

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Option 1 - Manual Reads of Probe Meters

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
1 Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
2 Units Installed	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3 #Units with Upfront Contribution	100															
4 #Units with Monthly Contribution	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	
Benefits																
5 Regional Network System (RNS) Charges	\$640,000	\$645,050	\$644,517	\$631,433	\$612,490	\$594,115	\$576,292	\$559,003	\$542,233	\$525,966	\$505,210	\$484,455	\$463,699	\$442,944	\$422,188	Total
6 Local Network System (LNS) Charges	\$126,284	\$131,082	\$130,851	\$128,171	\$124,323	\$120,615	\$116,991	\$113,480	\$110,082	\$106,767	\$102,554	\$98,340	\$94,127	\$89,913	\$85,700	\$8,289,594
7 Distribution Circuit Upgrades (Rev Req)	\$0	\$96,101	\$92,889	\$89,797	\$86,815	\$83,934	\$81,148	\$78,450	\$75,831	\$73,226	\$70,622	\$68,017	\$65,412	\$62,807	\$60,202	\$1,679,280
8 Customer Contribution	\$208,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$0	\$0	\$0	\$0	\$0	\$1,085,251
9 Total Benefits	\$974,284	\$980,233	\$976,257	\$957,401	\$931,627	\$906,665	\$882,432	\$858,933	\$836,146	\$813,959	\$788,386	\$765,812	\$743,238	\$720,664	\$698,090	\$12,234,125
Costs																
10 Revenue Requirement - Batteries	(\$1,520,349)	(\$1,394,563)	(\$1,285,974)	(\$1,189,668)	(\$1,102,110)	(\$1,014,575)	(\$927,016)	(\$850,439)	(\$784,820)	(\$719,200)	\$0	\$0	\$0	\$0	\$0	(\$10,788,714)
11 Cogsdale Programming Costs	(\$92,290)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$92,290)
12 Probe Meters	(\$43,873)	(\$42,023)	(\$40,220)	(\$38,461)	(\$36,743)	(\$35,062)	(\$33,415)	(\$31,801)	(\$30,191)	(\$28,582)	(\$26,973)	(\$25,364)	(\$23,755)	(\$22,145)	(\$20,536)	(\$479,144)
13 O&M Cost to read meters each month	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$129,600)	(\$1,944,000)
14 Total Costs	(\$1,786,112)	(\$1,566,186)	(\$1,455,794)	(\$1,357,730)	(\$1,268,452)	(\$1,179,237)	(\$1,090,032)	(\$1,011,840)	(\$944,611)	(\$877,382)	(\$810,573)	(\$743,964)	(\$677,354)	(\$610,745)	(\$543,136)	(\$13,304,148)
15 Net Benefit to All Customers	(\$811,829)	(\$585,953)	(\$479,537)	(\$400,329)	(\$336,825)	(\$272,572)	(\$207,600)	(\$152,907)	(\$108,465)	(\$63,423)	\$521,813	\$495,848	\$469,883	\$443,919	\$417,954	(\$1,070,023)
Net Present Value Calculation																
16 Required Rate of Return		9.40%														
17 Net Present Value of Option 2																(\$1,766,777)

- 1 Year of installation
- 2 Total units in pilot
- 3 Based on Green Mountain Power's experience of 10% paying upfront
- 4 (2) - (3)
- 5 Calculation as described in testimony; Includes 3% degradation per year
- 6 Calculation as described in testimony
- 7 Page 7
- 8 Customer contribution of \$1000 upfront (100) plus \$10 per month (900)
- 9 Sum of lines 5-8
- 10 Page 3
- 11 Estimated programming costs associated with billing TOU rates
- 12 Page 5
- 13 Estimated costs associated with reading probe meters
- 14 Sum of lines 10 through 13
- 15 Sum of lines 9 + 14
- 16 Page 3
- 17 Net Present Value calculation of net benefits -> NPV(9.40%, revenue requirement values in line 16)

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis

	Option 2 - Cellular Based Metering															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
1 Year																
2 Units Installed	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3 #Units with Upfront Contribution	100															
4 #Units with Monthly Contribution	900	900	900	900	900	900	900	900	900	900						
Benefits																
5 Regional Network System (RNS) Charges	\$640,000	\$645,050	\$644,517	\$631,433	\$612,490	\$594,115	\$576,292	\$559,003	\$542,233	\$525,966	\$505,210	\$484,455	\$463,699	\$442,944	\$422,188	\$8,289,594
6 Local Network System (LNS) Charges	\$126,284	\$131,082	\$130,851	\$128,171	\$124,323	\$120,615	\$116,991	\$113,480	\$110,082	\$106,767	\$102,554	\$98,340	\$94,127	\$89,913	\$85,700	\$1,679,280
7 Distribution Circuit Upgrades (Rev Req)	\$0	\$96,101	\$92,889	\$89,797	\$86,815	\$83,934	\$81,148	\$78,450	\$75,831	\$73,226	\$70,622	\$68,017	\$65,412	\$62,807	\$60,202	\$1,085,251
8 Customer Contribution	\$208,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$108,000	\$0	\$0	\$0	\$0	\$0	\$1,180,000
9 Total Benefits	\$974,284	\$980,233	\$976,257	\$957,401	\$931,627	\$906,665	\$882,432	\$858,933	\$836,146	\$813,959	\$678,386	\$650,812	\$623,238	\$595,664	\$568,090	\$12,234,125
Costs																
10 Revenue Requirement - Batteries	(\$1,520,349)	(\$1,394,563)	(\$1,285,974)	(\$1,189,668)	(\$1,102,110)	(\$1,014,575)	(\$927,016)	(\$850,439)	(\$784,820)	(\$719,200)	\$0	\$0	\$0	\$0	\$0	(\$10,788,714)
11 Revenue Requirement - Cell Based Meters	(\$43,873)	(\$42,023)	(\$40,220)	(\$38,461)	(\$36,743)	(\$35,062)	(\$33,415)	(\$31,801)	(\$30,191)	(\$28,582)	(\$26,973)	(\$25,364)	(\$23,755)	(\$22,145)	(\$20,536)	(\$479,144)
12 Monthly Cellular Reading Cost	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$36,000)	(\$540,000)
13 Cogsdale Programming Costs	(\$92,290)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$92,290)
14 Meter MV-90 Programming Costs	(\$80,000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$80,000)
15 Total Costs	(\$1,772,512)	(\$1,472,586)	(\$1,362,194)	(\$1,264,130)	(\$1,174,852)	(\$1,085,637)	(\$996,432)	(\$918,240)	(\$851,011)	(\$783,782)	(\$62,973)	(\$61,364)	(\$59,754)	(\$58,145)	(\$56,536)	(\$11,980,148)
16 Net Benefit to All Customers	\$798,229	(\$492,353)	(\$385,937)	(\$306,729)	(\$243,225)	(\$178,972)	(\$114,000)	(\$59,307)	(\$14,865)	\$30,177	\$615,413	\$589,448	\$563,483	\$537,519	\$511,554	\$253,977
Net Present Value Calculation																
17 Required Rate of Return		9.40%														
18 Net Present Value of Option 2		(\$1,102,900)														
19 Net Present Value of Circuit Upgrade Only		(\$619,940)														

1 Year of installation
2 Total units in pilot
3 Based on Green Mountain Power's experience of 10% paying upfront
4 (2) - (3)
5 Calculation as described in testimony; Includes 3% degradation per year
6 Calculation as described in testimony
7 Page 7
8 Customer contribution of \$1000 upfront (100) plus \$10 per month (900)
9 Sum of lines 5-8
10 Page 3
11 Page 5
12 Verizon monthly cell data charges
13 Estimated programming costs associated with billing TOU rates
14 Estimated programming costs associated with reading cellular meters
15 Sum of lines 10-14
16 Sum of lines 9+15
17 Page 3
18 Net Present Value calculation of net benefits -> NPV(9.40%, revenue requirement values in line 16)
19 Net Present Value calculation of circuit upgrade only -> NPV(9.40%, revenue requirement values in line 7)

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Battery Revenue Requirement

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1 <u>Deferred Tax Calculation</u>															
Battery Capital Cost	\$7,192,000														
2 Total	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000
3 FEDERAL Vintage Year Tax Depreciation:	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4 Annual Tax Depreciation	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5 Cumulative Tax Depreciation	\$1,027,737	\$2,789,058	\$4,046,939	\$4,945,219	\$5,587,465	\$6,228,991	\$6,871,237	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000
6 STATE Vintage Year Tax Depreciation:	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7 Annual Tax Depreciation	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8 Cumulative Tax Depreciation	\$1,027,737	\$2,789,058	\$4,046,939	\$4,945,220	\$5,587,466	\$6,228,992	\$6,871,238	\$7,192,001	\$7,192,001	\$7,192,001	\$7,192,001	\$7,192,001	\$7,192,001	\$7,192,001	\$7,192,001
9 Book Depreciation Rate (a)	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10 Book Depreciation	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$0	\$0	\$0	\$0	\$0
11 Cumulative Book Depreciation	\$719,200	\$1,438,400	\$2,157,600	\$2,876,800	\$3,596,000	\$4,315,200	\$5,034,400	\$5,753,600	\$6,472,800	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000
12 Book/Tax Timer (Federal)	\$308,537	\$1,350,658	\$1,889,339	\$2,068,419	\$1,991,465	\$1,913,791	\$1,836,837	\$1,438,400	\$719,200	\$0	\$0	\$0	\$0	\$0	\$0
13 less: Deferred Tax Reserve (State)	\$24,374	\$106,702	\$149,258	\$163,405	\$157,326	\$151,190	\$145,110	\$113,634	\$56,817	\$0	\$0	\$0	\$0	\$0	\$0
14 Net Book/Tax Timer (Federal)	\$284,163	\$1,243,956	\$1,740,081	\$1,905,014	\$1,834,139	\$1,762,602	\$1,691,727	\$1,324,767	\$662,383	\$0	\$0	\$0	\$0	\$0	\$0
15 Effective Tax Rate (Federal)	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
16 Deferred Tax Reserve (Federal)	\$59,674	\$261,231	\$365,417	\$400,053	\$385,169	\$370,146	\$355,263	\$278,201	\$139,100	\$0	\$0	\$0	\$0	\$0	\$0
17 Book/Tax Timer (State)	\$308,537	\$1,350,658	\$1,889,339	\$2,068,420	\$1,991,466	\$1,913,792	\$1,836,838	\$1,438,401	\$719,201	\$1	\$1	\$1	\$1	\$1	\$1
18 Effective Tax Rate (State)	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%
19 Deferred Tax Reserve (State)	\$24,374	\$106,702	\$149,258	\$163,405	\$157,326	\$151,190	\$145,110	\$113,634	\$56,817	\$0	\$0	\$0	\$0	\$0	\$0
20 TOTAL Deferred Tax Reserve	\$84,049	\$367,933	\$514,675	\$563,458	\$542,495	\$521,336	\$500,373	\$391,835	\$195,917	\$0	\$0	\$0	\$0	\$0	\$0
21 <u>Rate Base Calculation</u>															
Plant In Service	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000	\$7,192,000
Accumulated Book Depreciation	(\$719,200)	(\$1,438,400)	(\$2,157,600)	(\$2,876,800)	(\$3,596,000)	(\$4,315,200)	(\$5,034,400)	(\$5,753,600)	(\$6,472,800)	(\$7,192,000)	(\$7,192,000)	(\$7,192,000)	(\$7,192,000)	(\$7,192,000)	(\$7,192,000)
Deferred Tax Reserve	(\$84,049)	(\$367,933)	(\$514,675)	(\$563,458)	(\$542,495)	(\$521,336)	(\$500,373)	(\$391,835)	(\$195,917)	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
25 Year End Rate Base	\$6,388,751	\$5,385,667	\$4,519,725	\$3,751,742	\$3,053,505	\$2,355,464	\$1,657,227	\$1,046,565	\$523,283	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
26 <u>Revenue Requirement Calculation</u>															
Year End Rate Base	\$6,388,751	\$5,385,667	\$4,519,725	\$3,751,742	\$3,053,505	\$2,355,464	\$1,657,227	\$1,046,565	\$523,283	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
Pre-Tax ROR	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%
Return and Taxes	\$600,543	\$506,253	\$424,854	\$352,664	\$287,029	\$221,414	\$155,779	\$98,377	\$49,189	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
Book Depreciation	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$719,200	\$0	\$0	\$0	\$0	\$0
Property Taxes (b) 3.14%	\$200,607	\$169,110	\$141,919	\$117,805	\$95,880	\$73,962	\$52,037	\$32,862	\$16,431	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
32 Annual Revenue Requirement	\$1,520,349	\$1,394,563	\$1,285,974	\$1,189,668	\$1,102,110	\$1,014,575	\$927,016	\$850,439	\$784,820	\$719,200	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
33 <u>Imputed Capital Structure (c)</u>															
	Ratio	Rate	Weighted Rate	Pre Tax											
34 Long Term Debt	50.00%	5.88%	2.94%	2.94%											
35 Common Equity	50.00%	9.40%	4.70%	6.46%											
36	100.00%		7.64%	9.40%											

(a) Batteries have 15-year life. Utilized MACRS 15-year depreciation rates
(b) DE 17-043 property tax calculation
(c) Capital structure per Settlement in Docket No. DE 16-383

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Battery Depreciation Calculation

	(a) <u>CY 2019</u>	(b) <u>CY 2020</u>	(c) <u>CY 2021</u>	(d) <u>CY 2022</u>	(e) <u>CY 2023</u>	(f) <u>CY 2024</u>	(g) <u>CY 2025</u>	(h) <u>CY 2026</u>	(i) <u>CY 2027</u>	(j) <u>CY 2028</u>	(j) <u>CY 2029</u>	(j) <u>CY 2030</u>	(j) <u>CY 2031</u>	(j) <u>CY 2032</u>	(j) <u>CY 2033</u>
1 <u>Tax Depreciation (Federal)</u>															
2 Plant Additions	\$7,192,000														
3 7 Year MACRS Rate	14.290%	24.490%	17.490%	12.490%	8.930%	8.920%	8.930%	4.460%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
4 Remaining Tax Depreciation	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5 <u>Remaining Tax Depreciation (State)</u>															
6 Plant Additions	\$7,192,000														
7 7 Year MACRS Rate	14.290%	24.490%	17.490%	12.490%	8.930%	8.920%	8.930%	4.460%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
8 Remaining Tax Depreciation	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
9 Federal Tax Depreciation	\$ 1,027,737	\$ 1,761,321	\$ 1,257,881	\$ 898,281	\$ 642,246	\$ 641,526	\$ 642,246	\$ 320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10 State Tax Depreciation	\$1,027,737	\$1,761,321	\$1,257,881	\$898,281	\$642,246	\$641,526	\$642,246	\$320,763	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Meter Revenue Requirement

	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>	<u>2032</u>	<u>2033</u>
Deferred Tax Calculation															
1 Meter Capital Cost	\$255,600														
2 Total	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600
3 FEDERAL Vintage Year Tax Depreciation:	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
4 Annual Tax Depreciation	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
5 Cumulative Tax Depreciation	\$9,585	\$28,037	\$45,103	\$60,892	\$75,494	\$89,002	\$101,496	\$113,054	\$124,459	\$135,862	\$147,266	\$158,669	\$170,074	\$181,476	\$192,881
6 STATE Vintage Year Tax Depreciation:	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
7 Annual Tax Depreciation	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
8 Cumulative Tax Depreciation	\$9,585	\$28,037	\$45,103	\$60,891	\$75,493	\$89,001	\$101,495	\$113,053	\$124,458	\$135,860	\$147,265	\$158,667	\$170,072	\$181,474	\$192,879
9 Book Depreciation Rate (a)	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%	5.23%
10 Book Depreciation	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368
11 Cumulative Book Depreciation	\$13,368	\$26,736	\$40,104	\$53,472	\$66,839	\$80,207	\$93,575	\$106,943	\$120,311	\$133,679	\$147,047	\$160,415	\$173,782	\$187,150	\$200,518
12 Book/Tax Timer (Federal)	(\$3,783)	\$1,301	\$5,000	\$7,420	\$8,655	\$8,795	\$7,921	\$6,111	\$4,148	\$2,183	\$220	(\$1,746)	(\$3,709)	(\$5,674)	(\$7,637)
13 less: Deferred Tax Reserve (State)	(\$299)	\$103	\$395	\$586	\$684	\$695	\$626	\$483	\$328	\$172	\$17	(\$138)	(\$293)	(\$448)	(\$603)
14 Net Book/Tax Timer (Federal)	(\$3,484)	\$1,198	\$4,605	\$6,834	\$7,971	\$8,100	\$7,295	\$5,629	\$3,821	\$2,011	\$203	(\$1,608)	(\$3,416)	(\$5,226)	(\$7,034)
15 Effective Tax Rate (Federal)	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
16 Deferred Tax Reserve (Federal)	(\$732)	\$252	\$967	\$1,435	\$1,674	\$1,701	\$1,532	\$1,182	\$802	\$422	\$43	(\$338)	(\$717)	(\$1,097)	(\$1,477)
17 Book/Tax Timer (State)	(\$3,783)	\$1,301	\$4,999	\$7,419	\$8,654	\$8,794	\$7,920	\$6,110	\$4,147	\$2,181	\$218	(\$1,748)	(\$3,710)	(\$5,676)	(\$7,639)
18 Effective Tax Rate (State)	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%
19 Deferred Tax Reserve (State)	(\$299)	\$103	\$395	\$586	\$684	\$695	\$626	\$483	\$328	\$172	\$17	(\$138)	(\$293)	(\$448)	(\$603)
20 TOTAL Deferred Tax Reserve	(\$1,030)	\$354	\$1,362	\$2,021	\$2,358	\$2,396	\$2,158	\$1,665	\$1,130	\$595	\$60	(\$476)	(\$1,010)	(\$1,546)	(\$2,081)
Rate Base Calculation															
21 Plant In Service	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600
22 Accumulated Book Depreciation	(\$13,368)	(\$26,736)	(\$40,104)	(\$53,472)	(\$66,839)	(\$80,207)	(\$93,575)	(\$106,943)	(\$120,311)	(\$133,679)	(\$147,047)	(\$160,415)	(\$173,782)	(\$187,150)	(\$200,518)
24 Deferred Tax Reserve	\$1,030	(\$354)	(\$1,362)	(\$2,021)	(\$2,358)	(\$2,396)	(\$2,158)	(\$1,665)	(\$1,130)	(\$595)	(\$60)	\$476	\$1,010	\$1,546	\$2,081
25 Year End Rate Base	\$243,263	\$228,510	\$214,134	\$200,107	\$186,403	\$172,997	\$159,867	\$146,992	\$134,159	\$121,327	\$108,494	\$95,661	\$82,828	\$69,996	\$57,162
Revenue Requirement Calculation															
26 Year End Rate Base	\$243,263	\$228,510	\$214,134	\$200,107	\$186,403	\$172,997	\$159,867	\$146,992	\$134,159	\$121,327	\$108,494	\$95,661	\$82,828	\$69,996	\$57,162
28 Pre-Tax ROR	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%
29 Return and Taxes	\$22,867	\$21,480	\$20,129	\$18,810	\$17,522	\$16,262	\$15,028	\$13,817	\$12,611	\$11,405	\$10,198	\$8,992	\$7,786	\$6,580	\$5,373
30 Book Depreciation	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368	\$13,368
31 Property Taxes (b) 3.14%	\$7,638	\$7,175	\$6,724	\$6,283	\$5,853	\$5,432	\$5,020	\$4,616	\$4,213	\$3,810	\$3,407	\$3,004	\$2,601	\$2,198	\$1,795
32 Annual Revenue Requirement	\$43,873	\$42,023	\$40,220	\$38,461	\$36,743	\$35,062	\$33,415	\$31,801	\$30,191	\$28,582	\$26,973	\$25,364	\$23,755	\$22,145	\$20,536
Imputed Capital Structure (c)															
	Ratio	Rate	Weighted Rate	Pre Tax											
34 Long Term Debt	50.00%	5.88%	2.94%	2.94%											
35 Common Equity	50.00%	9.40%	4.70%	6.46%											
36	100.00%		7.64%	9.40%											

(a) Approved depreciation rate for FERC Account 370 in Docket No. DE 16-383
(b) DE 17-043 property tax calculation
(c) Capital structure per Settlement in Docket No. DE 16-383

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Meter Depreciation Calculation

	<u>(a)</u>	<u>(b)</u>	<u>(c)</u>	<u>(d)</u>	<u>(e)</u>	<u>(f)</u>	<u>(g)</u>	<u>(h)</u>	<u>(i)</u>	<u>(j)</u>	<u>(j)</u>	<u>(j)</u>	<u>(j)</u>	<u>(j)</u>	<u>(j)</u>
	<u>CY 2019</u>	<u>CY 2020</u>	<u>CY 2021</u>	<u>CY 2022</u>	<u>CY 2023</u>	<u>CY 2024</u>	<u>CY 2025</u>	<u>CY 2026</u>	<u>CY 2027</u>	<u>CY 2028</u>	<u>CY 2029</u>	<u>CY 2030</u>	<u>CY 2031</u>	<u>CY 2032</u>	<u>CY 2033</u>
1 <u>Tax Depreciation (Federal)</u>															
2 Plant Additions	\$255,600														
3 20 Year MACRS Rate	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%	4.461%	4.462%	4.461%	4.462%	4.461%	4.462%
4 Remaining Tax Depreciation	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
5 <u>Remaining Tax Depreciation (State)</u>															
6 Plant Additions	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600	\$255,600
7 20 Year MACRS Rate	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%	4.461%	4.462%	4.461%	4.462%	4.461%	4.462%
8 Remaining Tax Depreciation	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
9 Federal Tax Depreciation	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405
10 State Tax Depreciation	\$9,585	\$18,452	\$17,066	\$15,788	\$14,602	\$13,508	\$12,494	\$11,558	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405	\$11,402	\$11,405

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Distribution Circuit Revenue Requirement

	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>	<u>2032</u>	<u>2033</u>
Deferred Tax Calculation															
1 Distribution Circuit Upgrades	\$0	\$644,000													
2 Total	\$0	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000
3 FEDERAL Vintage Year Tax Depreciation:	\$0	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
4 Annual Tax Depreciation	\$0	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
5 Cumulative Tax Depreciation	\$0	\$24,150	\$70,640	\$113,640	\$153,420	\$190,212	\$224,247	\$255,726	\$284,848	\$313,583	\$342,312	\$371,047	\$399,776	\$428,511	\$457,240
6 STATE Vintage Year Tax Depreciation:	\$0	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
7 Annual Tax Depreciation	\$0	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
8 Cumulative Tax Depreciation	\$0	\$24,150	\$70,640	\$113,640	\$153,420	\$190,212	\$224,247	\$255,726	\$284,848	\$313,583	\$342,312	\$371,047	\$399,776	\$428,511	\$457,240
9 Book Depreciation Rate (a)	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%
10 Book Depreciation	\$0	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794
11 Cumulative Book Depreciation	\$0	\$17,794	\$35,587	\$53,381	\$71,175	\$88,968	\$106,762	\$124,556	\$142,349	\$160,143	\$177,937	\$195,730	\$213,524	\$231,318	\$249,111
12 Book/Tax Timer (Federal)	\$0	\$6,356	\$35,053	\$60,259	\$82,245	\$101,243	\$117,485	\$131,170	\$142,498	\$153,440	\$164,375	\$175,317	\$186,252	\$197,193	\$208,129
13 less: Deferred Tax Reserve (State)	\$0	\$502	\$2,769	\$4,760	\$6,497	\$7,998	\$9,281	\$10,362	\$11,257	\$12,122	\$12,986	\$13,850	\$14,714	\$15,578	\$16,442
14 Net Book/Tax Timer (Federal)	\$0	\$5,854	\$32,284	\$55,499	\$75,748	\$93,245	\$108,204	\$120,808	\$131,241	\$141,318	\$151,389	\$161,467	\$171,538	\$181,615	\$191,686
15 Effective Tax Rate (Federal)	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
16 Deferred Tax Reserve (Federal)	\$0	\$1,229	\$6,780	\$11,655	\$15,907	\$19,581	\$22,723	\$25,370	\$27,561	\$29,677	\$31,792	\$33,908	\$36,023	\$38,139	\$40,254
17 Book/Tax Timer (State)	\$0	\$6,356	\$35,053	\$60,259	\$82,245	\$101,244	\$117,485	\$131,170	\$142,499	\$153,440	\$164,375	\$175,317	\$186,252	\$197,193	\$208,129
18 Effective Tax Rate (State)	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%
19 Deferred Tax Reserve (State)	\$0	\$502	\$2,769	\$4,760	\$6,497	\$7,998	\$9,281	\$10,362	\$11,257	\$12,122	\$12,986	\$13,850	\$14,714	\$15,578	\$16,442
20 TOTAL Deferred Tax Reserve	\$0	\$1,732	\$9,549	\$16,415	\$22,404	\$27,580	\$32,004	\$35,732	\$38,818	\$41,799	\$44,777	\$47,758	\$50,737	\$53,717	\$56,696
Rate Base Calculation															
21 Plant In Service	\$0	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000
22 Accumulated Book Depreciation	\$0	(\$17,794)	(\$35,587)	(\$53,381)	(\$71,175)	(\$88,968)	(\$106,762)	(\$124,556)	(\$142,349)	(\$160,143)	(\$177,937)	(\$195,730)	(\$213,524)	(\$231,318)	(\$249,111)
23 Deferred Tax Reserve	\$0	(\$1,732)	(\$9,549)	(\$16,415)	(\$22,404)	(\$27,580)	(\$32,004)	(\$35,732)	(\$38,818)	(\$41,799)	(\$44,777)	(\$47,758)	(\$50,737)	(\$53,717)	(\$56,696)
24 Year End Rate Base	\$0	\$624,475	\$598,864	\$574,204	\$550,421	\$527,452	\$505,234	\$483,712	\$462,833	\$442,058	\$421,286	\$400,512	\$379,739	\$358,965	\$338,192
Revenue Requirement Calculation															
26 Year End Rate Base	\$0	\$624,475	\$598,864	\$574,204	\$550,421	\$527,452	\$505,234	\$483,712	\$462,833	\$442,058	\$421,286	\$400,512	\$379,739	\$358,965	\$338,192
27 Pre-Tax ROR	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%
28 Return and Taxes	\$0	\$58,699	\$56,291	\$53,973	\$51,738	\$49,579	\$47,490	\$45,467	\$43,505	\$41,552	\$39,600	\$37,647	\$35,694	\$33,742	\$31,789
29 Book Depreciation	\$0	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794	\$17,794
30 Property Taxes (b)	3.14%	\$0	\$19,609	\$18,804	\$18,030	\$17,283	\$16,562	\$15,864	\$15,189	\$14,533	\$13,881	\$13,228	\$12,576	\$11,924	\$11,271
31 Annual Revenue Requirement	\$0	\$96,101	\$92,889	\$89,797	\$86,815	\$83,934	\$81,148	\$78,450	\$75,831	\$73,226	\$70,622	\$68,017	\$65,412	\$62,807	\$60,202
Imputed Capital Structure (c)															
		Ratio	Rate	Weighted Rate	Pre Tax										
34 Long Term Debt		50.00%	5.88%	2.94%	2.94%										
35 Common Equity		50.00%	9.40%	4.70%	6.46%										
36		100.00%		7.64%	9.40%										

(a) Book Depreciation Calculation Using 2016 FERC Form 1 Data Filed May 18, 2017
(b) DE 17-043 property tax calculation
(c) Capital structure per Settlement in Docket No. DE 16-383

Liberty Utilities (Granite State Electric) d/b/a Liberty Utilities
Benefit/Cost Analysis
Distribution Circuit Depreciation Calculation

	(a) <u>CY 2019</u>	(b) <u>CY 2020</u>	(c) <u>CY 2021</u>	(d) <u>CY 2022</u>	(e) <u>CY 2023</u>	(f) <u>CY 2024</u>	(g) <u>CY 2025</u>	(h) <u>CY 2026</u>	(i) <u>CY 2027</u>	(j) <u>CY 2028</u>	(j) <u>CY 2029</u>	(j) <u>CY 2030</u>	(j) <u>CY 2031</u>	(j) <u>CY 2032</u>	(j) <u>CY 2033</u>
1 <u>Tax Depreciation (Federal)</u>															
2 Plant Additions	\$ -	\$644,000													
3 20 Year MACRS Rate	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%	4.461%	4.462%	4.461%	4.462%	4.461%
4 Regional Network System (RNS) Charges	\$ -	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
5 <u>Remaining Tax Depreciation (State)</u>															
6 Plant Additions	\$ -	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000	\$644,000
7 20 YR MACRS Tax Depreciation Rates	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%	4.461%	4.462%	4.461%	4.462%	4.461%
8	\$ -	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
9 Federal Tax Depreciation	\$ -	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729
10 State Tax Depreciation	\$ -	\$24,150	\$46,490	\$43,000	\$39,780	\$36,792	\$34,035	\$31,479	\$29,122	\$28,735	\$28,729	\$28,735	\$28,729	\$28,735	\$28,729