2020 LCIRP**

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

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

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

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

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

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

20 III. An assessment of supply options including owned capacity, market
21 procurements, renewable energy, and distributed energy resources.
22

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

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

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

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

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

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

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

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

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

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

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

22
23

1 **RSA 378:38, I – Demand Forecast**

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

4 **A.** Yes. According to the Company’s Plan, Liberty’s system planning is a 20-year
5 timeframe forecast using historical peak load to establish a correlation for future
6 forecasting. An econometric model evaluates historical peak demand as a function of
7 peak day weather conditions and the economy. The econometric model utilizes two
8 different weather variables, normal weather conditions and extreme weather conditions,
9 in forecasting summer peak demand and includes consideration of cooling degree days.
10 The first scenario of the forecast assumes normal weather conditions, which are based off
11 the most recent 20-year period.³ Liberty produces a 50/50 and a 90/10 peak demand
12 forecast. The 50/50 forecast is based off normal 20-year weather and has a 50 percent
13 chance of being exceeded. The second scenario of the forecast which is the 90/10
14 forecast is the extreme weather scenario that has a 10 percent chance of being exceeded.
15 Other variables considered by the econometric model include historical and forecasted
16 economic conditions at the county level, historical peak demand data for each service
17 area, and a forecast of weather conditions based on historical data obtained from a
18 weather station located in Concord, NH.⁴
19 Once the forecast is developed, Liberty makes what it describes as “certain out of model
20 adjustments” to account for known future loads or generation. Specifically, those
21 adjustments are made for new load greater than 300 kW interconnecting to Liberty’s
22 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.

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

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

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

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

19 **A.** The Company's modeling projects an increase in summer peak demand from a weather
20 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.

1 of 0.4 percent. Under the extreme weather scenario, Liberty forecasts an increase in
2 summer peak demand from 188.5 MW in 2021 to 217.34 MW in 2037 resulting in an
3 average annual increase of 0.87 percent.⁸ However, in response to data request DOE TS
4 1-3, Liberty revised and updated these results because the weather adjusted peak demand
5 of 188.5 MW represented in the Plan was applicable to 2020 and not 2021, and the
6 reported percentage increased were incorrect.⁹ The revised summer peak demand for
7 2021 under normal weather conditions is 192.2 MW increasing to 202.6 MW in 2037
8 resulting in an annual increase of 0.3 percent. The revised extreme weather forecast of
9 summer peak demand for 2021 is 207 MW increasing to 217.3 MW in 2037 resulting in
10 an annual increase of 0.3 percent.

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

13 **A.** Yes. First, it is important to keep in mind that the planning process for designing a
14 distribution system begins with an accurate load forecast based on reasonable
15 assumptions and good data. The Department finds that Liberty's use of the 20-year
16 historical basis for both normal weather and extreme weather demand forecasting is
17 overly conservative and covers too long of a period for any projection of probability to be
18 useful. By using a 20-year historical period, Liberty is planning for a peak event that has
19 a five percent likelihood of occurring, leading Liberty to build its system to anticipate
20 higher peaks potentially resulting in more frequent replacement and addition of
21 transformers regardless of whether the future peaks will materialize. Both Unitil and
22 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.

1 translates to a ten percent likelihood of a peak event occurring.¹⁰ In response to data
2 request Staff 1-37, the Company re-worked its forecasted peak calculations in Appendix
3 B, Tables 2 and 3 for normal weather and extreme weather, basing the calculations on the
4 10-year historical period instead of the 20-year period.¹¹ The results were that peak
5 megawatt growth percentages were much lower than those depicted in Appendix B for
6 the 20-year historical period. Also in the response, Liberty expressed a willingness to
7 switch to the 10-year historical period. As a result, the Department recommends that the
8 Commission direct Liberty to shift its load forecasting historical basis to the 10-year
9 historical period for all future LCIRP's.

10 Secondly, Liberty's demand forecast does not contemplate or include approximately 177
11 MVA of projected "total" capacity and 142 MVA of "firm" capacity at Salem's
12 Rockingham Substation driven largely by the Tuscan Village development.¹² The "total"
13 capacity resides in two transformers sized such that one can back up the other if there is a
14 transformer failure or if maintenance is required. The 142 MVA "firm" capacity is
15 designed to support ten distribution feeders: six will be connected to satisfy near-term
16 capacity needs, and four will be left for future growth needs.¹³ Given the size and
17 complexity of this design, combined with the fact that Salem is one of four towns
18 identified by Liberty in the Plan as part of its Eastern PSA, and because the expected 177
19 MVA of new capacity is so close to the Company's overall service area peak in 2020 of
20 188.5 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.

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

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

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

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

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

¹⁴ LCIRP at Bates 16.

¹⁵ *Id.* Appendix D, Bates 196.

1 *Distribution Planning Criteria* approved in Docket No. DE 19-064.¹⁷ Two types of
2 planning studies are conducted: 1) PSA area studies, and 2) interconnection studies.¹⁸
3 PSA’s consist of loads, substations, and distribution feeders. Interconnection studies
4 determine facility and system upgrades to satisfy capacity and planning criteria
5 constraints.¹⁹ Each PSA operates independently, i.e., there is no interconnection between
6 them.²⁰

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

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

18 Industry references in support of equipment rating guidelines/applications are included in
19 Appendix D of the LCIRP (e.g., IEEE, ANSI, NESC, Doble). A summary of equipment
20 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.

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

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

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

10 **A.** Liberty updated its Distribution Planning Criteria (from 2016 to 2020) as part of
11 settlement agreement Docket No. DE 19-064.²⁵ Changes were made to move Liberty's
12 criteria closer to that of other utilities in the region, in particular, National Grid.²⁶

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

19 Under contingency (N-1) conditions, similar actions have been taken, e.g., moving from
20 36 MWhrs to 120 MWhrs of load at risk, or from 2.5 MW to 10 MVA (10 MW if power
21 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.

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

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

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

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

8 **RSA 378:38, II – Demand Side Management**

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

11 **A.** The Company states that it has offered energy efficiency (“EE”) and other demand side
12 management (“DSM”) programs to its customers for the past twenty years. Since 2002,
13 Liberty has collaborated with the other New Hampshire utilities to deliver coordinated
14 energy efficiency solutions to customers, residential, municipal, commercial and
15 industrial throughout the state. These programs are offered under the NHSaves™
16 Programs (“NHSaves Programs”) brand. In 2016, Liberty was a party to a settlement
17 agreement filed with the Commission in Docket DE 15-137 that lead to the establishment
18 of the state’s Energy Efficiency Resource Standard (“EERS”).²⁸ In 2020, Liberty was
19 also a party to the settlement agreement filed in Docket DE 20-092 involving the 2021-
20 2023 New Hampshire Statewide Energy Efficiency Plan based on the EERS. The EERS
21 is the framework within which the NHSaves Programs have been implemented since
22 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.

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

19 As discussed below, Liberty has also incorporated and implemented a NWS and Non-
20 Wires Alternative (“NWA”) evaluation process screening tool for system planning and
21 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.

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

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

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

8 NWS screening guidelines utilized by Liberty's system planners to identify potential
9 NWS candidates are as follows: 1) when the identified need is at least 24 months in the
10 future to allow time to develop NWS; 2) when the need is not based on asset conditions;
11 or 3) when traditional solutions will cost more than \$500,000.³⁵ Project-specific
12 exceptions are possible if they can be justified. Liberty also uses an NWS Analysis
13 Workbook³⁶ to compare and rank alternatives.

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

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

13 This was followed by a *Report on Wires and Non-Wire Solutions to Address Reliability*
14 *in the Bellows Falls Area – 2022* where six alternatives were developed (three traditional
15 and three NWS) based on meeting reliability needs.⁴⁰ Two of the NWS alternatives were
16 rejected for being too expensive, leaving one NWS alternative (solar + battery storage)
17 and three traditional alternatives (system upgrades). The same scoring process was used
18 as in the earlier study. Total assessment scores fell within a larger range: 1.93 (NWS) to
19 3.42 (traditional) on a 4-point scale (4 = best solution), same system (Bellows Falls), but
20 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

1 Liberty has a process in place⁴¹ to ensure potential NWS solutions are an integral part of
2 the planning process that includes the use of data-driven NWS Analysis Workbooks.⁴²
3 They are also actively investigating/promoting behind-the-meter technologies an example
4 of which is their Battery Storage Pilot Program where up to 200 Tesla Powerwall 2
5 batteries were installed at the customer premises during Phase 1 with the potential for an
6 additional amount to be installed if approved for Phase2.⁴³ Pilot project objectives were
7 to reduce peak load, provide backup power to participating customers, and learn more
8 about customer behavior through time-of-use rates. Consideration of alternatives was not
9 an objective, and as a result, were not developed.⁴⁴

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

17 As a result, the Department believes that Liberty's current approach to NWS is not
18 sufficiently robust. A more aggressive stance (e.g., hybrid solutions) could be taken
19 when evaluating NWS alternatives against traditional solutions, including modifying
20 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.

1 worth considering if the “24 months in the future” and/or the above \$500,000 threshold
2 guidelines are too restrictive.

3 **RSA 378:38, III – Supply Options**

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

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

⁴⁸ *Id.* at Bates 24-26.

1 process, and criteria so as to better inform the decision-making process.⁴⁹ The Company
2 plans to have a total of three percent of its system peak under a dedicated DER program
3 by the end of 2024 and six percent by 2029.⁵⁰

4 Liberty also provided a detailed discussion of the supply situation related to ISO-NE,
5 however, this discussion is now dated since the LCIRP was submitted on January 15,
6 2021.⁵¹ As Liberty points out, ISO-NE is dependent on natural gas fueled generation for
7 approximately 40% of energy production for 2019. For 2021 ISO-NE reported that gas-
8 powered generation provided 53%.⁵² With the onset of the war in Ukraine, the global
9 natural gas market has structurally changed with European countries increasing their
10 natural gas imports to offset decreases in supply from Russia. New England gas supplies
11 are exposed to the global natural gas market because LNG is a component of the natural
12 gas supply. As “the marginal unit setting the energy market clearing price is most often a
13 natural gas fired generator, “the energy supply future has potentially changed
14 significantly since Liberty’s January 2021 filing.⁵³ Consequently, the Department
15 recommends that the Commission direct Liberty to include in its supplement to the
16 LCIRP an updated discussion on the impacts of a more global natural gas market on price
17 and the longer-term availability of capacity.

18 **RSA 378:38, IV – Distribution and Transmission Requirements**

19 **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.*

1 **requirements?**⁵⁴

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

4 **Transmission**

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

13 **Distribution**

14 As explained above, Liberty's distribution system is divided into two PSA's: East and
15 West. PSA studies are performed when conditions (e.g., load additions) change within a
16 given PSA, and are documented in a *Distribution PSA Study* report describing study
17 assumptions, procedures, economics, conclusions, and recommendations.⁵⁶ PSAs are
18 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.

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

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

11 The LCIRP included the Lebanon area study as a distribution planning example.⁶³ Four
12 solution alternatives/options were developed and ranked, 2 traditional (system upgrades)
13 and 2 NWS (solar + storage; DER for large customer). The traditional solution (option 2)
14 scored the highest (best solution). Details are included in the study report. However,
15 individual alternatives and “total assessment” scores for each option were not provided
16 until compiled on the NWS evaluation worksheet included in Appendix G.1 of the
17 report.⁶⁴ It would be helpful if the four alternatives cited as Options 1-4 on the NWA
18 Evaluation Summary worksheet would have been explained in the body of the report or at
19 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

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

3 **Smart Grid Technology**

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

5 **A.** Yes. In 2019, Liberty engaged CMG Consulting to develop a grid modernization plan,
6 the results of which were summarized in a Grid Modernization Report (updated in
7 2020).⁶⁵ Ten dedicated programs in four focus areas (metering, distribution automation,
8 customer connections, and smart city) were identified. Budgets were proposed for each
9 area along with 5-year and 10-year targets.⁶⁶

10 Nine (9) pilot programs and corresponding budgets covering each of the four focus areas
11 was proposed as the next step. Metering (AMI) and distribution operations (fault
12 detection, load forecasting, conservation voltage reduction, asset management, islanding)
13 were the largest budget items over a 5-year period⁶⁷ covering 2021-2025.⁶⁸ During this
14 period, Liberty would monitor the results and adjust as needed in preparation for a
15 subsequent five-year period covering 2025-2029.⁶⁹

16 The report refers to “grid modernization” activities as being important to overall success.
17 There is a distinction to be made between smart grid and grid modernization. Smart grid
18 is the implementation of technologies that increase system “visibility” using enhanced
19 communication (more sensors) and controls (more automation); e.g., distribution
20 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

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

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

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

17 **Planned Investments**

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

20 **A.** Yes. Unlike a rate case, specific rate proposals and revenue requirements are not at issue
21 in an LCIRP proceeding, therefore the review of capital investments for least cost
22 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.

1 independent finding of prudence. As the Commission stated in its Order No. 26,362 in
2 Docket No. DE 19-139, an LCIRP “provides a regular snapshot of the factors supporting
3 a utility’s investment decisions, which can be helpful in a later rate case when the
4 Commission determines whether the costs of an investment were prudently incurred.”⁷²
5 As such, the Commission’s approval of the LCIRP does not represent a finding of
6 prudence with respect to any particular capital investment described in the Plan.
7 However, in order to complete a review of these planned investments, the utility must
8 provide sufficient detail of those capital projects in the proposed LCIRP. According to
9 Liberty’s Plan, the Company’s five-year budget totals \$124 million with spending on its
10 mandated and growth projects comprising 41 percent of the budget and spending on
11 discretionary programs comprising 59 percent of the budget.⁷³ One of the major
12 deficiencies of the current Plan is that Liberty discusses these planned investments in
13 very general terms and at a high level, and provides little or no detail on investments or
14 projects that are currently underway.⁷⁴ Although Appendix H does provide a listing of
15 capacity and reliability related improvements, there is no mention of Liberty’s many
16 business-as-usual blanket projects, growth projects, and discretionary projects that
17 typically constitute some of the Company’s largest investments. As a result, no
18 evaluations of specific planned capital investments or potential least cost alternatives
19 were included or available for the Department’s review in this proceeding. This is
20 especially true for Liberty’s ongoing investments in the Town of Salem largely associated
21 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.

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

8 The Department appreciates the Company's submission of additional project information,
9 however, Liberty did not submit specific project documentation (i.e. Business Cases) to
10 support those investments as part of its LCIRP filing.⁷⁸ This is in sharp contrast with
11 Eversource's LCIRP filing in Docket No. DE 20-161 where Eversource included its
12 project authorization forms in Appendix L of that filing describing numerous projects that
13 were in progress or planned to commence at the time of the LCIRP submission. This is
14 also in contrast to PUC Staff's (now DOE's) prior understanding from Docket No. DE
15 19-120 where the Commission recognized Staff's recommendation that Liberty's
16 "January 2021 LCIRP provide a level of detail regarding planned capital projects, circuit
17 level load forecasts, and system visibility consistent with Unitil's 2016 LCIRP filing,"⁷⁹
18 meaning that sufficient detail should be provided to allow "Staff to evaluate how the
19 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.

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

6 In terms of Salem and the related Tuscan Village projects, the Department (and
7 previously PUC Staff) have continuing concerns involving Liberty’s planning and
8 management of that development dating back to the Company’s two most recent rate
9 cases, Docket Nos. DE 16-383 and DE 19-064, and associated step adjustment requests.

10 DOE’s primary issues continue to be as follows:

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

⁸⁰ Docket No. DE 16-463, Unifit 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.*

- 1 • The Company chose the highest cost option of \$35 million out of a total six
2 possible alternatives for serving load at Tuscan Village.⁸³
- 3 • Opting to build out the overall project based on 115kV supply as opposed to
4 23kV would likely result in significant over-build if the forecasted loads do not
5 materialize.
- 6 • Liberty has a history of incurring significant cost overruns for larger, more
7 complex projects.⁸⁴
- 8 • Liberty’s planning process for the Salem area failed to take into consideration
9 simulations to determine overall costs to fully upgrade either Baron Avenue or
10 Salem Depot substations, of both, to satisfy criteria violations and resolve asset
11 condition concerns. To provide a more complete comparison of project
12 alternatives/plans, we believe the following additional simulations could have
13 been investigated: 1) How can Salem Depot and/or Barron Avenue Substations
14 be upgraded to solve all contingency conditions and asset condition concerns if
15 near-by property was not available for purchase and cost is not a constraint? 2)
16 How can Salem Depot and/or Barron Avenue Substations be upgraded to solve
17 all contingency conditions and asset condition concerns if near-by property
18 was available for purchase and cost is not a constraint?

19 The Department provides the above overview for the edification of the Commission
20 based on the Commission’s previously expressed desire for a “snapshot” of factors
21 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.

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

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

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

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

17 **RSA 378:38, V – Environmental Compliance**

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

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.

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

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

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

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

14 **RSA 378:38, VII Consistency with State Energy Strategy**

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

17 A. Yes. In our assessment, Liberty's 2021 LCIRP is generally consistent with the state
18 energy strategy then in effect at the time of the Company's filing on January 15, 2021.
19 Since that time, the Department released a new and revised state energy strategy in July
20 2022. The policy goals and objectives outlined in the new state energy strategy are not
21 significantly different from those provided in the prior strategy; therefore, we find that
22 Liberty's 2021 LCIRP still remains consistent with the state energy strategy.
23

⁸⁷ LCIRP at Bates 11-20,33,36-38

1 **IV. BELLOWS FALLS RELIABILITY REPORT**

2 **Q. In a letter to the Commission dated February 28, 2022, Liberty reported what it**
3 **characterized as a “dire reliability picture” in the Charlestown/Bellows Falls service**
4 **area. Has Liberty assessed the Bellows Falls area system’s reliability?**

5 **A.** Yes. Liberty has provided assessments in their Bellows Falls Reliability Report 2022,
6 (“Report”) filed with the Commission on May 2, 2022,⁸⁸ and in their “Reliability Review
7 2020”, Appendix H of Liberty’s LCIRP.

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

10 **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.

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

3 The Report provided reliability data that identified the primary causes of the poor
4 reliability on the distribution circuits 12L1 and 12L2. “Fallen Trees” and “Tree-Broken
5 Limbs” categories represent the significant causes of service interruption on 12L1 and
6 12L2, representing “62% of total incidents and 74% of total customer minutes
7 interrupted”.⁹³ Based upon the data provided, the Department believes mechanical
8 damages to the distribution circuit facilities from “Fallen Trees” and “Tree-Broken
9 Limbs” were the major contributing factors to the service interruptions. Outages from
10 tree limbs “touching” the circuits were insignificant in comparison, as evidenced by the
11 “Tree Growth” category data provided in the Report. Generally, mechanical damage to
12 distribution circuit facilities includes conditions such as downed wires, broken poles,
13 broken crossarms, or broken pole hardware.

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

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

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

⁹² *Id.* at 8.

⁹³ *Id.* at 6.

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

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

6 In reviewing plots of CKAIDI (circuit outage duration),⁹⁴ 12L1 is experiencing
7 significantly more tree-only related outage interruptions than 12L2. Outages occur from
8 tree-related equipment failure or damage. Additionally, the plots of CKAIFI (circuit
9 outage frequency)⁹⁵ show that tree-only outage frequency is significantly greater for
10 12L1 than for 12L2. From the reliability performance statistics provided in the Report,
11 addressing tree-only issues for circuit 12L1 would have the most impact and should be
12 addressed first, starting with the 2022 tree trimming on 12L1. However, since the
13 reliability on 12L1 is still not in an acceptable range, the tree trimming approach may
14 need re-evaluation.

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

⁹⁴ *Id.* at 9.

⁹⁵ *Id.* at 10.

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

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

8 The proposed reconductoring solutions for 12L1 and 12L2 circuits were also included in
9 both the “*Reliability Review 2020*”, *Appendix H of Liberty’s LCIRP*” as part of Liberty’s
10 Enhanced Bare Conductor Replacement Program⁹⁷ and the “*Bellows Falls Area System*
11 *Planning Summary 2020*” as part of their Grid Needs Assessment for Potential Non-
12 Wires Solutions.⁹⁸ A portion of the 12L2, Watkins Hills Phase 3, was proposed for 2023
13 at an estimated cost of \$550,000; and 12L1 was proposed for 2024 at an estimated cost of
14 \$790,000. The resulting reliability improvement on the 12L2 circuit is expected to be an
15 8% reduction in frequency and a 4% reduction in duration.⁹⁹

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

17 **A.** Yes. As discussed previously, the Report has stated that most of the outages on both
18 circuits were caused by trees/limbs falling on the lines and not limbs making incidental
19 contact. Therefore, the Department believes that based on the data provided by Liberty,
20 reconductoring portions of 12L2 with covered wire along the same route may have a
21 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.

1 **Q. What are the Department’s conclusions regarding the reliability solutions presented**
2 **in the Report?**

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

11 **V. CONCLUSIONS AND RECOMMENDATIONS**

12 **Q. Please summarize your recommendations.**

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

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

- 3 • Liberty should provide a supplemental filing that addresses the following areas:

- 4 1. Specific reporting on each of the criteria in RSA 378:39, to be supported by
5 written testimony, as set out in the Commission’s Order No. 26,225 in Docket
6 No. DG 17-152.

- 7 2. The impacts of existing and new projected load in the Salem service area on
8 Liberty’s demand forecasting, planned capital investments, and grid needs
9 forecast.

- 10 3. Rework and update the sections in the LCIRP involving planned system
11 investments and grid needs assessment to include project descriptions,
12 projected costs, and any alternatives considered related to the ongoing system
13 build out in Salem and Tuscan Village, and any other ongoing or near-term
14 projects (i.e. over the next 2-year period in excess of \$250,000) that have been
15 initiated or are about to be initiated.

- 16 4. Update on the criteria in RSA 378:38 III-Supply Options. The supplement
17 should address the substantial impacts of the current global natural gas market
18 on electric rates and the longer-term availability of capacity.

- 19 5. Provide an update on each of the ten proposed grid modernization programs,
20 with a focus on the top three net present value opportunities.

- 21 • Liberty should continue its participation in the processes set forth by the
22 Commission’s “guidance” in Docket IR 15-296, Order No. 26,575, to develop its next

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

3 • Liberty should adopt a more aggressive stance (e.g., hybrid solutions) when
4 evaluating NWS alternatives against traditional solutions, including modifying NWS
5 selection guidelines to make them more competitive. For example, it might be worth
6 considering if the “24 months in the future” and/or the above \$500,000 threshold
7 guidelines are too restrictive.

8 • Liberty should consider that the solution to most of the reliability issues occurring on
9 problem distribution circuits (e.g. Charlestown/Bellows Falls) could be focused tree
10 trimming and may include a combination of routine tree trimming, hot-spot tree
11 trimming, and danger-tree management focused on actual field observed conditions.
12 Liberty should also consider using reclosing protection devices in tree-affected areas.
13 Additionally, based on the reliability improvement data contained in the reports
14 provided, there appears to be limited reliability value on mitigating the impact of
15 falling danger trees by reconductoring with spacer cable.

16 **Q. Does that conclude your testimony?**

17 A. Yes, it does.

18

19