MAY 1, 2016


# CELT Report

*2016 – 2025 Forecast Report of*

*Capacity, Energy, Loads, and Transmission*

System Planning

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## Preface

This 2016 edition of the "Forecast Report of Capacity, Energy, Loads, and Transmission" (CELT) reflects a load forecast based upon demographic, economic, and market information available through winter 2015-16 for publication in May 2016. Accordingly, this CELT edition supersedes prior CELT publications.

This report presents the ISO-NE Reliability Coordinator area 2016 - 2025 forecast of:

- Electric energy demand and peak load;
- Existing ISO-NE Control Area electrical capacity and proposed changes;
- Scheduled and proposed transmission changes; with listings of existing and summaries of proposed generation projects.

Generating asset details are represented in Section 2.1 of this report for three different periods: a snapshot of January 1, 2016, a snapshot of the winter peak on February 15, 2016, and a projection for the summer of 2016.

This report represents the efforts of Market Participants' staffs, jointly with ISO-NE, under the review of the Load Forecasting and Reliability Committees.

Additional information regarding the documentation of the electric energy demand and peak load forecasts presented in this report may be found on ISO-NE’s web site at:

http://www.iso-ne.com/system-planning/system-plans-studies/celt

# Introduction

## 2016 ISO New England (ISO-NE) Reliability Coordinator Area Forecast

The “2016-2025 Forecast Report of Capacity, Energy, Loads, and Transmission” (CELT Report) is a source of assumptions for use in electric planning and operations reliability studies. This report provides assumptions for the ISO New England Reliability Coordinator area.

In previous CELT Reports, total New England Load and Total New England Capacity, which included northern Maine, were included in the Section 1 summaries for reference purposes. However, in this year's report those lines have been removed since they are no longer used by ISO New England System Planning.

In this edition of the CELT Report, there have been some changes to the reporting of behind-the-meter (BTM) PV in Section 3.1, "Forecast of Solar Photovoltaic (PV) Resources by State". Section 3.1 consists of total state-by-state solar PV forecasts based on nameplate rating, as well as the estimated summer seasonal peak load reductions and estimated energy production from behind-the-meter (BTM) PV. In contrast to the 2015 CELT, for which BTM PV was further subdivided into two categories, behind-the-meter PV embedded in load (BTMEL) and behind-the-meter PV not embedded in load (BTMNEL), full PV reconstitution allowed ISO to combine these two categories into one (BTM) category. The forecast methodology and assumptions are available at http://www.iso-ne.com/system-planning/system-forecasting/distributed-generation-forecast.

In Section 1, the ISO New England Reliability Coordinator area reference load forecast may be characterized as having a fifty percent chance of being exceeded. The load forecast distributions for the years 2016 through 2025 are included in Section 1.6 of this report. Additional information on the load forecast, including the forecast bandwidths, is available on the ISO New England web site (see links below).

The capacity values in Section 1 are based on the Capacity Supply Obligations (CSO) for the Forward Capacity Market’s (FCM) 2015-2016, 2016-2017, 2017-2018, 2018-2019 and 2019-2020 Capacity Commitment Periods as of March 18, 2016. These include new and existing generating resources, demand resources, and imports.

The CSOs for each of the commitment periods are based on the following FCM auction results:

| | |
|---|---|
| 2015-2016 | Annual Reconfiguration Auction 3 |
| 2016-2017 | Annual Reconfiguration Auction 3 |
| 2017-2018 | Annual Reconfiguration Auction 1 |
| 2018-2019 | Forward Capacity Auction |
| 2019-2020 | Forward Capacity Auction |

The generating resource and demand resource CSO totals for the 2019-2020 Capacity Commitment Period are assumed to remain in place for the remainder of the CELT reporting period. Imports beyond the 2019-2020 Capacity Commitment Period reflect only known, long-term contracts.

The annual generating capacity totals based on Seasonal Claimed Capability (SCC)[2] are included as a line item in Sections 1.1 and 1.2. Those values are based on the SCCs of existing assets plus the expected capability of future FCM and non-FCM resources. The non-FCM resources are those that do not have FCM obligations, but are part of the ISO New England Generator Interconnection Queue[3] and are expected to become commercial in 2016 or 2017.

Section 2.1 of the CELT Report lists details for all generating assets as of January 1, 2016. It also includes SCC values for the winter 2015/16 peak, which occurred on February 15, 2016, and projected summer SCC values for August 1, 2016.

Section 4.1 summarizes the results of the 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020 Forward Capacity Market Capacity Supply Obligations (CSOs) by Load Zone as of March 18, 2016. In the case of 2015-16, monthly auction results are not taken into consideration; the results shown are for the third Annual Reconfiguration Auction (ARA3).

The October 31, 2008 Forward Capacity Market (FCM)/Queue Amendments filing (FERC Docket ER09237 http://www.iso-ne.com/static-assets/documents/regulatory/ferc/filings/2008/oct/er09_237_000_10_8_31_fcm_queue.pdf) established the Network Resource Capability (NRC) and Capacity Network Resource Capability (CNRC) values for each generating resource. Section 5.1, “Network Resource Capability (NRC) & Capacity Network Resource Capability (CNRC) List”, lists the NRC & CNRC values calculated consistent with Schedules 22 and 23 of the Open Access Transmission Tariff (the Large and Small Generator Interconnection Procedures).

Section 6 lists links associated with transmission related documents available on the ISO New England website at: http://www.iso-ne.com.

The appendices in the report are as follows:

- Appendix A defines the commonly used terms and abbreviations used in this report;
- Appendix B provides a list of the Federal Information Processing Standard (FIPS) Codes and the list of Regional System Plan (RSP) Subareas;
- Appendix C includes two graphs that illustrate the summer Capacity Supply Obligations and load forecast;
- Appendix D tracks the CSOs for each Commitment Period, by Load Zone, from the Forward Capacity Auction (FCA) results through the subsequent proration, bilaterals, and Annual Reconfiguration Auctions;
- Appendix E lists the Qualified and Cleared Capacity for all Resources that qualified to participate in the tenth Forward Capacity Auction (FCA 10);
- Appendix F is the most recent update of the New England geographic transmission map.

CELT Reports and related documents are available on the ISO New England website at:

http://www.iso-ne.com/system-planning/system-plans-studies/celt
http://www.iso-ne.com/isoexpress/web/reports/operations/-/tree/seasonal-claimed-capability
http://www.iso-ne.com/system-planning/system-plans-studies/rsp
http://www.iso-ne.com/participate/applications-status-changes/new-modified-interconnections
http://www.iso-ne.com/system-planning/transmission-planning/interconnection-request-queue

Please do not hesitate to contact ISO New England at custserv@iso-ne.com with any questions or comments regarding the information contained herein.

[1] ISO New England is the Reliability Coordinator (RC), Balancing Authority (BA) and Transmission Operator (TOP) for New England. Throughout this document, the ISO is referred to as the RC since the RC has responsibility for overseeing the other two functions.

[2] For more information on generating assets, refer to the Seasonal Claimed Capability Report at: http://www.iso-ne.com/isoexpress/web/reports/operations/-/tree/seasonal-claimed-capability.

[3] The Generator Interconnection Queue is posted on the ISO New England website at http://www.iso-ne.com/system-planning/transmission-planning/interconnection-request-queue.

## 1.1 Summer Peak Capabilities and Load Forecast (MW)

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ISO-NE RELIABILITY COORDINATOR AREA** | | | | | | | | | | | |
| **1. LOAD** (1, 2, 3) | | | | | | | | | | | |
| **1.1 REFERENCE - Without reductions** | 28660 | 28966 | 29307 | 29652 | 29975 | 30276 | 30578 | 30883 | 31190 | 31493 | 31794 |
| 1.1.1 Behind-the-Meter (BTM) PV (4) | 314 | 423 | 520 | 582 | 632 | 676 | 714 | 746 | 775 | 802 | 828 |
| 1.2 REFERENCE - With reduction for BTM PV | 28346 | 28543 | 28788 | 29070 | 29344 | 29601 | 29863 | 30137 | 30415 | 30691 | 30966 |
| 1.2.1 Passive DR (PDR) used in System Planning (5) | 1685 | 1839 | 2089 | 2306 | 2561 | 2812 | 3047 | 3267 | 3473 | 3665 | 3844 |
| 1.3 REFERENCE - With reduction for BTM PV and PDR | 26661 | 26704 | 26698 | 26765 | 26783 | 26789 | 26816 | 26870 | 26942 | 27026 | 27122 |
| **2. CAPACITY BASED ON FCM OBLIGATIONS** | | | | | | | | | | | |
| 2.1 GENERATING RESOURCES (6) | 29726 | 29888 | 29547 | 30393 | 31341 | 31441 | 31441 | 31441 | 31441 | 31441 | 31441 |
| 2.2 DEMAND RESOURCES (6, 7) | 2326 | 2441 | 2798 | 2751 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 |
| 2.2.1 ACTIVE DR | 638 | 556 | 841 | 597 | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| 2.2.2 PASSIVE DR | 1687 | 1885 | 1957 | 2154 | 2369 | 2369 | 2369 | 2369 | 2369 | 2369 | 2369 |
| 2.3 IMPORTS (8) | 1337 | 1162 | 1406 | 1479 | 1480 | 96 | 90 | 90 | 90 | 90 | 90 |
| **2.4 TOTAL** (9) | **33389** | **33492** | **33750** | **34623** | **35567** | **34283** | **34277** | **34277** | **34277** | **34277** | **34277** |
| **3. CAPACITY BASED ON SEASONAL CLAIMED CAPABILITY (SCC)** (10) (11) | | | | | | | | | | | |
| 3.1 GENERATION CLAIMED FOR CAPABILITY | 30580 | 30581 | 29908 | 30968 | 32118 | 32111 | 32121 | 32127 | 32133 | 32138 | 32144 |
| **4. RESERVES -** Based on Reference Load with reduction for Passive DR | | | | | | | | | | | |
| 4.1 INSTALLED RESERVES - Based on CSOs of Generating Resources (line 2.1), Active DR (line 2.2.1), and Imports (line 2.3) | | | | | | | | | | | |
| 4.1.1 MW | 5040 | 4903 | 5096 | 5704 | 6415 | 5125 | 5092 | 5038 | 4966 | 4882 | 4786 |
| 4.1.2 % OF LOAD | 19 | 18 | 19 | 21 | 24 | 19 | 19 | 19 | 18 | 18 | 18 |
| 4.2 INSTALLED RESERVES - Based on Generation SCC (line 3.1), Active DR (line 2.2.1), Imports (line 2.3), and Exports (see footnote 12) | | | | | | | | | | | |
| 4.2.1 MW | 5794 | 5496 | 5357 | 6179 | 7093 | 5796 | 5773 | 5725 | 5659 | 5580 | 5490 |
| 4.2.2 % OF LOAD | 22 | 21 | 20 | 23 | 26 | 22 | 22 | 21 | 21 | 21 | 20 |

KEY:

4.1.1 = 2.1 + 2.2.1 + 2.3 – 1.3
4.1.2 = (4.1.1 / 1.3 ) x 100
4.2.1 = (3.1 + 2.2.1 + 2.3) – 1.3
4.2.2 = (4.2.1 / 1.3 ) x 100
2.4 = 2.1 + 2.2 + 2.3

FOOTNOTES:

See Section 1.1 Footnotes on following sheet

## 1.1 Footnotes

(1) Represents MW load level associated with a reference forecast having a 50% chance of being exceeded. More information on the April 2016 CELT forecast, including the high and low bandwidths, is available on the ISO-NE Website located at http://www.iso-ne.com/system-planning/system-plans-studies/celt.

(2) Three versions of the seasonal peak load forecast are shown. The first forecast does not reflect the peak and energy savings of Passive Demand Resources (PDR) or Behind-the-Meter (BTM) PV. The second forecast shown reflects a reduction for BTM PV. The third forecast shown reflects the reductions of BTM PV and PDR. Detailed forecast documentation on the ISO-NE website includes all three versions of the forecast.

(3) The 2015 summer peak load shown reflects weather normalization. Prior to weather normalization, the actual metered 2015 summer peak of 24,437 MW occurred on July 20, 2015 at hour ending 17:00. See Section 1.5 for actual and estimated peaks and energies. The reconstituted (for the load reducing action of FCM Passive Demand Resources) peak of 26,472 MW occurred on July 20, 2015 at hour ending 17:00.

(4) Line 1.1.1 consists of Behind-the-Meter PV estimated summer peak load reductions as of July 1 of that year, including an 8% transmission and distribution loss gross up. Refer to Section 3.1 for more details on these values.

(5) The passive DR shown on line 1.2.1 consists of the Qualified Capacity (QC) of existing resources and primary auction (FCA) results for new resources. These values are used by ISO-NE System Planning in their long-term Needs Assessments and Solutions Studies (see Sec. 5.2 of this report for a breakdown by Load Zone and DR type), and are different from the Capacity Supply Obligations shown on line 2.2.2 . Beginning in 2020-2021, passive DR includes an ISO-NE forecast of incremental EE beyond the FCM.

(6) The 2016 through 2019 capacity for generating and demand resources consists of the current Forward Capacity Market CSOs as of March 18, 2016, and the 2015 CSOs are based on the 2015-2016 ARA 3 results. The 2019 FCM CSO is assumed to remain in place through the end of the CELT reporting period. It is assumed that the 211 MW of Static De-List Bids that were cleared to leave the 2019-2020 Forward Capacity Auction will remain de-listed through the reporting period. The Citizens Block Load CSO is treated as an import rather than a generating resource.

(7) The demand resource values are based on DR with FCM CSOs, including an 8% transmission and distribution loss gross-up. A passive DR forecast is included with the QC-based DR values on line 1.2.1, beginning in 2020.

(8) The 2015 through 2019 imports are based on FCM import CSOs. An Administrative Export De-List of 100 MW, which expires on May 31, 2020, is taken into account in the generation capability values from 2015 through 2019. The purchases beyond the 2019-2020 Capacity Commitment Period reflect only known, long-term contracts. Note that one of those long-term contracts is a 6 MW contract that ends October 2020. The FCA #11 qualification process will take this into account in determining its qualified capacity for the upcoming auction.

(9) May not equal sum due to rounding.

(10) The generating capability based on SCC values includes all existing ISO New England generating assets as well as projected additions and retirements. Future generating assets consist of non-FCM resources that are expected to go commercial in 2016 or 2017, and all new resources with FCM CSOs. The capabilities of the FCM resources are based on their Qualified Capacity. Also included is a forecast of non-FCM PV capacity, which is based on the nameplate PV forecast shown in Section 3.1.1, together with the assumed percentage of annual growth (37% in service by July 1), and estimated summer seasonal peak load reduction (in % of nameplate) for each year, as shown in Section 3.2.2.

(11) The 2016 SCC value of 30,581 MW is consistent with the total capacity projected for August 1 in the Section 2.1 Generator List.

(12) Exports consist of a 100 MW Administrative Export De-List through 2019.

## 1.2 Winter Peak Capabilities and Load Forecast (MW)

| | 15/16 | 16/17 | 17/18 | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ISO-NE RELIABILITY COORDINATOR AREA** | | | | | | | | | | | |
| **1. LOAD** (1, 2, 3) | | | | | | | | | | | |
| **1.1 REFERENCE - Without reductions** | 22860 | 22992 | 23170 | 23353 | 23507 | 23633 | 23758 | 23890 | 24022 | 24151 | 24276 |
| 1.1.1 Behind-the-Meter (BTM) PV (4) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1.2 REFERENCE - With reduction for BTM PV | 22860 | 22992 | 23170 | 23353 | 23507 | 23633 | 23758 | 23890 | 24022 | 24151 | 24276 |
| 1.2.1 Passive DR (PDR) used in System Planning (5) | 1663 | 1652 | 1832 | 2171 | 2371 | 2604 | 2821 | 3025 | 3215 | 3393 | 3559 |
| 1.3 REFERENCE - With reduction for BTM PV and PDR | 21197 | 21340 | 21338 | 21183 | 21136 | 21029 | 20937 | 20865 | 20807 | 20758 | 20717 |
| **2. CAPACITY BASED ON FCM OBLIGATIONS** | | | | | | | | | | | |
| 2.1 GENERATING RESOURCES (6) | 30070 | 30178 | 29872 | 31108 | 31990 | 32090 | 32090 | 32090 | 32090 | 32090 | 32090 |
| 2.2 DEMAND RESOURCES (6, 7) | 2285 | 2427 | 2799 | 2752 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 |
| 2.2.1 ACTIVE DR | 600 | 543 | 843 | 598 | 378 | 378 | 378 | 378 | 378 | 378 | 378 |
| 2.2.2 PASSIVE DR | 1685 | 1884 | 1956 | 2154 | 2369 | 2369 | 2369 | 2369 | 2369 | 2369 | 2369 |
| 2.3 IMPORTS (8) | 1326 | 1137 | 1406 | 1017 | 1069 | 89 | 89 | 89 | 89 | 89 | 89 |
| **2.4 TOTAL** (9) | **33682** | **33742** | **34076** | **34877** | **35805** | **34925** | **34925** | **34925** | **34925** | **34925** | **34925** |
| **3. CAPACITY BASED ON SEASONAL CLAIMED CAPABILITY (SCC)** (10) | | | | | | | | | | | |
| 3.1 GENERATION CLAIMED FOR CAPABILITY | 33068 | 33045 | 32309 | 33414 | 34690 | 34690 | 34690 | 34690 | 34690 | 34690 | 34690 |
| **4. RESERVES -** Based on Reference Load with reduction for Passive DR | | | | | | | | | | | |
| 4.1 INSTALLED RESERVES - Based on CSOs of Generating Resources (line 2.1), Active DR (line 2.2.1), and Imports (line 2.3) | | | | | | | | | | | |
| 4.1.1 MW | 10799 | 10518 | 10782 | 11540 | 12301 | 11528 | 11620 | 11692 | 11750 | 11799 | 11840 |
| 4.1.2 % OF LOAD | 51 | 49 | 51 | 54 | 58 | 55 | 55 | 56 | 56 | 57 | 57 |
| 4.2 INSTALLED RESERVES - Based on Generation SCC (line 3.1), Active DR (line 2.2.1), Imports (line 2.3), and Exports (see footnote 11) | | | | | | | | | | | |
| 4.2.1 MW | 13697 | 13285 | 13120 | 13746 | 14901 | 14128 | 14220 | 14292 | 14350 | 14399 | 14440 |
| 4.2.2 % OF LOAD | 65 | 62 | 61 | 65 | 70 | 67 | 68 | 68 | 69 | 69 | 70 |

KEY:

4.1.1 = 2.1 + 2.2.1 + 2.3 – 1.3
4.1.2 = (4.1.1 / 1.3 ) x 100
4.2.1 = (3.1 + 2.2.1 + 2.3) – 1.3
4.2.2 = (4.2.1 / 1.3 ) x 100
2.4 = 2.1 + 2.2 + 2.3

FOOTNOTES:

See Section 1.2 Footnotes on following sheet

## 1.2 Footnotes

(1) Represents MW load level associated with a reference forecast having a 50% chance of being exceeded. More information on the April 2016 CELT forecast, including the high and low bandwidths, is available on the ISO-NE Website located at http://www.iso-ne.com/system-planning/system-plans-studies/celt.

(2) Two versions of the seasonal peak load forecast are shown. The first forecast does not reflect the peak and energy savings of the passive demand resources. The second forecast shown reflects a reduction for that passive DR. Detailed forecast documentation on the ISO-NE website includes both the original CELT forecast and the forecast minus passive demand resources.

(3) The 2015/16 winter peak load shown reflects weather normalization. Prior to weather normalization, the actual metered 2015/16 winter peak of 19,524 MW occurred on February 15, 2016 at hour ending 18:00. See Section 1.5 for actual and estimated peaks and energies. The reconstituted (for the load reducing action of FCM Passive Demand Resources) peak of 21,860 MW occurred on February 15, 2016 at hour ending 18:00.

(4) Behing-the-Meter PV is assumed to be zero during the winter peak.

(5) The passive DR shown on line 1.2.1 consists of the Qualified Capacity (QC) of existing resources and primary auction (FCA) results for new resources. These values are used by ISO-NE System Planning in their long-term Needs Assessments and Solutions Studies (see Sec. 5.2 of this report for a breakdown by Load Zone and DR type), and are different from the Capacity Supply Obligations shown on line 2.2.2. Beginning in 2020-2021, passive DR includes an ISO-NE forecast of incremental EE beyond the FCM.

(6) The 2016/17 through 2019/20 capacity for generating and demand resources consists of the Forward Capacity Market CSOs current as of March 18, 2016, and the 2015/16 CSOs are based on the ARA 3 results. The 2019/20 FCM CSO is assumed to remain in place through the end of the CELT reporting period. It is assumed that the 211 MW of Static De-List Bids that were cleared to leave the 2019-2020 Forward Capacity Auction will remain de-listed through the reporting period. The Citizens Block Load CSO is treated as an import rather than a generating resource.

(7) The demand resource values are based on DR with FCM CSOs, including an 8% transmission and distribution loss gross-up. A passive DR forecast is included with the QC-based DR values on line 1.2.1, beginning in 2019/20.

(8) The 2015/16 through 2019/20 imports are based on FCM import CSOs. An Administrative Export De-List of 100 MW, which expires on May 31, 2020, is taken into account in the generation capability values from 2015/16 through 2019/20. The purchases beyond the 2019-2020 Capacity Commitment Period reflect only known, long-term contracts. Note that one of those long-term contracts is a 6 MW contract that ends October 2020. The FCA #11 qualification process will take this into account in determining its qualified capacity for the upcoming auction.

(9) May not equal sum due to rounding.

(10) The generating capability based on SCC values includes all existing ISO New England generating assets as well as projected additions and retirements. Future generating assets consist of non-FCM resources that are expected to go commercial in 2016 or 2017, and all new resources with FCM CSOs. The capabilities of the FCM resources are based on their Qualified Capacity.

(11) Exports consist of a 100 MW Administrative Export De-List through 2019/20.

## 1.3 - Summary Summer Capability by Fuel/Unit Type (MW) [1]

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NUCLEAR STEAM | 3877 | 4010 | 4023 | 4024 | 3347 | 3347 | 3347 | 3347 | 3347 | 3347 | 3347 |
| HYDRO (DAILY CYCLE - PONDAGE) | 327 | 338 | 339 | 338 | 340 | 340 | 340 | 340 | 340 | 340 | 340 |
| HYDRO (DAILY CYCLE - RUN OF RIVER) | 300 | 261 | 292 | 274 | 239 | 239 | 239 | 239 | 239 | 239 | 239 |
| HYDRO (WEEKLY CYCLE) | 859 | 868 | 844 | 841 | 872 | 872 | 872 | 872 | 872 | 872 | 872 |
| HYDRO (PUMPED STORAGE) | 1624 | 1677 | 1679 | 1643 | 1665 | 1765 | 1765 | 1765 | 1765 | 1765 | 1765 |
| GAS COMBINED CYCLE | 8857 | 8283 | 8999 | 9729 | 10362 | 10362 | 10362 | 10362 | 10362 | 10362 | 10362 |
| GAS/OIL COMBINED CYCLE | 3202 | 3957 | 4018 | 4020 | 4005 | 4005 | 4005 | 4005 | 4005 | 4005 | 4005 |
| GAS COMBUSTION (GAS) TURBINE | 345 | 219 | 232 | 517 | 1335 | 1335 | 1335 | 1335 | 1335 | 1335 | 1335 |
| GAS/OIL COMBUSTION (GAS) TURBINE | 629 | 542 | 554 | 552 | 549 | 549 | 549 | 549 | 549 | 549 | 549 |
| OIL COMBUSTION (GAS) TURBINE | 1613 | 1695 | 1680 | 1694 | 1710 | 1710 | 1710 | 1710 | 1710 | 1710 | 1710 |
| COAL STEAM | 1981 | 1947 | 927 | 922 | 917 | 917 | 917 | 917 | 917 | 917 | 917 |
| GAS/OIL STEAM | 2777 | 2831 | 2481 | 2497 | 2490 | 2490 | 2490 | 2490 | 2490 | 2490 | 2490 |
| OIL STEAM | 2184 | 2128 | 2201 | 2148 | 2192 | 2192 | 2192 | 2192 | 2192 | 2192 | 2192 |
| GAS INTERNAL COMBUSTION | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| GAS/OIL INTERNAL COMBUSTION | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| OIL INTERNAL COMBUSTION | 111 | 116 | 118 | 112 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| BIO/REFUSE | 908 | 897 | 1001 | 923 | 977 | 977 | 977 | 977 | 977 | 977 | 977 |
| WIND TURBINE | 102 | 79 | 123 | 109 | 135 | 135 | 135 | 135 | 135 | 135 | 135 |
| GAS FUEL CELL | 16 | 21 | 16 | 16 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| PHOTOVOLTAIC | 2 | 5 | 4 | 20 | 62 | 62 | 62 | 62 | 62 | 62 | 62 |
| **SUBTOTAL ISO-NE RELIABILITY COORDINATOR AREA CAPACITY** (2) (4) | **29726** | **29888** | **29547** | **30393** | **31341** | **31441** | **31441** | **31441** | **31441** | **31441** | **31441** |
| DEMAND RESOURCES (2) | 2326 | 2441 | 2798 | 2751 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 |
| IMPORTS (3) | 1337 | 1162 | 1406 | 1479 | 1480 | 96 | 90 | 90 | 90 | 90 | 90 |
| **TOTAL ISO-NE RELIABILITY COORDINATOR AREA CAPACITY** (4) | **33389** | **33492** | **33750** | **34623** | **35567** | **34283** | **34277** | **34277** | **34277** | **34277** | **34277** |

FOOTNOTES:

(1) Gas/oil units are not necessarily fully operable on both fuels.

(2) The 2015 through 2019 capacity values consist of the Forward Capacity Market CSOs current as of March 18, 2016. The 2019 FCM CSO is assumed to remain in place through the end of the CELT reporting period. It is assumed that the 211 MW of Static De-List Bids that were cleared to leave the 2019/20 Forward Capacity Auction will remain de-listed through the reporting period.

(3) Imports are from entities outside the ISO-NE Reliability Coordinator area boundary. The 2015 through 2019 imports are based on FCM import CSOs. An Export De-List of 100 MW is taken into account in the generation capability values through 2019. The imports beyond the 2019/20 Capacity Commitment Period reflect only known, long-term contracts.

(4) May not equal sum due to rounding.

## 1.4 - Summary Winter Capability by Fuel/Unit Type (MW)[1]

| | 15/16 | 16/17 | 17/18 | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NUCLEAR STEAM | 3877 | 4010 | 4023 | 4024 | 3347 | 3347 | 3347 | 3347 | 3347 | 3347 | 3347 |
| HYDRO (DAILY CYCLE - PONDAGE) | 327 | 339 | 340 | 339 | 340 | 340 | 340 | 340 | 340 | 340 | 340 |
| HYDRO (DAILY CYCLE - RUN OF RIVER) | 405 | 384 | 458 | 434 | 411 | 411 | 411 | 411 | 411 | 411 | 411 |
| HYDRO (WEEKLY CYCLE) | 860 | 860 | 843 | 839 | 854 | 854 | 854 | 854 | 854 | 854 | 854 |
| HYDRO (PUMPED STORAGE) | 1623 | 1677 | 1657 | 1643 | 1655 | 1755 | 1755 | 1755 | 1755 | 1755 | 1755 |
| GAS COMBINED CYCLE | 8898 | 8285 | 9022 | 10146 | 10640 | 10640 | 10640 | 10640 | 10640 | 10640 | 10640 |
| GAS/OIL COMBINED CYCLE | 3290 | 3983 | 4020 | 4027 | 4090 | 4090 | 4090 | 4090 | 4090 | 4090 | 4090 |
| GAS COMBUSTION (GAS) TURBINE | 374 | 221 | 239 | 523 | 1335 | 1335 | 1335 | 1335 | 1335 | 1335 | 1335 |
| GAS/OIL COMBUSTION (GAS) TURBINE | 629 | 542 | 554 | 552 | 549 | 549 | 549 | 549 | 549 | 549 | 549 |
| OIL COMBUSTION (GAS) TURBINE | 1613 | 1719 | 1702 | 1736 | 1770 | 1770 | 1770 | 1770 | 1770 | 1770 | 1770 |
| COAL STEAM | 1981 | 1947 | 927 | 922 | 917 | 917 | 917 | 917 | 917 | 917 | 917 |
| GAS/OIL STEAM | 2777 | 2831 | 2481 | 2481 | 2479 | 2479 | 2479 | 2479 | 2479 | 2479 | 2479 |
| OIL STEAM | 2185 | 2128 | 2201 | 2148 | 2192 | 2192 | 2192 | 2192 | 2192 | 2192 | 2192 |
| GAS INTERNAL COMBUSTION | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| GAS/OIL INTERNAL COMBUSTION | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| OIL INTERNAL COMBUSTION | 111 | 116 | 118 | 112 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| BIO/REFUSE | 913 | 902 | 1011 | 934 | 988 | 988 | 988 | 988 | 988 | 988 | 988 |
| WIND TURBINE | 178 | 200 | 247 | 218 | 280 | 280 | 280 | 280 | 280 | 280 | 280 |
| GAS FUEL CELL | 16 | 21 | 16 | 16 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| PHOTOVOLTAIC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SUBTOTAL ISO-NE RELIABILITY COORDINATOR AREA CAPACITY** (2) (4 | **30070** | **30178** | **29872** | **31108** | **31990** | **32090** | **32090** | **32090** | **32090** | **32090** | **32090** |
| DEMAND RESOURCES (2) | 2285 | 2427 | 2799 | 2752 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 | 2746 |
| IMPORTS (3) | 1326 | 1137 | 1406 | 1017 | 1069 | 89 | 89 | 89 | 89 | 89 | 89 |
| **TOTAL ISO-NE RELIABILITY COORDINATOR AREA CAPACITY** (4) | **33682** | **33742** | **34076** | **34877** | **35805** | **34925** | **34925** | **34925** | **34925** | **34925** | **34925** |

FOOTNOTES:

(1) Gas/oil units are not necessarily fully operable on both fuels.

(2) The 2015/16 through 2019/20 capacity values consist of the Forward Capacity Market CSOs as of March 18, 2016. The 2019/20 FCM CSO is assumed to remain in place through the end of the CELT reporting period. It is assumed that the 21 1 MW of Static De-List Bids that were cleared to leave the 2019/20 Forward Capacity Auction will remain de-listed through the reporting period.

(3) Imports are from entities outside the ISO-NE Reliability Coordinator Area boundary. The 2015/16 through 2019/20 imports are based on FCM import CSOs. An Export De-List of 100 MW is taken into account in the generation capability values through 2019/20. The imports beyond the 2019/20 Capacity Commitment Period reflect only known, long-term contracts.

(4) May not equal sum due to rounding.

## 1.5 - Actual and Forecasted Energy and Peak Loads (Forecast is Reference with reduction for BTM PV)[1]

**2015 ACTUAL**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTHLY PEAK LOAD - MW | 20583 | 20108 | 18848 | 16455 | 19544 | 20923 | 24437 | 24216 | 24368 | 16247 | 17643 | 18157 |
| MONTHLY NET ENERGY - GWH | 11732 | 11032 | 10869 | 9239 | 9729 | 10161 | 12099 | 12229 | 10735 | 9495 | 9419 | 10160 |

**2016 FORECAST**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTHLY PEAK LOAD - MW | 19421 A | 19524 A | 21185 | 17858 | 19845 | 24827 | 28543 | 28543 | 23251 | 18512 | 20038 | 22992 |
| MONTHLY NET ENERGY - GWH | 10986 A | 10095 A | 11690 | 10134 | 10413 | 11652 | 13290 | 13076 | 11003 | 10563 | 10812 | 12217 |

**2017 FORECAST**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTHLY PEAK LOAD - MW | 22992 | 22062 | 21383 | 17996 | 19941 | 25031 | 28788 | 28788 | 23439 | 18621 | 20192 | 23170 |
| MONTHLY NET ENERGY - GWH | 12947 | 11434 | 11803 | 10218 | 10501 | 11756 | 13414 | 13200 | 11108 | 10672 | 10929 | 12359 |

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | CAGR (6) 2016 to 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUMMER PEAK - MW | 24437 A | 28543 | 28788 | 29070 | 29344 | 29601 | 29863 | 30137 | 30415 | 30691 | 30966 | 0.9 |
| WINTER PEAK - MW (2) | 19524 A | 22992 | 23170 | 23353 | 23507 | 23633 | 23758 | 23890 | 24022 | 24151 | 24276 | 0.6 |
| NET ANNUAL ENERGY - GWH (3, 4) | 126899 A | 138968 (5) | 140342 | 141877 | 143171 | 144208 | 145262 | 146400 | 147554 | 148677 | 149772 | 0.8 |

FOOTNOTES:

A = ACTUAL

(1) Recognizing that the seasonal peaks usually occur within a few months of the year, the forecasted monthly peaks of July and August have been replaced by the summer peak, and December and January have been replaced by the winter peak.

(2) Winter beginning in December of the year shown.

(3) May not equal sum due to rounding.

(4) The Net Annual Energy does not include a reduction for Passive DR. With a reduction for PDR, the CAGR would be -0.2%. Refer to the ISO website for the full forecast details: http://www.iso-ne.com/system-planning/system-plans-studies/celt

(5) Forecasted value only; does not include the January 2016 actual monthly net energy shown above.

(6) Compound Annual Growth Rate (%).

## 1.6 - Seasonal Peak Load Forecast Distributions (Forecast is Reference with reduction for BTM PV)

| | | Peak Load Forecast at Milder Than Expected Weather | | | | Reference Forecast at Expected Weather | Peak Load Forecast at More Extreme Than Expected Weather | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Summer (MW)** | 2016 | 27147 | 27397 | 27735 | 28117 | 28543 | 28995 | 29457 | 30119 | 30880 | 31547 |
| | 2017 | 27370 | 27624 | 27967 | 28355 | 28788 | 29247 | 29716 | 30388 | 31161 | 31837 |
| | 2018 | 27632 | 27889 | 28238 | 28631 | 29070 | 29536 | 30012 | 30695 | 31479 | 32166 |
| | 2019 | 27884 | 28145 | 28499 | 28898 | 29344 | 29816 | 30300 | 30992 | 31788 | 32485 |
| | 2020 | 28120 | 28385 | 28744 | 29149 | 29601 | 30080 | 30571 | 31273 | 32081 | 32788 |
| | 2021 | 28361 | 28630 | 28994 | 29405 | 29863 | 30350 | 30847 | 31560 | 32379 | 33096 |
| | 2022 | 28614 | 28886 | 29255 | 29672 | 30137 | 30631 | 31135 | 31858 | 32689 | 33416 |
| | 2023 | 28870 | 29146 | 29520 | 29943 | 30415 | 30915 | 31427 | 32159 | 33002 | 33739 |
| | 2024 | 29125 | 29405 | 29785 | 30213 | 30691 | 31198 | 31717 | 32460 | 33314 | 34062 |
| | 2025 | 29379 | 29663 | 30047 | 30482 | 30966 | 31480 | 32006 | 32759 | 33625 | 34383 |
| **WTHI (1)** | | **78.49** | **78.73** | **79.00** | **79.39** | **79.88** | **80.30** | **80.72** | **81.14** | **81.96** | **82.33** |
| **Dry-Bulb Temperature (2)** | | **88.50** | **88.90** | **89.20** | **89.90** | **90.20** | **91.20** | **92.20** | **92.90** | **94.20** | **95.40** |
| **Probability of Forecast Being Exceeded** | | **90%** | **80%** | **70%** | **60%** | **50%** | **40%** | **30%** | **20%** | **10%** | **5%** |
| **Winter (MW)** | 2016/17 | 22558 | 22679 | 22776 | 22839 | 22992 | 23147 | 23318 | 23423 | 23680 | 24055 |
| | 2017/18 | 22736 | 22857 | 22954 | 23017 | 23170 | 23325 | 23496 | 23601 | 23858 | 24233 |
| | 2018/19 | 22919 | 23041 | 23137 | 23200 | 23353 | 23508 | 23679 | 23784 | 24041 | 24417 |
| | 2019/20 | 23073 | 23194 | 23291 | 23354 | 23507 | 23662 | 23833 | 23938 | 24195 | 24570 |
| | 2020/21 | 23199 | 23320 | 23417 | 23480 | 23633 | 23787 | 23959 | 24063 | 24321 | 24696 |
| | 2021/22 | 23325 | 23446 | 23542 | 23605 | 23758 | 23913 | 24084 | 24189 | 24447 | 24822 |
| | 2022/23 | 23456 | 23577 | 23674 | 23737 | 23890 | 24045 | 24216 | 24321 | 24578 | 24953 |
| | 2023/24 | 23589 | 23710 | 23806 | 23869 | 24022 | 24177 | 24348 | 24453 | 24711 | 25086 |
| | 2024/25 | 23717 | 23838 | 23935 | 23998 | 24151 | 24306 | 24477 | 24582 | 24839 | 25214 |
| | 2025/26 | 23842 | 23964 | 24060 | 24123 | 24276 | 24431 | 24602 | 24707 | 24964 | 25340 |
| **Dry-Bulb Temperature (3)** | | **10.72** | **9.66** | **8.84** | **8.30** | **7.03** | **5.77** | **4.40** | **3.58** | **1.61** | **(1.15)** |

FOOTNOTES:

(1) WTHI - a three-day weighted temperature-humidity index for eight New England weather stations. It is the weather variable used in producing the summer peak load forecast. For more information on the weather variables see *http://www.iso-ne.com/system-planning/system-plans-studies/celt* .

(2) Dry-bulb temperature (in degrees Fahrenheit) shown in the summer season is for informational purposes only.

(3) Dry-bulb temperature (in degrees Fahrenheit) shown in the winter season is a weighted value from eight New England weather stations.