



Update on Draft 2021 Forecast

Planning Advisory Committee

Jon Black & Victoria Rojo

LOAD FORECASTING, SYSTEM PLANNING



Introduction

- Provide a high-level update on the 2021 CELT forecast including:
 - Impacts of changes to reconstitution of passive demand resources (PDRs)
 - Energy efficiency (EE) forecast
 - Photovoltaic (PV) forecast
 - Heating electrification forecast
 - Transportation electrification forecast
 - Gross and net summer demand forecasts
- 2021 CELT forecast will be discussed again at the April PAC meeting

CELT 2021 Forecast Timeline

Working Group and Committee Meetings

- Load Forecast Committee Meetings (LFC)
 - September 25, 2020 – [Long-term load forecast methodology](#), [electrification forecast update](#), [2020 summer peak review and COVID-19 impacts](#)
 - November 13, 2020 – [heating electrification update](#), [transportation electrification update](#)
 - December 11, 2020 – [Updated Moody's economic outlook](#), [draft 2021 energy forecast](#), [draft 2021 heating electrification forecast](#), [draft 2021 transportation electrification forecast](#)
 - February 19, 2021 – [Final 2021 heating electrification forecast](#), [final 2021 transportation electrification forecast](#), [draft 2021 peak demand forecast](#)
 - March 26, 2021 – Final draft energy and peak demand forecasts
- Distributed Generation Forecast Working Group (DGFWG)
 - December 7, 2020 – State DG policy updates from [MA](#), [CT](#), [RI](#), [VT](#), [NH](#), and [ME](#), [December 2020 Distributed Generation Survey Results](#)
 - February 22, 2021 – [Draft 2021 PV forecast](#)
 - March 22, 2021 – Final draft PV forecast
- Energy Efficiency Forecast Working Group Meetings (EEFWG)
 - September 11, 2020 – [Upcoming changes for the 2021 forecast](#), [EE data collection](#)
 - October 23, 2020 – [EE forecast model methodology](#), [impact of revised PDR reconstitution methodology on the EE forecast](#)
 - December 7, 2020 – [EE program data review](#), [EE measures data review](#), [accounting for embedded expiring measures in the EE forecast](#)
 - February 12, 2021 – [Draft 2021 EE forecast](#)
 - March 19, 2021 – Final draft 2021 EE forecast

IMPACTS OF NEW RECONSTITUTION METHODOLOGY FOR PASSIVE DEMAND RESOURCES (PDR)

Overview

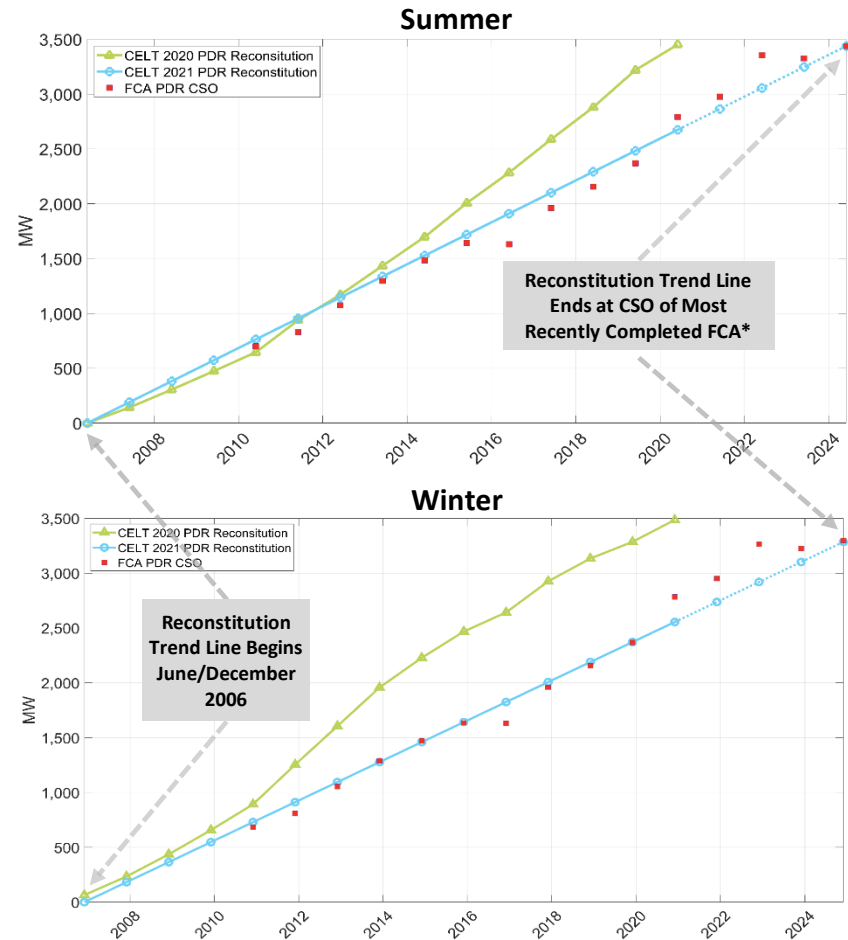
- On October 30, 2020, the Federal Energy Regulatory Commission accepted Tariff changes that the ISO filed joined by NEPOOL to [modify](#) the reconstitution methodology for passive demand resources (PDR)
 - Under the new methodology, which will be used for the 2021 gross load forecast, PDR reconstitution will be based on the total CSOs acquired by PDR resources in the most recent Forward Capacity Auction (FCA)
- The impacts of this change to forecasting processes were discussed at recent working group meetings
 - Impacts to the load forecast were discussed at the [September 25, 2020 \(slides 13-18\)](#) and the [December 11, 2020 \(slides 3-7 and Appendix A\)](#) meetings of the Load Forecast Committee (LFC)
 - Impacts to the EE forecast were discussed at the [October 23, 2020](#) and [December 7, 2020](#) meetings of the Energy Efficiency Forecast Working Group (EEFWG)

PDR Reconstitution

Draft CELT 2021 - New England

- Since 2010, PDR reconstitution values have been based on PDR performance (green)
 - EE resources comprise the majority of PDRs
- Beginning with CELT 2021, PDR reconstitution will be based on CSOs from the most recently completed FCA (blue)
 - For CELT 2021 PDR reconstitution will be based on FCA 15 CSOs*
- When compared to the prior methodology, the new PDR reconstitution exhibits a **lower level and slope, and will therefore result in a lower gross load forecast**
 - The PDR reconstitution trend line now reflects the net of all EE measures expired through the most recent FCA, therefore a certain level of these expired measures are inherently embedded in the resulting load forecast
 - These “embedded expiring measures” are correspondingly removed from the EE forecast (see [December 7, 2020 presentation](#) to the EEFWG) to avoid a “double-counting” of the associated load reductions

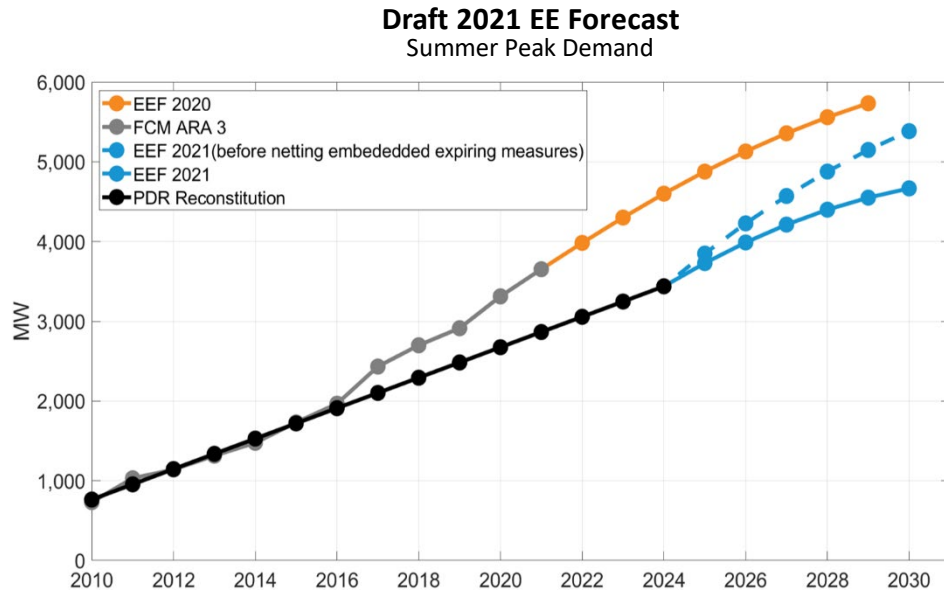
* FCA 15 CSO values shown are an estimate based on Qualified Capacity values for FCA 15. Final FCA 15 CSO values will be incorporated into the final load forecast.



ENERGY EFFICIENCY (EE) AND PHOTOVOLTAIC (PV) FORECASTS

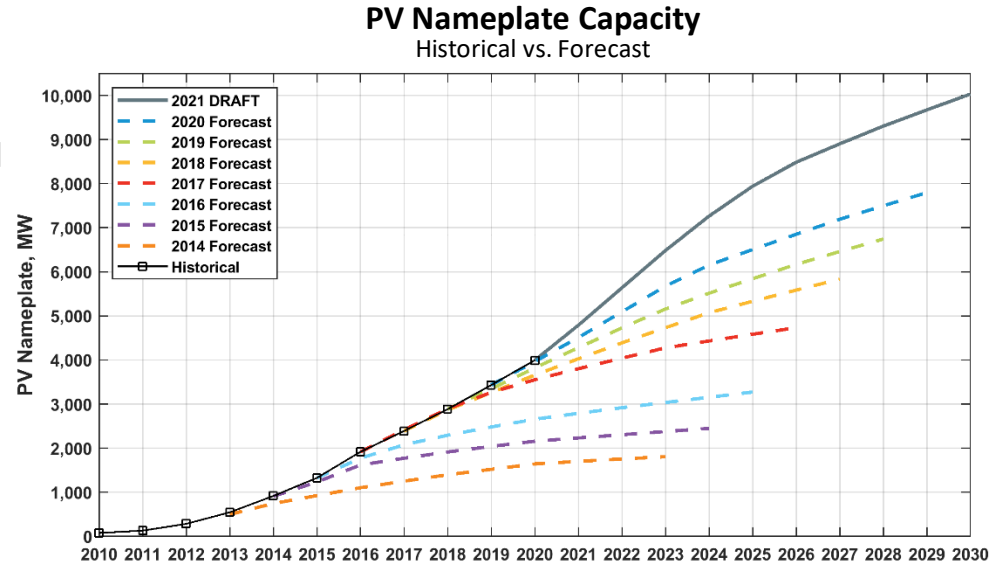
2021 Draft EE Forecast

- The draft 2021 EE forecast reflects:
 - Updated annual state EE program budgets
 - Updated state-level projections of end-uses to be targeted by EE program activity
 - Updated end-use production costs
- Incorporation of new PDR reconstitution methodology
 - Years through the most recent FCA reflect the new PDR reconstitution trend line shown on slide 6
 - Years following the most recent FCA reflect the removal of expiring measures embedded in the load forecast
- The [Draft 2021 EE Forecast](#) was presented at the February 12, 2021 EEFWG meeting



2021 Draft PV Forecast

- The draft 2021 PV forecast reflects:
 - Updated PV installation data provided by Distribution Owners
 - Updated information from the New England states about PV policy drivers
 - Assumed impacts of PV panel degradation over the forecast horizon
 - Discount factors intended to capture uncertainty in the forecast
- Key updates to policy assumptions
 - Two-year extension of the federal Investment Tax Credit
 - Existence of significant PV development in the utilities' interconnection pipeline
 - Effects of increased policy support in MA and ME



- Solar Massachusetts Renewable Target (SMART) Program expanded program goal to 3,200 MWAC
- In Maine, almost 500 MW of additional PV growth expected due to Net Energy Billing projects
- The [Draft 2021 PV Forecast](#) was shared at the February 22, 2021 DGFVG meeting

ELECTRIFICATION FORECASTS

2021 Heating Electrification Forecast

Overview and Updates

- Starting in the 2020 CELT forecast, ISO began including forecasted impacts of heating electrification on state and regional electric energy and demand
 - Forecast focuses on winter months only (October through April)
 - Forecast methodology focuses on consumer adoption of (primarily residential) air-source heat pumps (ASHPs) across the region
 - Future forecasts will likely include other heating electrification technologies and applications
- Beginning with the 2021 CELT forecast, ISO has updated its methodology to account for the energy and demand impacts associated with two categories of ASHP:
 1. Partial heating applications – ASHPs that do not supply sufficient heat to meet full heating requirements
 2. Full heating applications – ASHPs that provide >95% of overall heating requirements, effectively heating the entire home
- To support this update the ISO has updated two components of the forecast process
 - State-level adoption forecasts now include a breakdown of shares of ASHPs that are expected to be installed in full versus partial heating applications
 - In consultation with Sagewell, Inc., the ISO used recent advanced metering infrastructure (AMI) data to better isolate the energy and demand impacts of each ASHP category (see the [November 13, 2020 LFC meeting](#) for details)

2021 Transportation Electrification Forecast

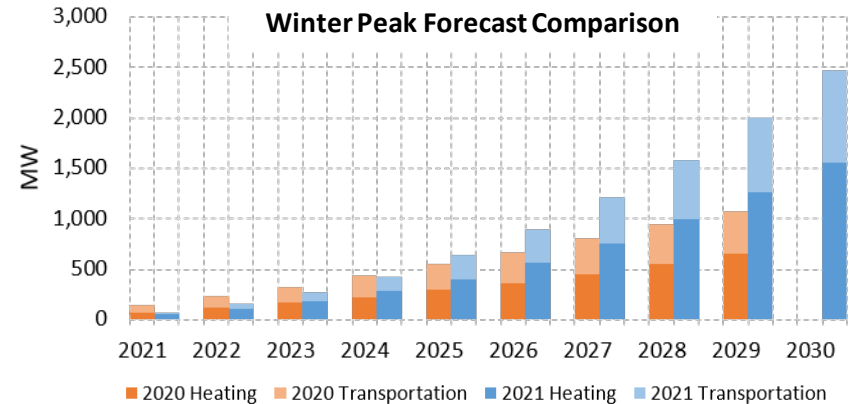
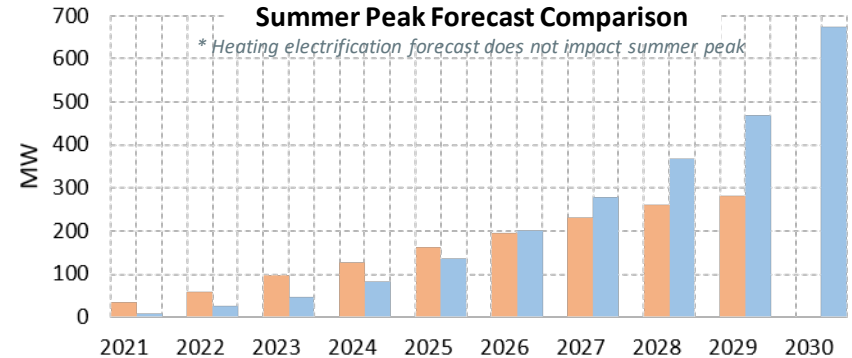
Overview and Updates

- Starting in the 2020 CELT forecast, ISO began including forecasted impacts of transportation electrification on state and regional electric energy and demand
 - Forecast focuses on light-duty vehicles (LDV), including cars and light-duty trucks
 - Electrification of other, non-LDV vehicle classes (e.g., freight vehicles, electric buses, rail, trolley) may be considered in future forecasts
- The methodology for the 2021 CELT forecast remains unchanged from the CELT 2020 forecast
- Updated assumptions regarding state adoption forecasts have been implemented
 - EV adoption forecasts from ME, VT, and MA reflect direct input from the states
 - EV adoption forecasts for CT, NH, and RI reflect a blending of the TCI reference case projections of electrified LDV stock growth and ISO's 2020 EV adoption forecast ([see the February 19, 2020 LFC meeting](#) for details)

Final Heating and Transportation Electrification

Forecasts - *Changes from CELT 2020*

- Transportation Electrification Forecast
 - In later years, forecast almost doubled relative to the CELT 2020 forecast, driven by increases in EV adoption forecasts, especially in MA and ME
- Heating Electrification Forecast
 - Updated assumptions incorporating the profiling of full and partial heating applications have increased energy and peak impact
 - The growing share of ASHPs in full heating applications drives a significant share of the energy and demand forecast growth in the later years of the forecast



LOAD FORECAST

Introduction

- The ISO annually develops 10-year forecasts of energy and demand that are published as part of the [Capacity, Energy, Loads, and Transmission \(CELT\) report](#)
- An overview of the [ISO's methodology](#) for developing the 10-year load forecast was given at the September 25, 2020 Load Forecast Committee (LFC) meeting
- All forecasts presented herein are draft and subject to change

Overview of Gross and Net Load Forecasts

- The gross load forecast reflects a forecast of load:
 - Before reductions from Demand Capacity Resources
 - Includes energy efficiency (EE), passive distributed generation (DG) resources, and price-responsive demand (PRD)
 - Before reductions from BTM PV
 - After load additions associated with forecasts of transportation and heating electrification
- The net load forecast reflects the gross load forecast minus forecasts of EE and BTM PV
 - The annual BTM PV forecast is developed through the [Distributed Generation Forecast Working Group \(DGFWG\)](#)
 - The annual EE forecast is developed through the [Energy Efficiency Forecast Working Group \(EEFWG\)](#)

Draft 2021 Gross Summer Peak Forecast

Overview

- No changes were made to the summer demand forecast methodology since CELT 2020
 - However, the 2021 CELT incorporates updated methodology for the reconstitution of PDR resources, which results in a lower gross load forecast (see slides 5-6 of this presentation)
- The following inputs are not yet finalized and may affect the final forecast:
 - FCA 15 PDR summer CSO values
 - Moody's February macroeconomic outlook
- The draft 2021 gross 50/50 summer peak demand forecast for the region is lower than the 2020 CELT forecast by 3.2% in 2021 and 4.4% in 2029
 - Percent differences vary over the forecast horizon and across states
- Gross summer peak demand for the region is forecast to increase at a compound annual growth rate (CAGR) of 0.8% from 2021 thru 2030, down slightly from 0.9% for CELT 2020
 - CAGRs vary by state

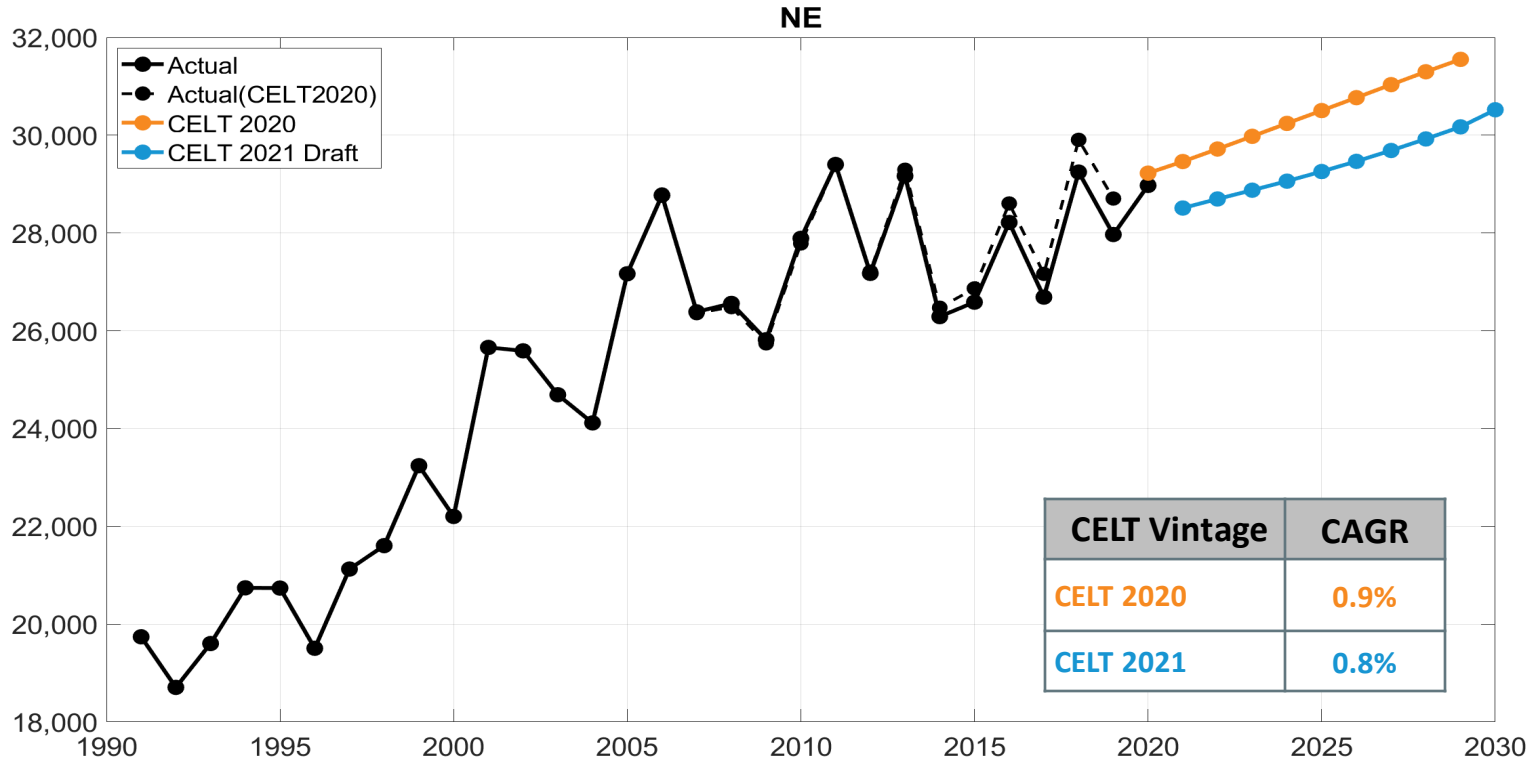
Draft Gross 50/50 Summer Peak Forecast Comparison

New England - Draft CELT 2021 Vs. CELT 2020

Year	Draft Gross CELT 2021 (MW)	Gross CELT 2020 (MW)	Change (MW)	% Change
2021	28,510	29,461	-951	-3.2%
2022	28,696	29,717	-1,022	-3.4%
2023	28,875	29,977	-1,102	-3.7%
2024	29,060	30,241	-1,181	-3.9%
2025	29,257	30,504	-1,247	-4.1%
2026	29,465	30,768	-1,302	-4.2%
2027	29,687	31,034	-1,347	-4.3%
2028	29,923	31,297	-1,374	-4.4%
2029	30,171	31,550	-1,380	-4.4%
2030	30,520			

Draft Gross 50/50 Summer Peak Forecast

New England



Draft Net 50/50 Summer Peak Forecast Comparison

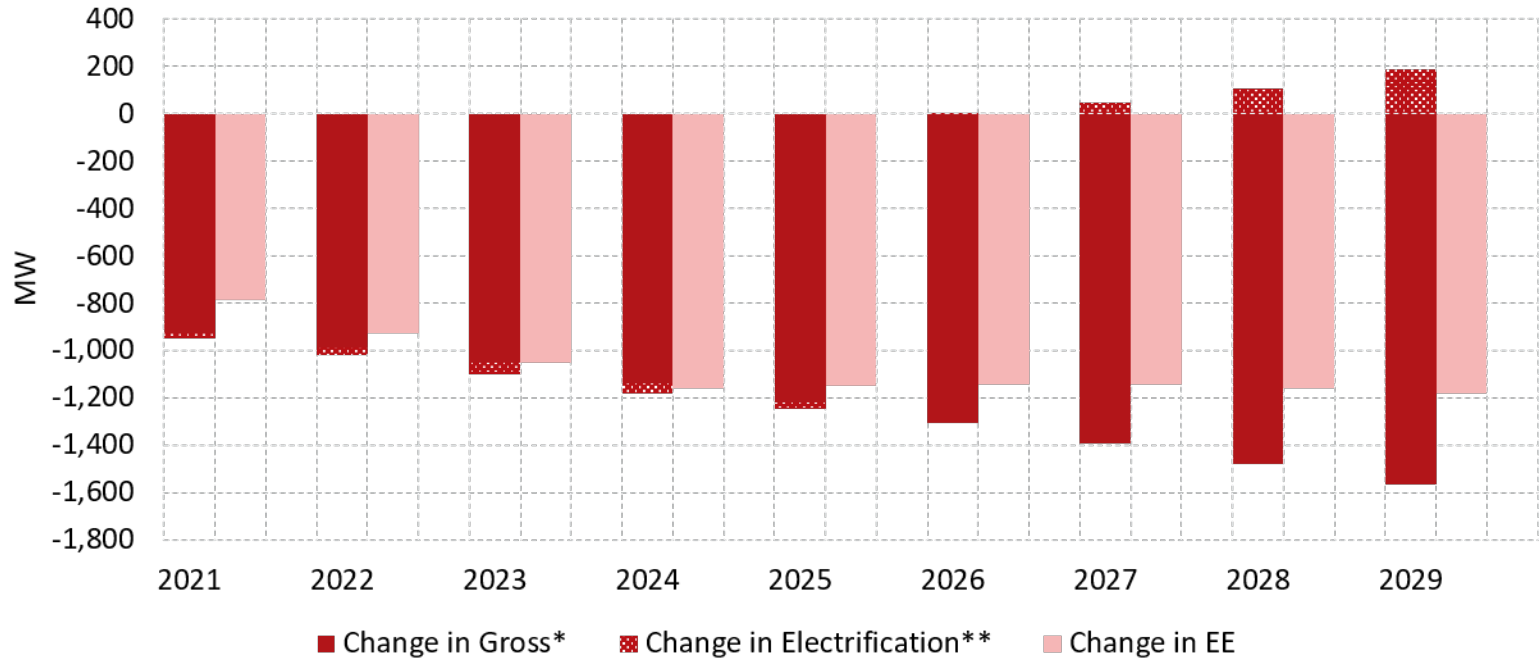
New England - Draft CELT 2021 Vs. CELT 2020

Year	Draft Net CELT 2021* (MW)	Net CELT 2020 (MW)	Change (MW)	% Change
2021	24,818	24,981	-163	-0.7%
2022	24,766	24,861	-95	-0.4%
2023	24,734	24,783	-49	-0.2%
2024	24,684	24,703	-19	-0.1%
2025	24,559	24,657	-98	-0.4%
2026	24,480	24,640	-161	-0.7%
2027	24,454	24,656	-202	-0.8%
2028	24,480	24,694	-214	-0.9%
2029	24,559	24,755	-197	-0.8%
2030				

** Net figures utilize the draft 2021 EE forecast and the final 2020 PV forecast (2021 PV forecast is currently under development)*

Changes to Draft 2021 Net Summer Peak Forecast

New England



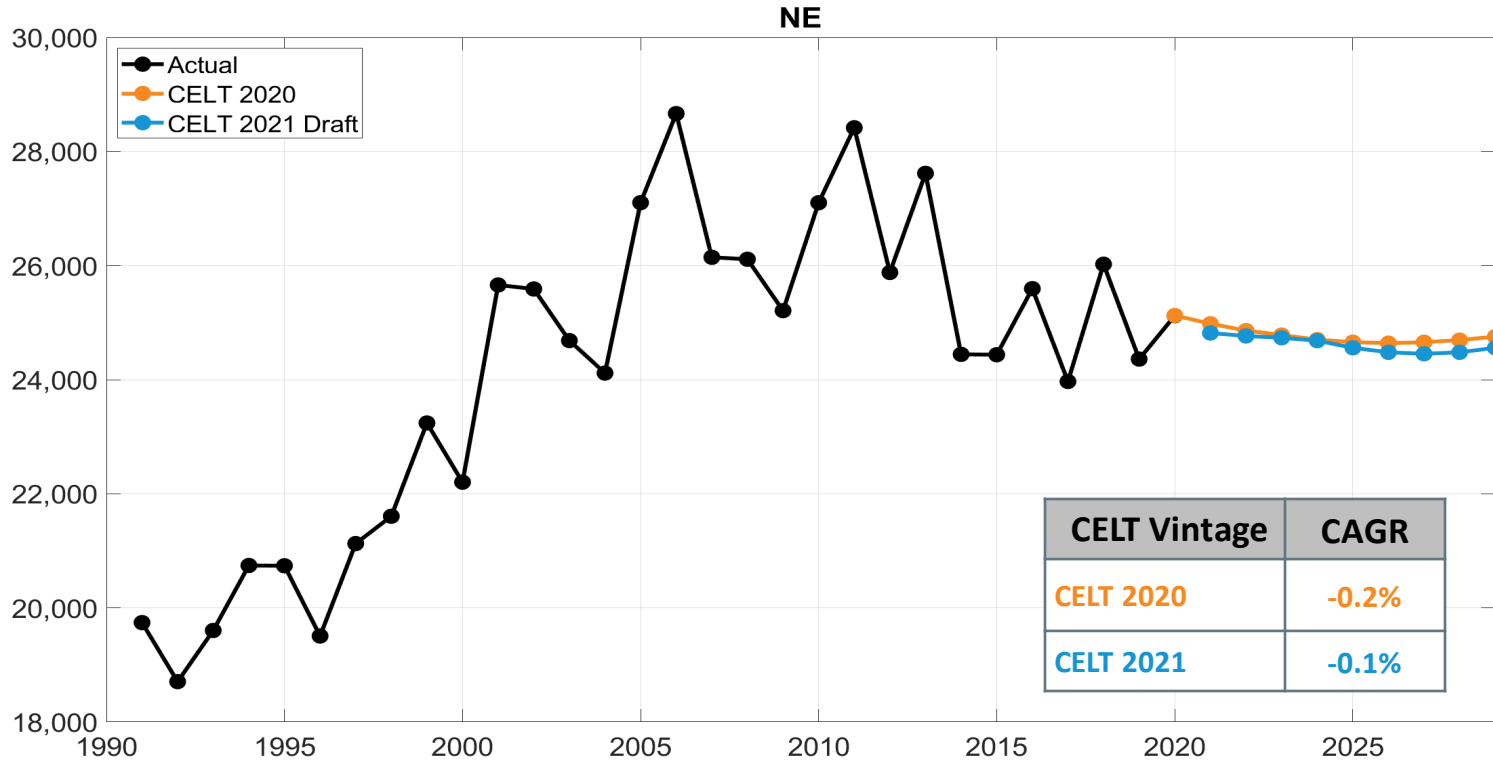
* Changes in gross forecast shown here are absent the impacts of electrification (changes in the electrification forecast are listed separately)

** Heating electrification forecast does not impact summer peak

Note: Draft 2021 net values utilize the 2020 PV forecast, so no change is attributed to the PV forecast.

Draft Net 50/50 Summer Peak Forecast

New England



Draft 2021 Gross and Net Summer Peak Forecasts

New England - Summary

Year	Gross 50/50 (MW)	Gross 90/10 (MW)	Transportation Electrification* (MW)	Heating Electrification* 50/50 (MW)	Heating Electrification* 90/10 (MW)	EE** (MW)	BTM PV** (MW)	Net** 50/50 (MW)	Net** 90/10 (MW)
2021	28,510	30,437	7	0	0	2,865	827	24,818	26,744
2022	28,696	30,640	25	0	0	3,056	874	24,766	26,710
2023	28,875	30,832	47	0	0	3,247	894	24,734	26,691
2024	29,060	31,029	84	0	0	3,438	938	24,684	26,653
2025	29,257	31,239	136	0	0	3,729	970	24,559	26,541
2026	29,465	31,460	202	0	0	3,988	997	24,480	26,474
2027	29,687	31,695	279	0	0	4,212	1,021	24,454	26,461
2028	29,923	31,943	368	0	0	4,399	1,044	24,480	26,500
2029	30,171	32,203	470	0	0	4,550	1,062	24,559	26,591
2030	30,520	32,565	675	0	0	4,666			

* Electrification forecasts are included in both gross and net peak forecasts

** Net figures utilize the draft 2021 EE forecast and the final 2020 PV forecast (2021 PV forecast is currently under development)

Next Steps

- Forthcoming updates to the 2021 CELT forecasts include:
 1. Incorporate Moody's February 2021 macroeconomic outlook
 2. Incorporate final FCA 15 results for PDR CSOs into final gross load reconstitution
 3. Finalize 2021 EE and PV forecasts
- Additional information on CELT 2021 gross and net forecasts will be discussed at the April 14, 2020 PAC meeting
 - Regional gross/net energy forecasts
 - Regional gross/net summer demand forecasts
 - Regional gross/net winter demand forecasts

Questions

