



Draft 2019 Energy Efficiency Forecast

Energy Efficiency Forecast Working Group

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SYSTEM PLANNING



Outline

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INTRODUCTION



Acronyms

- EE Energy Efficiency
- EEFWG Energy Efficiency Forecast Working Group
- FCM Forward Capacity Market
- FCA Forward Capacity Auction (FCM)
- CSO Capacity Supply Obligation (FCM)
- ARA 3 Third Annual Reconfiguration Auction (FCM)
- ICR Installed Capacity Requirement
- PA Program Administrator
- RGGI Regional Greenhouse Gas Initiative
- SBC System Benefit Charge
- CELT 10-year forecast of Capacity, Energy, Loads and Transmission



Introduction

- This presentation contains the draft EE forecast for the period 2020 through 2028
- The forecast estimates reductions in energy and demand from state-sponsored EE programs in the New England control area by state (CT, MA, ME, NH, RI, VT)
- The data used to create the forecast originates from state-sponsored EE Program Administrators and state regulatory agencies
- The draft forecast excludes the results of FCA #13
 - FCA #13 results will be included in final forecast



Introduction

Process

- This forecast follows the same fundamental forecast process and methodology used in prior years, starting in 2012
- The EE forecast is based on average production costs, peak-to-energy ratios, and projected budgets of state-sponsored EE programs
- The Energy-Efficiency Forecast Working Group (EEFWG) provided input during two prior meetings on October 19, 2018 and December 14, 2018
- The EE forecast is updated annually
- The final EE forecast will be incorporated into the CELT report

Introduction

Impacts

- The EE forecast is used in ISO studies including:
 - Long-term transmission planning studies
 - Economic planning studies
- EE forecast will not impact:
 - ICR/Local Sourcing Requirement/Maximum Capacity Limit/Demand Curves
 - FCM auctions
 - FCM related reliability studies (qualification, de-list bid reliability reviews)



Introduction

Looking Forward

- The ISO will accept formal public comments on this draft forecast through February 22, 2019
 - Please submit comments to: eeforecast@iso-ne.com
 - Comments will be posted at: <http://www.iso-ne.com/eefwg>
 - Background information is available at: <http://www.iso-ne.com/eefwg>
- The ISO will issue the final EE forecast by May 1, 2019 as an updated slide deck
 - A generalized characterization of the forecast process can be found in the “Energy-Efficiency Forecast Background Report” available at https://www.iso-ne.com/static-assets/documents/2016/05/Final_EEF_Background_Report_050116.pdf

FORECAST ASSUMPTIONS AND METHODOLOGY



Forecast Model

General Assumptions

- Annual EE budgets provided by the Commissions or representatives on their behalf were used in the model and held constant in years after the latest approved budget
- Production cost baselines were derived from a three-year average of recent performance
- Peak-to-Energy Ratios were derived from a three-year average of recent performance and held constant through the forecast period
- Inflation rate set at 2.5% per year
- Current CELT energy forecast used in conjunction with SBC rates to forecast SBC dollars
- FCM revenue has no effect on overall budget in ME, VT, MA, and RI



Forecast Model

2019 Draft Forecast Input Assumptions

- 2018 CELT Energy Forecast
- 2018 CELT FCM CSOs and FCA #12 clearing price used for calculating budgets
 - Final forecast will use FCA #13 clearing price
- Production Cost: PA 2015-2017 average
- Peak-to-Energy Ratio: PA 2015-2017 average
- Production Cost Escalation Rate: 2.5% inflation + 2.75% graduated rate (starting in year 1)
- No Budget Spend Rate deduction

Forecast Model

2019 Update to Graduated Production Cost Escalator

- All else unchanged, decreases in recent historical production costs result in an increased EE forecast
- Benchmarking of the 2018 EE forecast suggests the current forecast may be too high
- The ISO does not have sufficient evidence to support an increase in the outermost years of the EE forecast
 - Evolving measure mix (refer to the ISO's [February 2018 presentation](#) for background analysis on the potential impact of the phase out of claimable lighting savings)
 - Uncertainty around the level of EE funding 10 years out
 - Near-term production costs predicted in the EE forecast fall short of those expected by the MA PAs in the next three years
- A graduated production cost escalator of 2.75% was utilized to reflect the significant uncertainty in the outermost years of the forecast
 - Near term savings increase slightly
 - Level of savings in later years of the forecast are relatively consistent with the 2018 EE forecast at the regional level
- The ISO will continue to work with stakeholders to gain further insight into the expected outlook on these important topics, and incorporate them into future forecasts

Forecast Model

Assumptions Regarding the Forward Capacity Market

- FCM clearing price was held constant at \$4.63/kW-month[†], which was the clearing price for FCA #12
 - Final forecast will use FCA #13 clearing price
 - ISO assumes that all achieved EE capacity will be bid into and clear in future FCA's[‡]

[†] FCA clearing price used is for modeling purposes only and should not be considered an indication of future clearing prices.

[‡] The ISO assumption that all achieved EE capacity would be bid into and clear in future FCA's is only for modeling purposes and should not be considered an indication of any future FCA outcome.



Forecast Model

Fundamentals

- Compute Annual Energy Savings

$$\text{Annual Energy Savings} = \frac{(1 - \text{Budget Spend Rate Modifier}) * (\text{Budget})}{(\text{Production Cost}) * (\text{Production Cost Escalator})}$$

- Compute Annual Demand Savings

$$\text{Annual Demand Savings} = (\text{Annual Energy Savings}) * (\text{Peak-to-Energy Ratio})$$

- Where:

- Budget Spend Rate Modifier (%) = % to reduce state budgets
- Budget (\$) = \$SBC + \$RGGI + \$FCM + \$Policy
- Production Cost (\$/MWh) = unit cost to develop a MWh of annual savings
- Production Cost Escalator(%) = % increase in annual production cost
- Peak-to-Energy Ratio (MW/MWh) = ratio of annual demand to annual energy savings

FORECAST INPUTS

Summary of Program Administrator Data and Model Parameters



Summary of Program Performance Changes

2016 PA Data Versus 2017 PA Data

- Production Cost
 - Decreased in majority of states
 - Decreased for New England
 - Decrease in most recent rolling 3-year average
- Peak-to-Energy Ratio
 - Decreased in majority of states
 - Decreased for New England
 - Increase in most recent rolling 3-year average

Program Data Summary

| Period | Budget (\$1000's) | Total Costs (\$1000's) | Achieved Annual Energy (MWh) | Dollars per MWh | Achieved Summer Peak (MW) | Dollars per MW | % Energy Achieved | % Budget Spent | % Peak Achieved | Peak to Energy Ratio Achieved (MW/GWh) | Achieved Lifetime Energy (MWh) | Lifetime Dollars Per MWh |
|----------------------|-------------------|------------------------|------------------------------|-----------------|---------------------------|----------------|-------------------|----------------|-----------------|--|--------------------------------|--------------------------|
| New England | | | | | | | | | | | | |
| 2012 | 745,761 | 648,848 | 1,723,357 | 377 | 221 | 2,930,052 | 98% | 87% | 86% | 0.128 | 18,384,080 | 35 |
| 2013 | 727,655 | 707,930 | 1,833,883 | 386 | 254 | 2,787,351 | 109% | 97% | 105% | 0.138 | 20,414,118 | 35 |
| 2014 | 857,984 | 863,025 | 2,093,423 | 412 | 275 | 3,142,634 | 115% | 101% | 99% | 0.131 | 22,253,410 | 39 |
| 2015 | 902,490 | 926,779 | 2,375,192 | 390 | 333 | 2,784,155 | 123% | 103% | 129% | 0.140 | 26,658,969 | 35 |
| 2016 | 984,622 | 912,277 | 2,465,462 | 370 | 355 | 2,572,930 | 117% | 93% | 128% | 0.144 | 23,614,098 | 39 |
| 2017 | 1,042,235 | 894,105 | 2,532,331 | 353 | 347 | 2,573,479 | 119% | 86% | 125% | 0.137 | 25,233,171 | 35 |
| Avg 2014-2016 | 915,032 | 900,694 | 2,311,359 | 391 | 321 | 2,833,240 | 118% | 99% | 119% | 0.138 | 24,175,492 | 37 |
| Avg 2015-2017 | 976,449 | 911,054 | 2,457,662 | 371 | 345 | 2,643,521 | 119% | 94% | 127% | 0.140 | 25,168,746 | 36 |
| Massachusetts | | | | | | | | | | | | |
| 2012 | 508,987 | 400,607 | 980,105 | 409 | 125 | 3,198,050 | 88% | 79% | 75% | 0.128 | 10,724,658 | 37 |
| 2013 | 499,584 | 438,951 | 1,116,236 | 393 | 160 | 2,737,910 | 93% | 88% | 93% | 0.144 | 11,999,747 | 37 |
| 2014 | 511,262 | 518,438 | 1,246,950 | 416 | 166 | 3,119,041 | 110% | 101% | 103% | 0.133 | 13,397,730 | 39 |
| 2015 | 523,663 | 545,060 | 1,396,513 | 390 | 195 | 2,788,155 | 116% | 104% | 129% | 0.140 | 16,295,573 | 33 |
| 2016 | 588,032 | 537,413 | 1,475,270 | 364 | 224 | 2,397,873 | 110% | 91% | 128% | 0.152 | 12,652,697 | 42 |
| 2017 | 584,643 | 541,581 | 1,487,372 | 364 | 200 | 2,701,962 | 108% | 93% | 111% | 0.135 | 14,419,722 | 38 |
| Avg 2014-2016 | 540,985 | 533,637 | 1,372,911 | 390 | 195 | 2,768,356 | 112% | 99% | 120% | 0.142 | 14,115,333 | 38 |
| Avg 2015-2017 | 565,446 | 541,351 | 1,453,052 | 373 | 207 | 2,629,330 | 111% | 96% | 123% | 0.142 | 14,455,998 | 38 |
| Connecticut* | | | | | | | | | | | | |
| 2012 | 120,177 | 121,826 | 308,428 | 395 | 40 | 3,032,738 | 131% | 101% | 124% | 0.130 | 3,116,688 | 39 |
| 2013 | 97,955 | 121,612 | 271,480 | 448 | 33 | 3,648,317 | 139% | 124% | 130% | 0.123 | 2,885,413 | 42 |
| 2014 | 174,992 | 176,459 | 377,073 | 468 | 50 | 3,507,071 | 103% | 101% | 106% | 0.133 | 4,067,290 | 43 |
| 2015 | 181,980 | 179,351 | 411,055 | 436 | 64 | 2,816,838 | 108% | 99% | 113% | 0.155 | 4,282,544 | 42 |
| 2016 | 199,205 | 199,188 | 427,036 | 466 | 59 | 3,396,595 | 107% | 100% | 110% | 0.137 | 4,977,875 | 40 |
| 2017 | 191,244 | 158,917 | 457,866 | 347 | 64 | 2,469,681 | 120% | 83% | 127% | 0.141 | 4,780,069 | 33 |
| Avg 2014-2016 | 185,392 | 184,999 | 405,055 | 457 | 58 | 3,240,168 | 106% | 100% | 110% | 0.142 | 4,442,569 | 42 |
| Avg 2015-2017 | 190,810 | 179,152 | 431,986 | 417 | 62 | 2,894,371 | 111% | 94% | 117% | 0.144 | 4,680,163 | 38 |
| Rhode Island | | | | | | | | | | | | |
| 2012 | 61,246 | 48,870 | 119,666 | 408 | 20 | 2,504,009 | 93% | 80% | 82% | 0.163 | 1,288,325 | 38 |
| 2013 | 64,179 | 61,547 | 149,033 | 413 | 25 | 2,453,415 | 104% | 96% | 123% | 0.168 | 1,602,369 | 38 |
| 2014 | 73,766 | 74,537 | 193,613 | 385 | 24 | 3,161,426 | 107% | 101% | 59% | 0.122 | 1,781,643 | 42 |
| 2015 | 86,326 | 84,400 | 214,512 | 393 | 27 | 3,069,598 | 116% | 98% | 112% | 0.128 | 2,121,586 | 40 |
| 2016 | 88,468 | 73,867 | 213,865 | 345 | 27 | 2,722,154 | 107% | 83% | 105% | 0.127 | 2,027,270 | 36 |
| 2017 | 141,104 | 83,715 | 232,023 | 361 | 32 | 2,602,619 | 115% | 59% | 127% | 0.139 | 2,327,916 | 36 |
| Avg 2014-2016 | 82,853 | 77,601 | 207,330 | 375 | 26 | 2,984,393 | 110% | 94% | 92% | 0.126 | 1,976,833 | 39 |
| Avg 2015-2017 | 105,299 | 80,660 | 220,134 | 367 | 29 | 2,798,123 | 113% | 80% | 115% | 0.131 | 2,158,924 | 37 |

* CT 2017 budgets were not restated to reflect the impact of budget cuts, caused by the diversion of funds by the State of CT.

Program Data Summary

| Period | Budget (\$1000's) | Total Costs (\$1000's) | Achieved Annual Energy (MWh) | Dollars per MWh | Achieved Summer Peak (MW) | Dollars per MW | % Energy Achieved | % Budget Spent | % Peak Achieved | Peak to Energy Ratio Achieved (MW/GWh) | Achieved Lifetime Energy (MWh) | Lifetime Dollars Per MWh |
|----------------------|-------------------|------------------------|------------------------------|-----------------|---------------------------|----------------|-------------------|----------------|-----------------|--|--------------------------------|--------------------------|
| Maine | | | | | | | | | | | | |
| 2012 | 0 | 23,712 | 143,532 | 165 | 12 | 1,904,497 | 101% | 0% | 114% | 0.087 | 1,266,751 | 19 |
| 2013 | 0 | 24,279 | 141,978 | 171 | 15 | 1,603,990 | 0% | 0% | 0% | 0.107 | 2,043,036 | 12 |
| 2014 | 26,976 | 21,972 | 115,847 | 190 | 14 | 1,621,745 | 0% | 81% | 0% | 0.117 | 1,014,155 | 22 |
| 2015 | 41,991 | 45,493 | 166,500 | 273 | 21 | 2,124,405 | 0% | 108% | 0% | 0.129 | 1,499,177 | 30 |
| 2016 | 39,288 | 32,608 | 139,037 | 235 | 21 | 1,564,454 | 0% | 83% | 0% | 0.150 | 1,518,286 | 21 |
| 2017 | 48,614 | 31,435 | 92,185 | 341 | 20 | 1,590,962 | 0% | 65% | 0% | 0.214 | 1,119,512 | 28 |
| Avg 2014-2016 | 36,085 | 33,358 | 140,461 | 232 | 19 | 1,770,201 | 0% | 91% | 0% | 0.132 | 1,343,873 | 24 |
| Avg 2015-2017 | 43,297 | 36,512 | 132,574 | 283 | 21 | 1,759,940 | 0% | 85% | 0% | 0.164 | 1,378,992 | 27 |
| Vermont | | | | | | | | | | | | |
| 2012 | 35,678 | 35,130 | 117,653 | 299 | 16 | 2,172,427 | 119% | 98% | 109% | 0.137 | 1,320,789 | 27 |
| 2013 | 39,495 | 35,989 | 96,323 | 374 | 12 | 2,966,434 | 97% | 91% | 81% | 0.126 | 1,119,186 | 32 |
| 2014 | 44,690 | 45,795 | 96,557 | 474 | 11 | 4,121,184 | 113% | 102% | 74% | 0.115 | 1,141,386 | 40 |
| 2015 | 44,637 | 46,598 | 113,112 | 412 | 13 | 3,516,048 | 101% | 104% | 89% | 0.117 | 1,457,163 | 32 |
| 2016 | 45,189 | 46,346 | 140,592 | 330 | 15 | 3,002,514 | 123% | 103% | 104% | 0.110 | 1,484,990 | 31 |
| 2017 | 49,926 | 51,542 | 181,361 | 284 | 19 | 2,724,177 | 158% | 103% | 128% | 0.104 | 1,565,673 | 33 |
| Avg 2014-2016 | 44,839 | 46,246 | 116,754 | 405 | 13 | 3,546,582 | 112% | 103% | 89% | 0.114 | 1,361,180 | 34 |
| Avg 2015-2017 | 46,584 | 48,162 | 145,022 | 342 | 16 | 3,080,913 | 127% | 103% | 107% | 0.110 | 1,502,609 | 32 |
| New Hampshire | | | | | | | | | | | | |
| 2012 | 19,673 | 18,703 | 53,973 | 347 | 8 | 2,376,052 | 106% | 95% | 101% | 0.146 | 666,868 | 28 |
| 2013 | 26,442 | 25,552 | 58,833 | 434 | 8 | 3,207,104 | 111% | 97% | 107% | 0.135 | 764,368 | 33 |
| 2014 | 26,298 | 25,826 | 63,384 | 407 | 10 | 2,622,172 | 124% | 98% | 76% | 0.155 | 851,207 | 30 |
| 2015 | 23,894 | 25,877 | 73,499 | 352 | 12 | 2,240,227 | 129% | 108% | 119% | 0.157 | 1,002,926 | 26 |
| 2016 | 24,441 | 22,856 | 69,661 | 328 | 8 | 2,724,396 | 139% | 94% | 103% | 0.120 | 952,980 | 24 |
| 2017 | 26,704 | 26,915 | 81,525 | 330 | 12 | 2,281,136 | 132% | 101% | 158% | 0.145 | 1,020,279 | 26 |
| Avg 2014-2016 | 24,878 | 24,853 | 68,848 | 363 | 10 | 2,528,932 | 131% | 100% | 99% | 0.144 | 935,705 | 27 |
| Avg 2015-2017 | 25,013 | 25,216 | 74,895 | 337 | 11 | 2,415,253 | 133% | 101% | 127% | 0.141 | 992,062 | 25 |

FCM and RGGI Funds

| RGGI Dollars (\$1000's) Applied to EE Annually | | | | | | | |
|--|-------------|--------|--------|-----|--------|-----|-------|
| | New England | MA | CT | ME | RI | VT | NH |
| | 32,589 | 20,254 | 9,769 | - | - | - | 2,566 |
| FCM MW | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2022 | 2,975 | 1,609 | 681 | 165 | 280 | 120 | 121 |
| FCM Dollars (\$1000's, clearing price of \$4.63*) | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2022 | 149,549 | 89,439 | 37,862 | - | 15,544 | - | 6,704 |
| FCM Dollars for EE (\$1000's) | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2020 | 162,353 | 98,301 | 39,448 | - | 16,964 | - | 7,641 |
| 2021 | 149,549 | 89,439 | 37,862 | - | 15,544 | - | 6,704 |
| 2022 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |
| 2023 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |
| 2024 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |
| 2025 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |
| 2026 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |
| 2027 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |
| 2028 | 138,860 | 83,046 | 35,155 | - | 14,433 | - | 6,225 |

* Auction clearing price for Rest-of-Pool

Energy Forecast

2018 CELT Energy Forecast (GWh)

| | New England | MA | CT | ME | RI | VT | NH |
|------|-------------|--------|--------|--------|--------|-------|--------|
| 2020 | 144,633 | 67,891 | 34,489 | 13,042 | 9,422 | 7,040 | 12,749 |
| 2021 | 146,010 | 68,675 | 34,707 | 13,195 | 9,488 | 7,090 | 12,855 |
| 2022 | 147,537 | 69,527 | 34,956 | 13,380 | 9,563 | 7,140 | 12,971 |
| 2023 | 149,099 | 70,401 | 35,209 | 13,576 | 9,636 | 7,188 | 13,089 |
| 2024 | 150,485 | 71,196 | 35,419 | 13,749 | 9,702 | 7,230 | 13,189 |
| 2025 | 151,766 | 71,935 | 35,604 | 13,909 | 9,771 | 7,270 | 13,277 |
| 2026 | 153,071 | 72,685 | 35,794 | 14,067 | 9,846 | 7,311 | 13,368 |
| 2027 | 154,365 | 73,422 | 35,981 | 14,222 | 9,926 | 7,353 | 13,461 |
| 2028 | 155,659 | 74,159 | 36,168 | 14,377 | 10,006 | 7,395 | 13,554 |

2018 CELT Energy Forecast - FCM Passive Demand Resources (GWh)

| | New England | MA | CT | ME | RI | VT | NH |
|------|-------------|--------|--------|--------|-------|-------|--------|
| 2020 | 123,301 | 55,886 | 30,518 | 11,513 | 7,479 | 6,000 | 11,905 |
| 2021 | 122,184 | 55,153 | 30,349 | 11,525 | 7,302 | 5,939 | 11,916 |
| 2022 | 123,711 | 56,005 | 30,598 | 11,710 | 7,377 | 5,989 | 12,032 |
| 2023 | 125,273 | 56,879 | 30,851 | 11,906 | 7,450 | 6,037 | 12,150 |
| 2024 | 126,659 | 57,674 | 31,061 | 12,079 | 7,516 | 6,079 | 12,250 |
| 2025 | 127,940 | 58,413 | 31,246 | 12,239 | 7,585 | 6,119 | 12,338 |
| 2026 | 129,245 | 59,163 | 31,436 | 12,397 | 7,660 | 6,160 | 12,429 |
| 2027 | 130,539 | 59,900 | 31,623 | 12,552 | 7,740 | 6,202 | 12,522 |
| 2028 | 131,833 | 60,637 | 31,810 | 12,707 | 7,820 | 6,244 | 12,615 |

Energy Forecast

| SBC Eligible | | | | | | | |
|---|-------------|--------|--------|--------|--------|--------|--------|
| | | MA | CT | ME | RI | VT | NH |
| | | 85.9% | 94.7% | 98.7% | 100.0% | 100.0% | 100.0% |
| SBC Eligible 2018 Energy Forecast - FCM Passive Demand Resources (GWh) | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2020 | 113,654 | 48,006 | 28,901 | 11,363 | 7,479 | 6,000 | 11,905 |
| 2021 | 112,649 | 47,376 | 28,741 | 11,375 | 7,302 | 5,939 | 11,916 |
| 2022 | 114,040 | 48,108 | 28,976 | 11,558 | 7,377 | 5,989 | 12,032 |
| 2023 | 115,463 | 48,859 | 29,216 | 11,751 | 7,450 | 6,037 | 12,150 |
| 2024 | 116,724 | 49,542 | 29,415 | 11,922 | 7,516 | 6,079 | 12,250 |
| 2025 | 117,889 | 50,177 | 29,590 | 12,080 | 7,585 | 6,119 | 12,338 |
| 2026 | 119,076 | 50,821 | 29,770 | 12,236 | 7,660 | 6,160 | 12,429 |
| 2027 | 120,254 | 51,454 | 29,947 | 12,389 | 7,740 | 6,202 | 12,522 |
| 2028 | 121,432 | 52,087 | 30,124 | 12,542 | 7,820 | 6,244 | 12,615 |

Energy Sales and System Benefit Charge

| Sales (GWh) | | | | | | | | |
|------------------------|-------------|---------|--------|--------|---------|-------|---------|--|
| | New England | MA | CT | ME | RI | VT | NH | |
| 2020 | 107,221 | 45,289 | 27,265 | 10,720 | 7,056 | 5,660 | 11,231 | |
| 2021 | 106,273 | 44,695 | 27,114 | 10,731 | 6,889 | 5,603 | 11,242 | |
| 2022 | 107,585 | 45,385 | 27,336 | 10,904 | 6,959 | 5,650 | 11,351 | |
| 2023 | 108,928 | 46,093 | 27,562 | 11,086 | 7,028 | 5,695 | 11,462 | |
| 2024 | 110,117 | 46,738 | 27,750 | 11,247 | 7,091 | 5,735 | 11,557 | |
| 2025 | 111,216 | 47,337 | 27,915 | 11,396 | 7,156 | 5,773 | 11,640 | |
| 2026 | 112,336 | 47,944 | 28,085 | 11,543 | 7,226 | 5,811 | 11,725 | |
| 2027 | 113,447 | 48,542 | 28,252 | 11,688 | 7,302 | 5,851 | 11,813 | |
| 2028 | 114,559 | 49,139 | 28,419 | 11,832 | 7,377 | 5,891 | 11,901 | |
| SBC Rate (\$/kWh) | | | | | | | | |
| | | MA | CT | ME | RI | VT | NH | |
| | | 0.00250 | | - | 0.01000 | - | 0.00373 | |
| SBC Dollars (\$1000's) | | | | | | | | |
| | New England | MA | CT* | ME | RI | VT | NH | |
| 2020 | 239,294 | 113,222 | - | - | 84,180 | - | 41,892 | |
| 2021 | 239,069 | 111,737 | - | - | 85,401 | - | 41,931 | |
| 2022 | 244,681 | 113,463 | - | - | 88,879 | - | 42,339 | |
| 2023 | 248,993 | 115,234 | - | - | 91,005 | - | 42,754 | |
| 2024 | 252,794 | 116,844 | - | - | 92,843 | - | 43,106 | |
| 2025 | 256,256 | 118,341 | - | - | 94,499 | - | 43,416 | |
| 2026 | 259,615 | 119,861 | - | - | 96,019 | - | 43,736 | |
| 2027 | 262,833 | 121,354 | - | - | 97,416 | - | 44,063 | |
| 2028 | 265,907 | 122,847 | - | - | 98,669 | - | 44,391 | |

* CT SBC funding is discontinued beginning in 2020

Impacts of New EE on Revenue Streams

| Lost SBC Dollars (\$1000's) | | | | | | | |
|-----------------------------|-------------|--------|--------|----|-------|----|-------|
| | New England | MA | CT | ME | RI | VT | NH |
| 2023 | 10,865 | 6,354 | - | - | 3,745 | - | 765 |
| 2024 | 15,113 | 8,832 | - | - | 5,215 | - | 1,066 |
| 2025 | 18,616 | 10,872 | - | - | 6,430 | - | 1,315 |
| 2026 | 21,441 | 12,514 | - | - | 7,412 | - | 1,515 |
| 2027 | 23,670 | 13,807 | - | - | 8,190 | - | 1,674 |
| 2028 | 25,392 | 14,803 | - | - | 8,792 | - | 1,797 |
| New FCM Dollars (\$1000's) | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2023 | 27,438 | 18,652 | 4,760 | - | 2,536 | - | 1,490 |
| 2024 | 38,143 | 25,926 | 6,609 | - | 3,531 | - | 2,076 |
| 2025 | 46,956 | 31,914 | 8,128 | - | 4,354 | - | 2,560 |
| 2026 | 54,052 | 36,733 | 9,349 | - | 5,019 | - | 2,951 |
| 2027 | 59,642 | 40,529 | 10,308 | - | 5,546 | - | 3,260 |
| 2028 | 63,953 | 43,454 | 11,045 | - | 5,954 | - | 3,500 |

Policy Dollars and Total Budgets

| Policy Dollars (\$1000's)* | | | | | | | | |
|---------------------------------|-------------|---------|---------|--------|---------|--------|--------|--|
| | New England | MA | CT | ME | RI | VT | NH | |
| 2020 | 741,797 | 487,372 | 154,186 | 46,010 | - | 54,229 | - | |
| 2021 | 740,532 | 486,361 | 152,943 | 46,071 | - | 55,156 | - | |
| 2022 | 739,427 | 484,424 | 152,943 | 46,212 | - | 55,847 | - | |
| 2023 | 732,713 | 476,959 | 152,943 | 46,212 | - | 56,598 | - | |
| 2024 | 727,177 | 470,552 | 152,943 | 46,212 | - | 57,470 | - | |
| 2025 | 724,109 | 465,107 | 152,943 | 46,212 | - | 59,847 | - | |
| 2026 | 720,204 | 460,410 | 152,943 | 46,212 | - | 60,639 | - | |
| 2027 | 716,454 | 456,414 | 152,943 | 46,212 | - | 60,885 | - | |
| 2028 | 715,484 | 452,992 | 152,943 | 46,212 | - | 63,336 | - | |
| Total Budget Dollars (\$1000's) | | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH | |
| 2020 | 1,176,033 | 719,149 | 203,403 | 46,010 | 101,143 | 54,229 | 52,099 | |
| 2021 | 1,161,738 | 707,791 | 200,574 | 46,071 | 100,945 | 55,156 | 51,201 | |
| 2022 | 1,164,459 | 707,791 | 200,426 | 46,212 | 102,664 | 55,847 | 51,518 | |
| 2023 | 1,169,728 | 707,791 | 202,627 | 46,212 | 104,229 | 56,598 | 52,270 | |
| 2024 | 1,174,449 | 707,791 | 204,477 | 46,212 | 105,593 | 57,470 | 52,907 | |
| 2025 | 1,180,153 | 707,791 | 205,996 | 46,212 | 106,856 | 59,847 | 53,452 | |
| 2026 | 1,183,879 | 707,791 | 207,216 | 46,212 | 108,059 | 60,639 | 53,963 | |
| 2027 | 1,186,708 | 707,791 | 208,175 | 46,212 | 109,205 | 60,885 | 54,440 | |
| 2028 | 1,191,399 | 707,791 | 208,913 | 46,212 | 110,264 | 63,336 | 54,884 | |

* Policy dollars are funds not from SBC, RGGI, or FCM revenues. Policy dollars are present in states that set the SBC rate based on budget alone (VT and ME) and states that have a surcharge to cover the balance of the total budget (MA and CT). MA is adjusted to reflect a lower portion of budget coming from SBC due to higher FCM revenue.

Production Costs and Peak-to-Energy Ratio

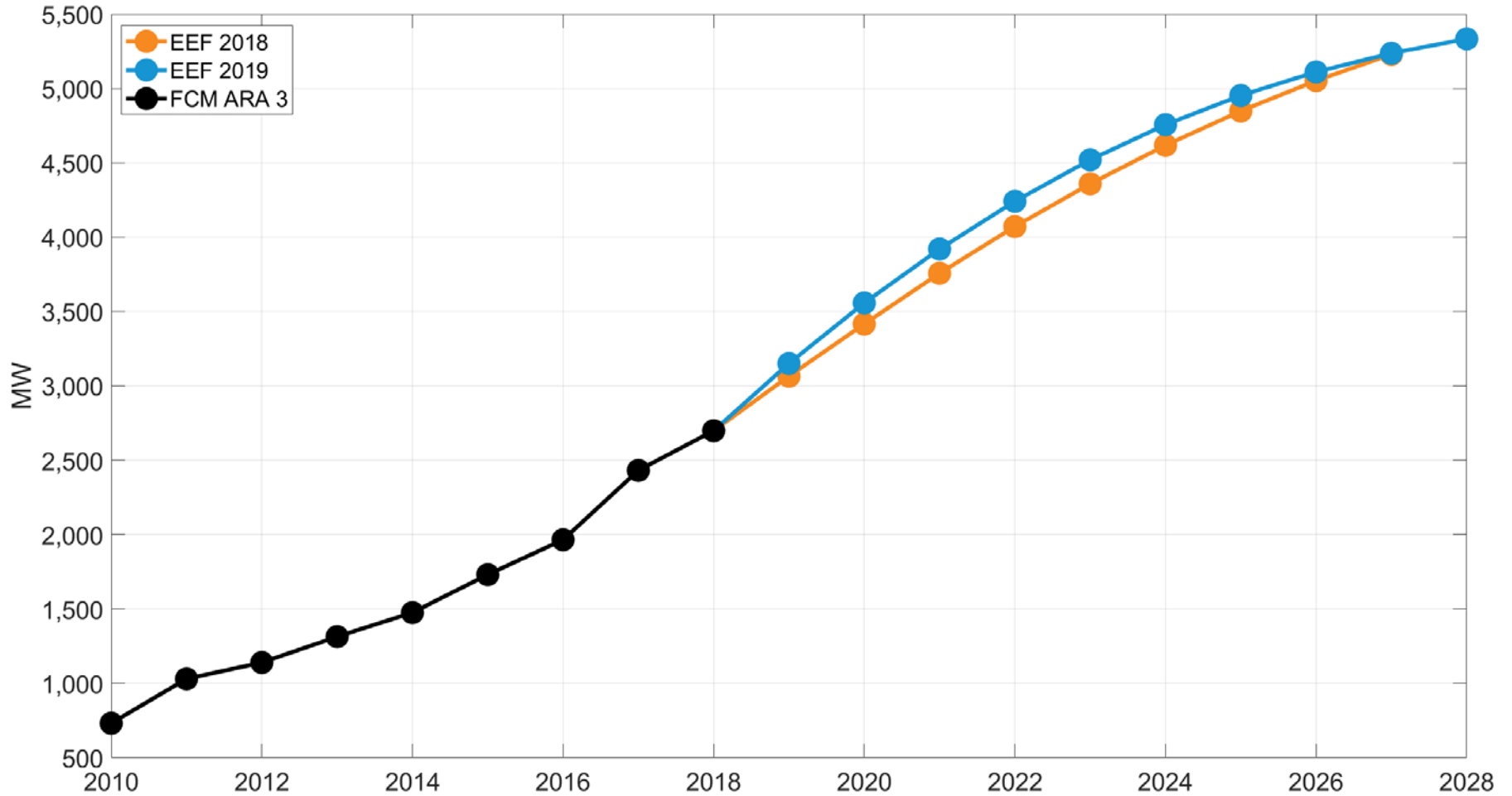
| Production Cost Multiplier (includes inflation) | | | | | | | |
|--|--------|--------|--------|--------|--------|--------|--|
| | MA | CT | ME | RI | VT | NH | |
| 2018 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | |
| 2019 | 1.0525 | 1.0525 | 1.0525 | 1.0525 | 1.0525 | 1.0525 | |
| 2020 | 1.0800 | 1.0800 | 1.0800 | 1.0800 | 1.0800 | 1.0800 | |
| 2021 | 1.1075 | 1.1075 | 1.1075 | 1.1075 | 1.1075 | 1.1075 | |
| 2022 | 1.1350 | 1.1350 | 1.1350 | 1.1350 | 1.1350 | 1.1350 | |
| 2023 | 1.1625 | 1.1625 | 1.1625 | 1.1625 | 1.1625 | 1.1625 | |
| 2024 | 1.1900 | 1.1900 | 1.1900 | 1.1900 | 1.1900 | 1.1900 | |
| 2025 | 1.2175 | 1.2175 | 1.2175 | 1.2175 | 1.2175 | 1.2175 | |
| 2026 | 1.2450 | 1.2450 | 1.2450 | 1.2450 | 1.2450 | 1.2450 | |
| 2027 | 1.2725 | 1.2725 | 1.2725 | 1.2725 | 1.2725 | 1.2725 | |
| 2028 | 1.3000 | 1.3000 | 1.3000 | 1.3000 | 1.3000 | 1.3000 | |
| Production Cost (\$/MWh) | | | | | | | |
| | MA | CT | ME | RI | VT | NH | |
| 2018 | 382 | 427 | 290 | 376 | 350 | 345 | |
| 2019 | 402 | 449 | 305 | 395 | 369 | 363 | |
| 2020 | 434 | 485 | 330 | 427 | 398 | 392 | |
| 2021 | 481 | 538 | 365 | 473 | 441 | 435 | |
| 2022 | 546 | 610 | 414 | 537 | 501 | 493 | |
| 2023 | 635 | 709 | 482 | 624 | 582 | 573 | |
| 2024 | 756 | 844 | 573 | 743 | 693 | 682 | |
| 2025 | 920 | 1,028 | 698 | 904 | 843 | 831 | |
| 2026 | 1,145 | 1,279 | 869 | 1,126 | 1,050 | 1,034 | |
| 2027 | 1,457 | 1,628 | 1,106 | 1,432 | 1,336 | 1,316 | |
| 2028 | 1,894 | 2,117 | 1,437 | 1,862 | 1,737 | 1,711 | |
| Peak-to-Energy Ratio (MW/GWh) | | | | | | | |
| | MA | CT | ME | RI | VT | NH | |
| | 0.142 | 0.144 | 0.164 | 0.131 | 0.110 | 0.141 | |

DRAFT FORECAST

New England

New England

Energy Efficiency on Summer Peak

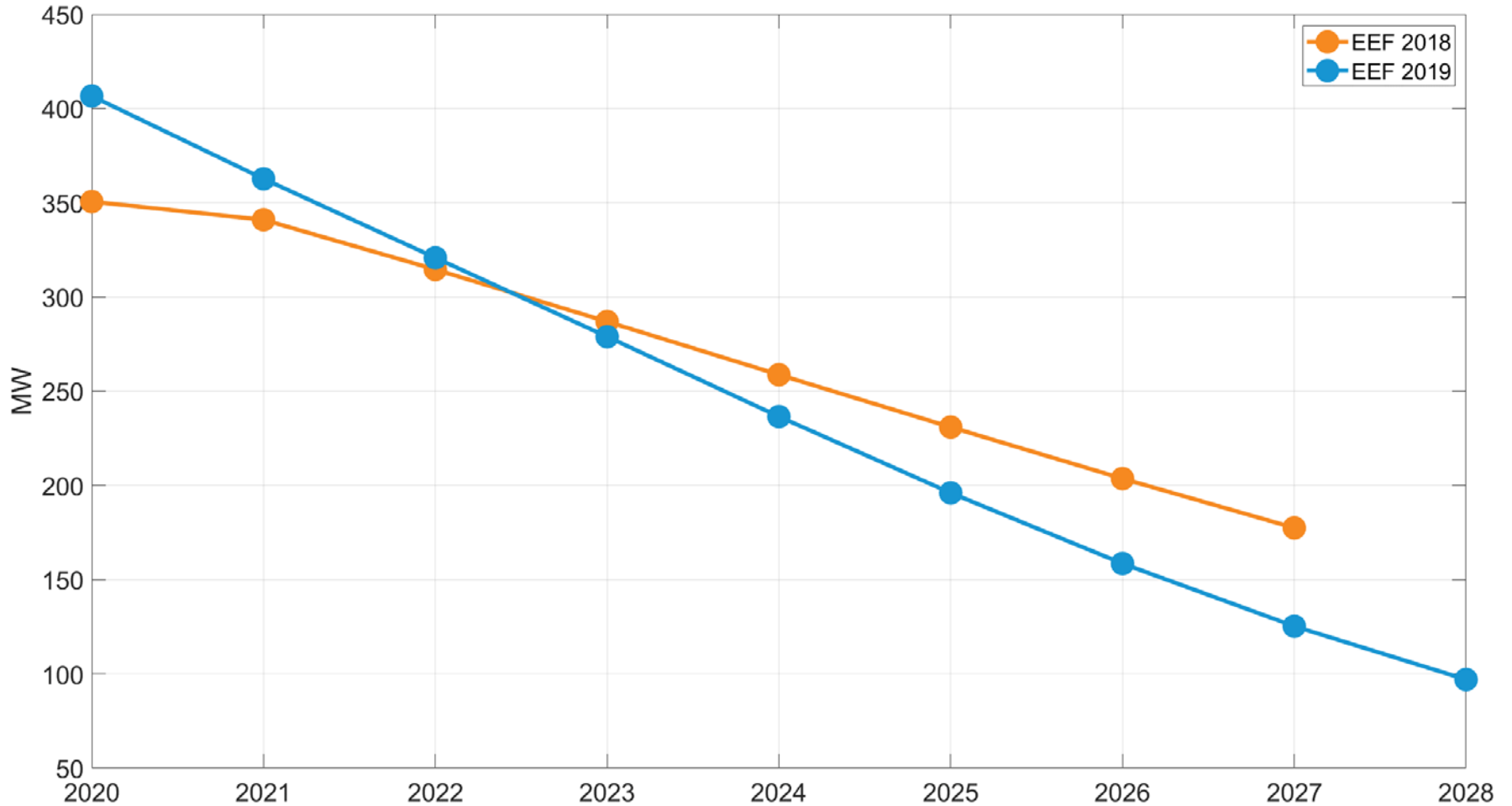


Energy and Summer Peak EE Forecast

| Energy Savings (GWh) | | | | | | | | |
|----------------------|-------------|-------|-------|-----|-------|-----|-----|--|
| | New England | MA | CT | ME | RI | VT | NH | |
| 2020 | 2,883 | 1,755 | 444 | 148 | 251 | 144 | 141 | |
| 2021 | 2,572 | 1,559 | 395 | 134 | 226 | 133 | 125 | |
| 2022 | 2,276 | 1,378 | 348 | 118 | 203 | 118 | 111 | |
| 2023 | 1,979 | 1,197 | 303 | 102 | 177 | 103 | 97 | |
| 2024 | 1,678 | 1,015 | 257 | 85 | 151 | 88 | 82 | |
| 2025 | 1,391 | 840 | 212 | 70 | 125 | 75 | 68 | |
| 2026 | 1,125 | 679 | 172 | 56 | 102 | 61 | 55 | |
| 2027 | 889 | 537 | 136 | 44 | 81 | 48 | 44 | |
| 2028 | 689 | 415 | 105 | 34 | 63 | 39 | 34 | |
| Total 2020-2028 | 15,483 | 9,375 | 2,372 | 792 | 1,378 | 809 | 757 | |
| Average | 1,720 | 1,042 | 264 | 88 | 153 | 90 | 84 | |
| Demand Savings (MW) | | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH | |
| 2020 | 407 | 250 | 64 | 24 | 33 | 16 | 20 | |
| 2021 | 363 | 222 | 57 | 22 | 30 | 15 | 18 | |
| 2022 | 321 | 196 | 50 | 19 | 27 | 13 | 16 | |
| 2023 | 279 | 170 | 44 | 17 | 23 | 11 | 14 | |
| 2024 | 237 | 144 | 37 | 14 | 20 | 10 | 12 | |
| 2025 | 196 | 119 | 31 | 12 | 16 | 8 | 10 | |
| 2026 | 159 | 97 | 25 | 9 | 13 | 7 | 8 | |
| 2027 | 125 | 76 | 20 | 7 | 11 | 5 | 6 | |
| 2028 | 97 | 59 | 15 | 6 | 8 | 4 | 5 | |
| Total 2020-2028 | 2,182 | 1,333 | 342 | 130 | 181 | 89 | 107 | |
| Average | 242 | 148 | 38 | 14 | 20 | 10 | 12 | |

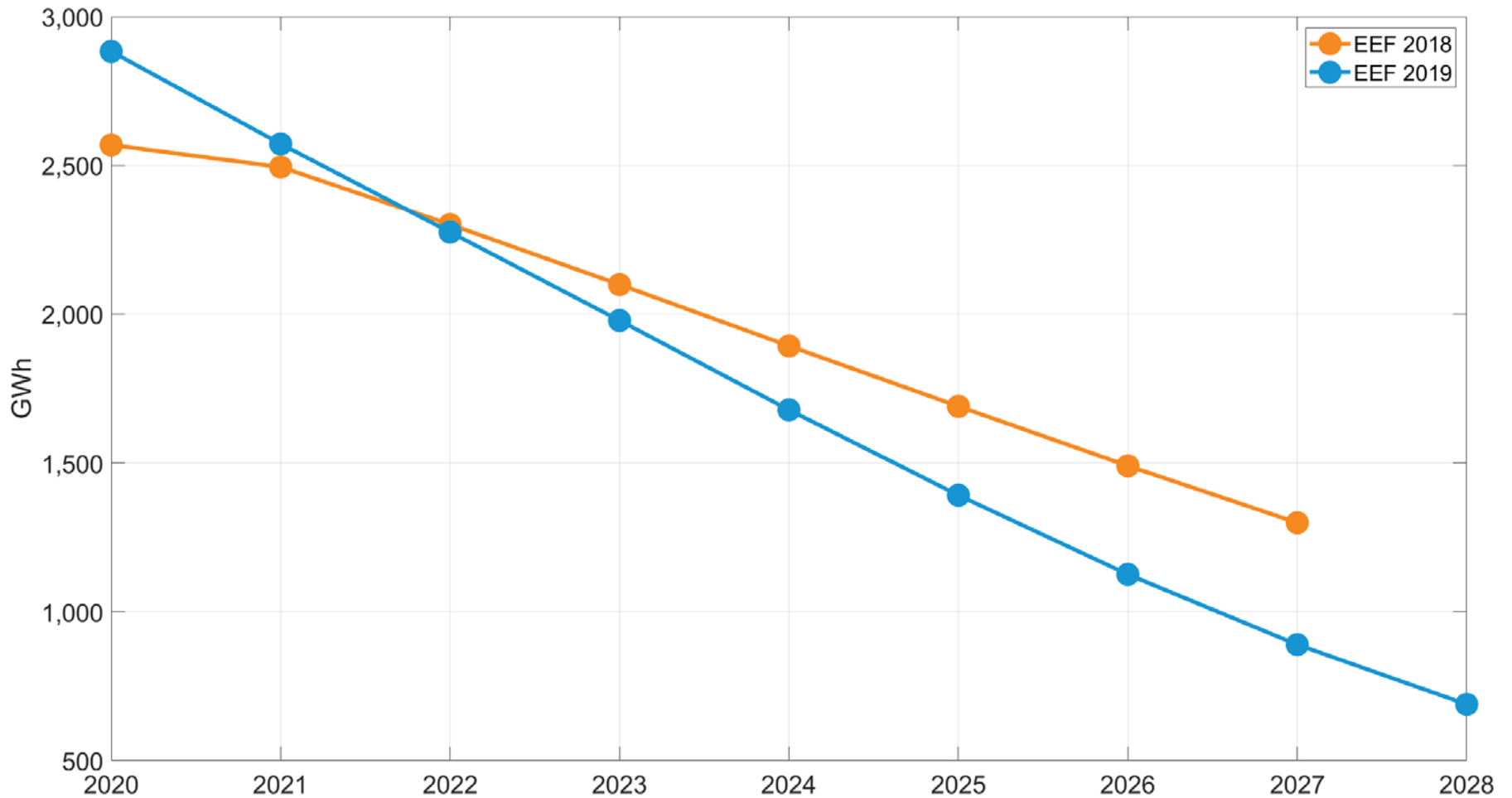
New England

Energy Efficiency on Summer Peak



New England

Energy Efficiency on Annual Energy



EE Forecast Comparison

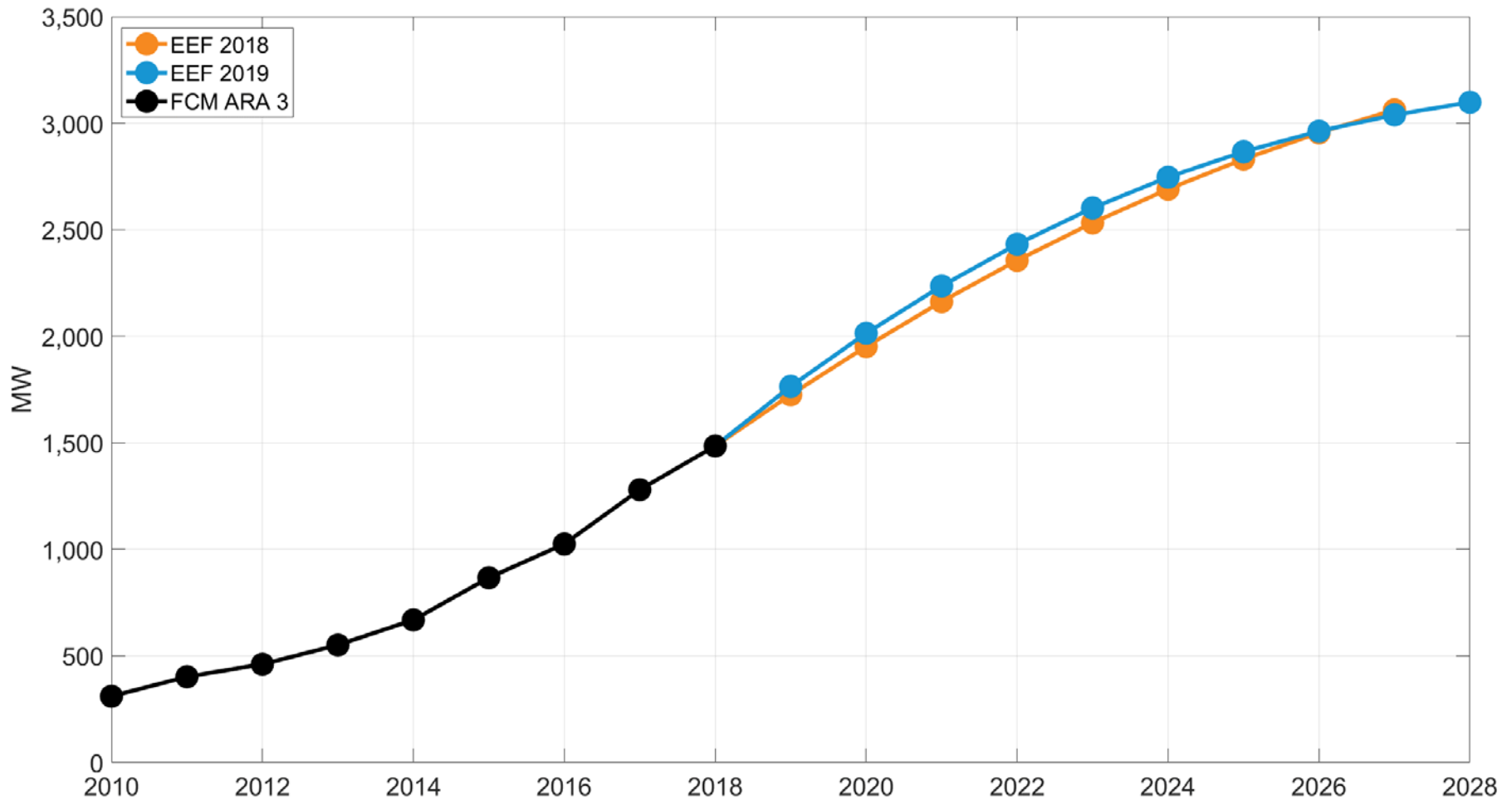
| PA Average Production Cost (\$/MWh) | | | | | | | |
|---|-------------|-----------|-----------|---------|---------|---------|---------|
| | | MA | CT | ME | RI | VT | NH |
| 2018 EE Forecast | | 392 | 457 | 232 | 375 | 411 | 363 |
| 2019 EE Forecast | | 373 | 417 | 283 | 367 | 342 | 337 |
| PA Average Peak-to-Energy Ratio (MW/GWh) | | | | | | | |
| | | MA | CT | ME | RI | VT | NH |
| 2018 EE Forecast | | 0.139 | 0.142 | 0.132 | 0.126 | 0.114 | 0.144 |
| 2019 EE Forecast | | 0.142 | 0.144 | 0.164 | 0.131 | 0.110 | 0.141 |
| Total EE Dollars (1000s) | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2018 EE Forecast | | | | | | | |
| Total 2019-2027 | 10,519,771 | 6,440,682 | 1,832,627 | 355,446 | 991,660 | 514,582 | 384,774 |
| Average | 1,168,863 | 715,631 | 203,625 | 39,494 | 110,184 | 57,176 | 42,753 |
| 2019 EE Forecast | | | | | | | |
| Total 2020-2028 | 10,588,546 | 6,381,474 | 1,841,808 | 415,565 | 948,958 | 524,007 | 476,734 |
| Average | 1,176,505 | 709,053 | 204,645 | 46,174 | 105,440 | 58,223 | 52,970 |
| Summer Peak Impacts (MW) | | | | | | | |
| | New England | MA | CT | ME | RI | VT | NH |
| 2018 EE Forecast | | | | | | | |
| Total 2019-2027 | 2,531 | 1,577 | 382 | 139 | 229 | 98 | 105 |
| Average | 281 | 175 | 42 | 15 | 25 | 11 | 12 |
| 2019 EE Forecast | | | | | | | |
| Total 2020-2028 | 2,182 | 1,333 | 342 | 130 | 181 | 89 | 107 |
| Average | 242 | 148 | 38 | 14 | 20 | 10 | 12 |

DRAFT FORECAST

States

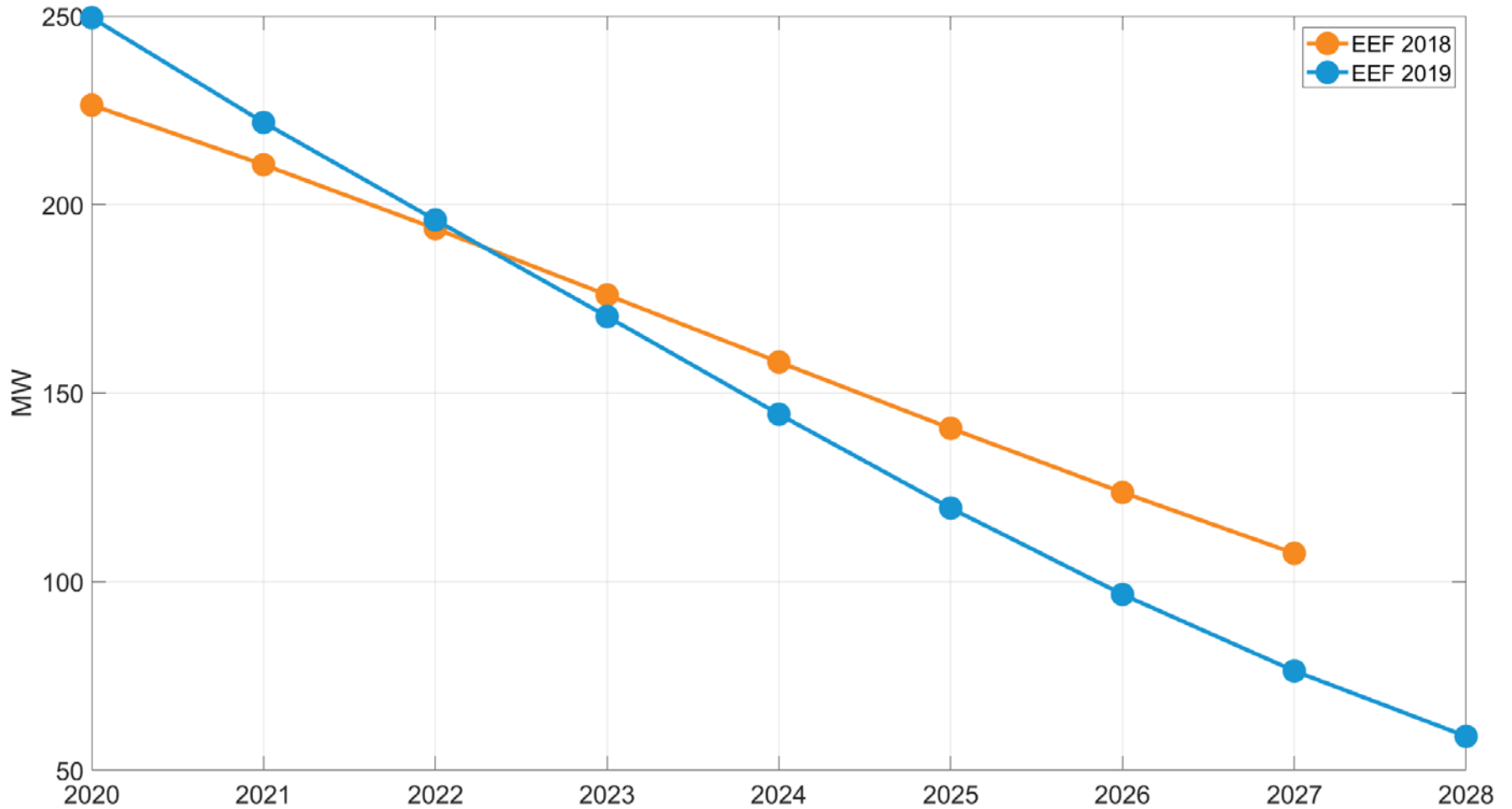
Massachusetts

Energy Efficiency on Summer Peak



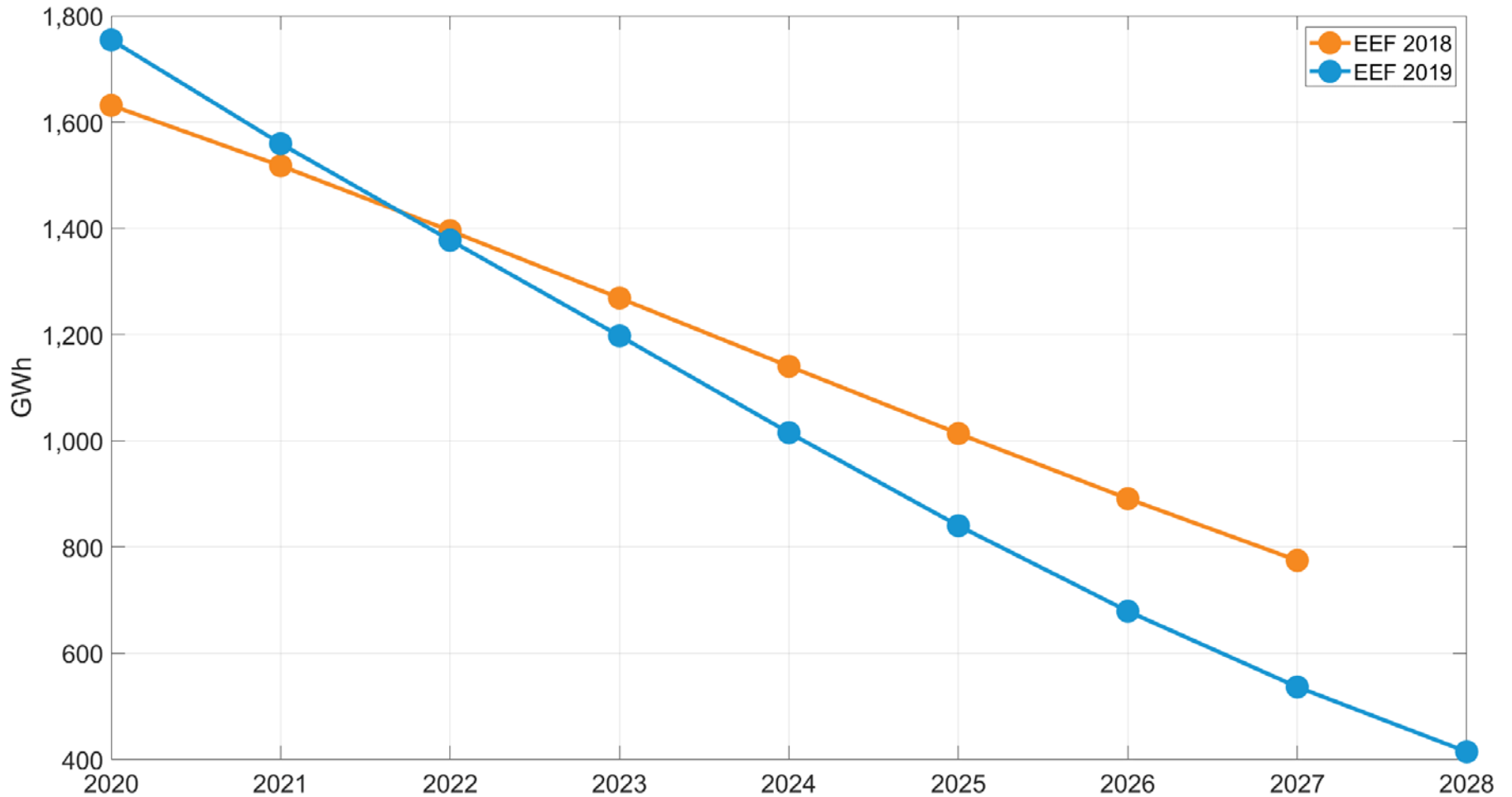
Massachusetts

Energy Efficiency on Summer Peak



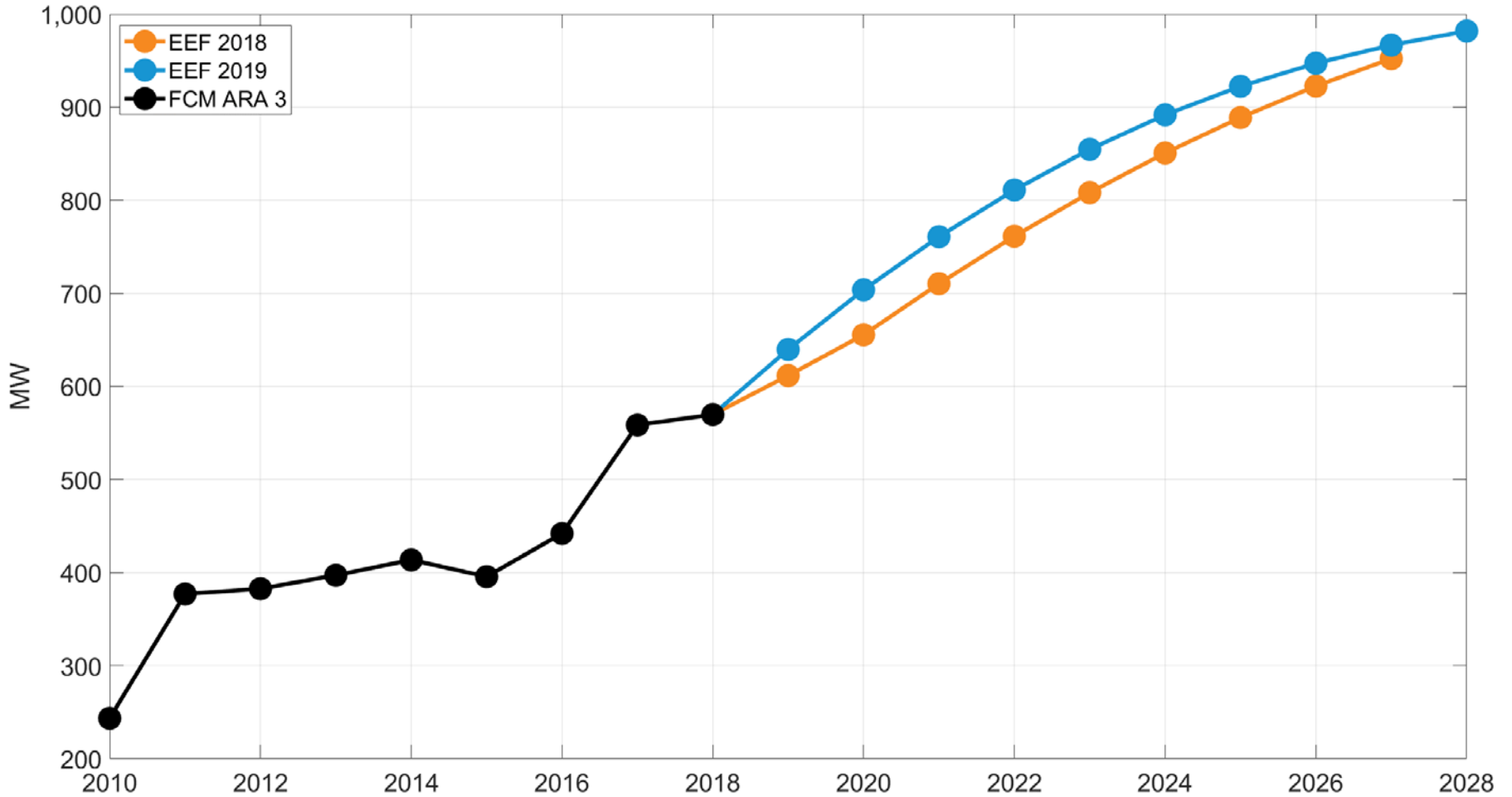
Massachusetts

Energy Efficiency on Annual Energy



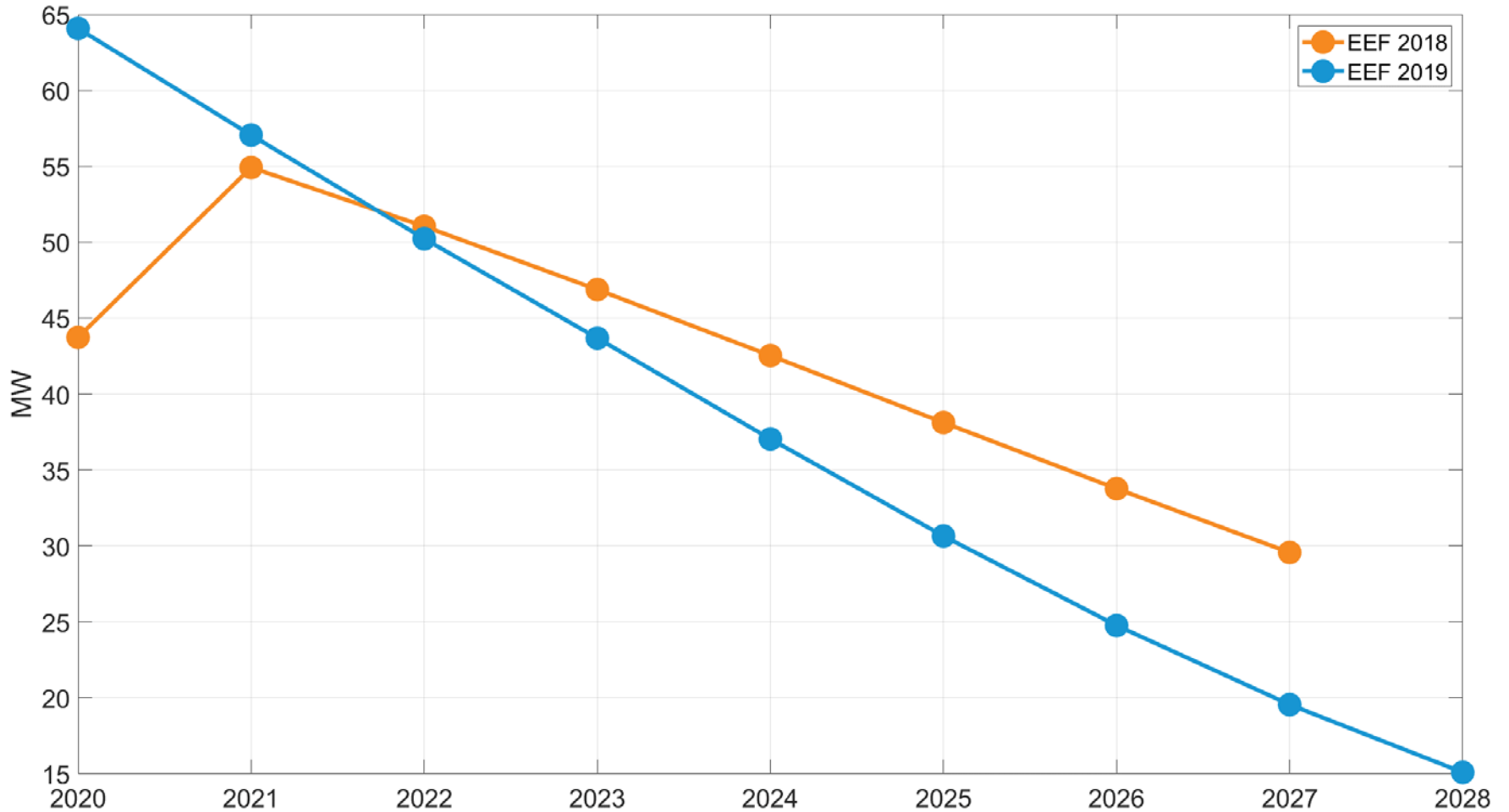
Connecticut

Energy Efficiency on Summer Peak



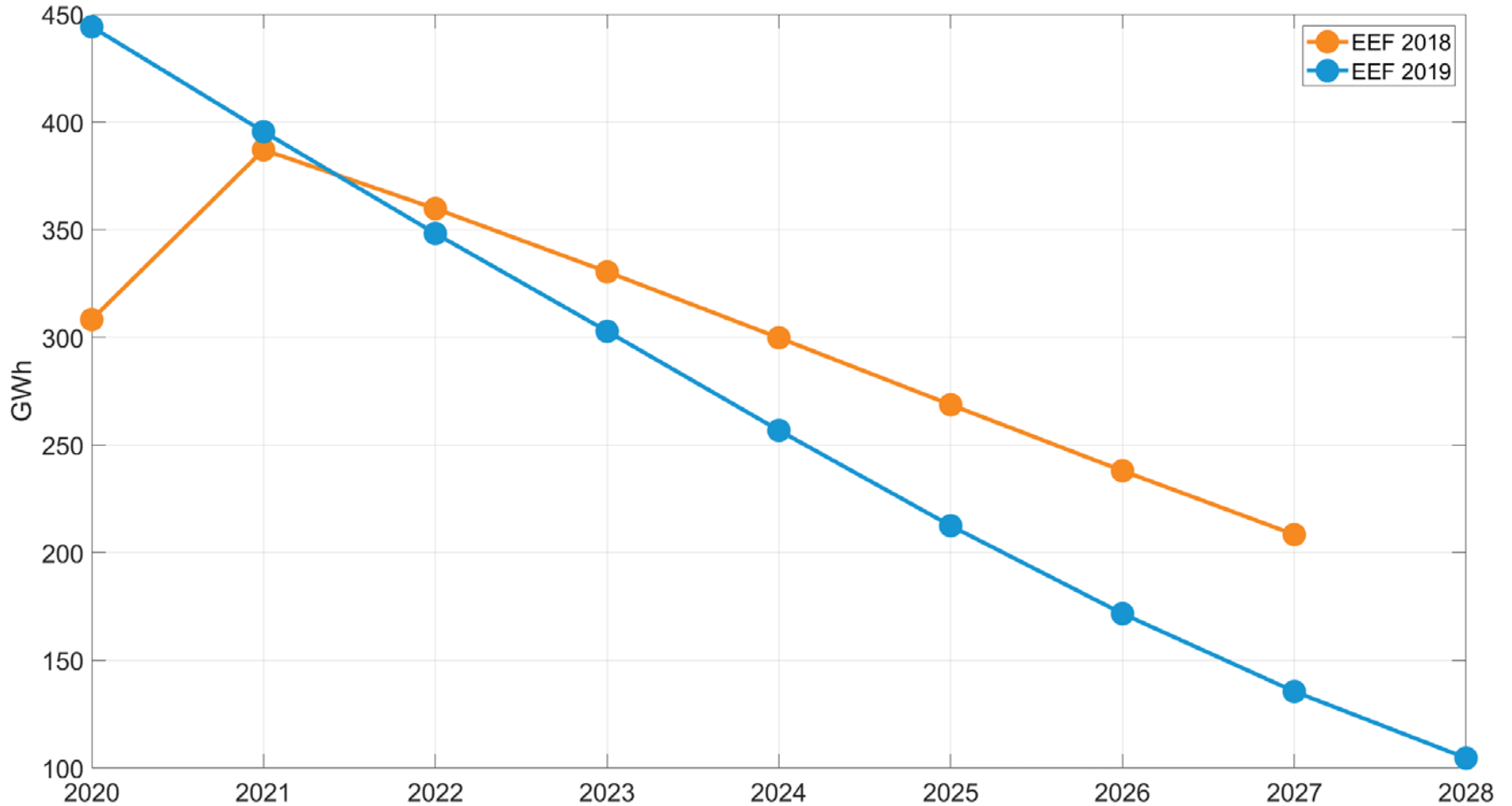
Connecticut

Energy Efficiency on Summer Peak



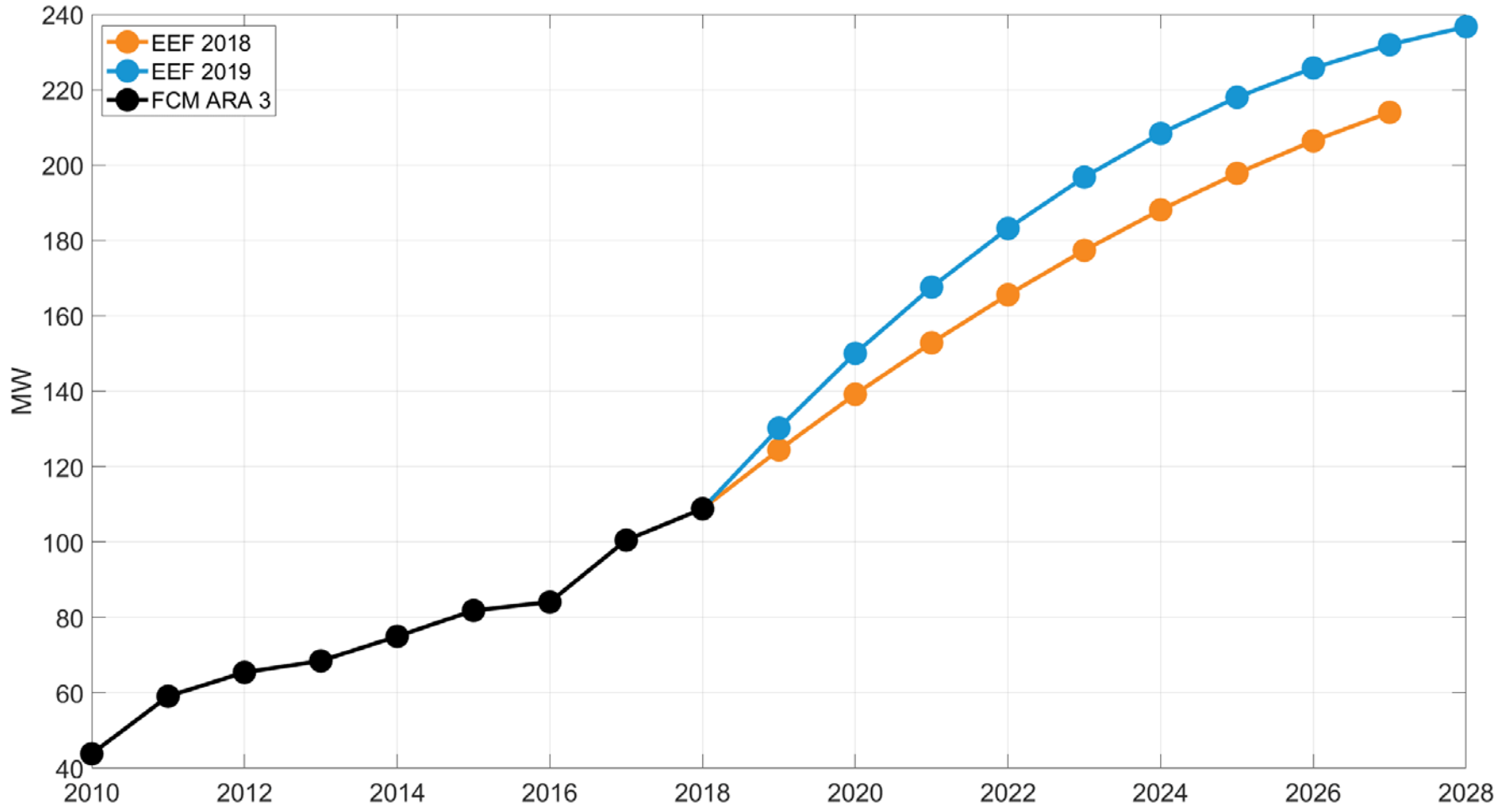
Connecticut

Energy Efficiency on Annual Energy



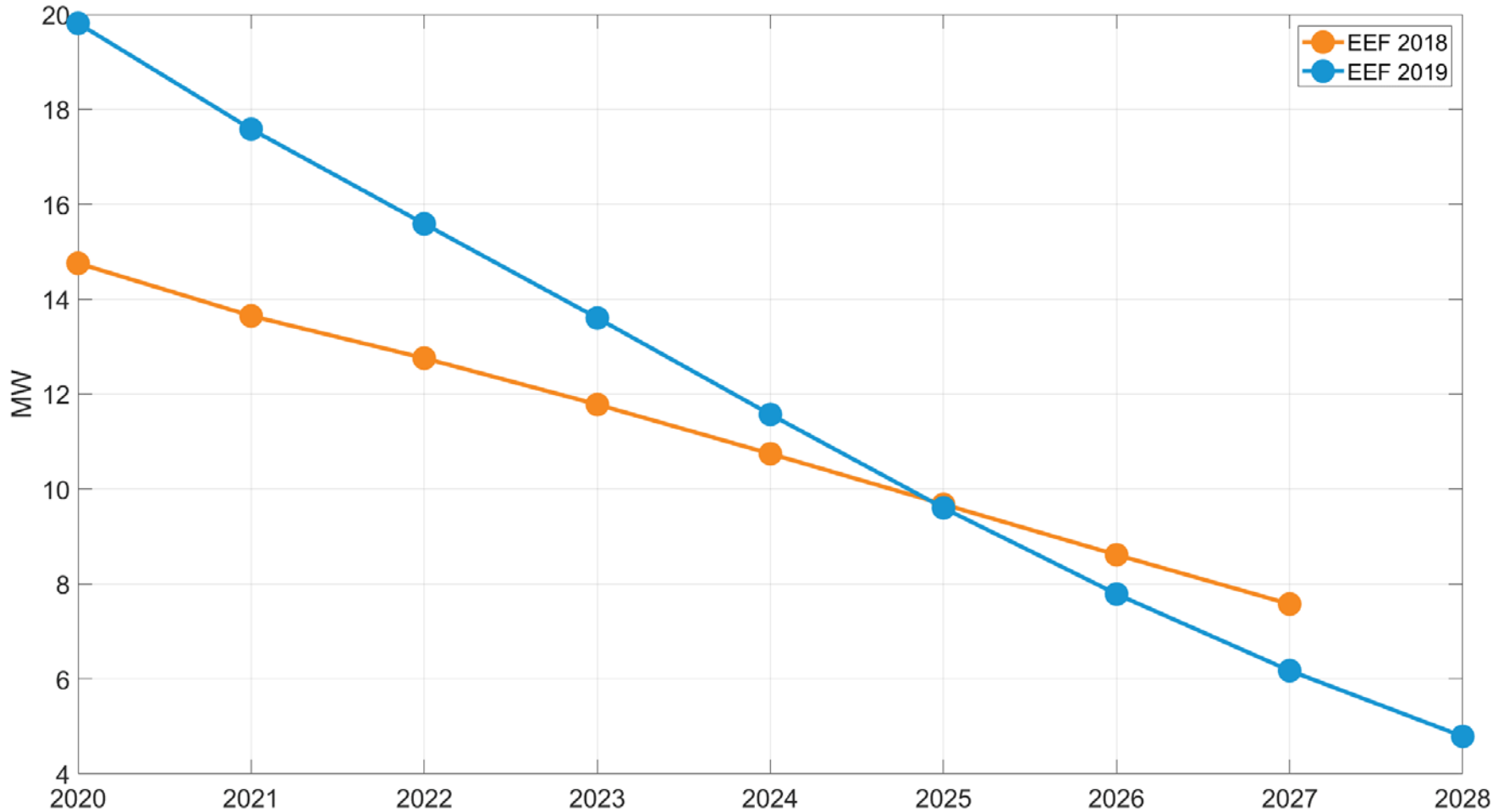
New Hampshire

Energy Efficiency on Summer Peak



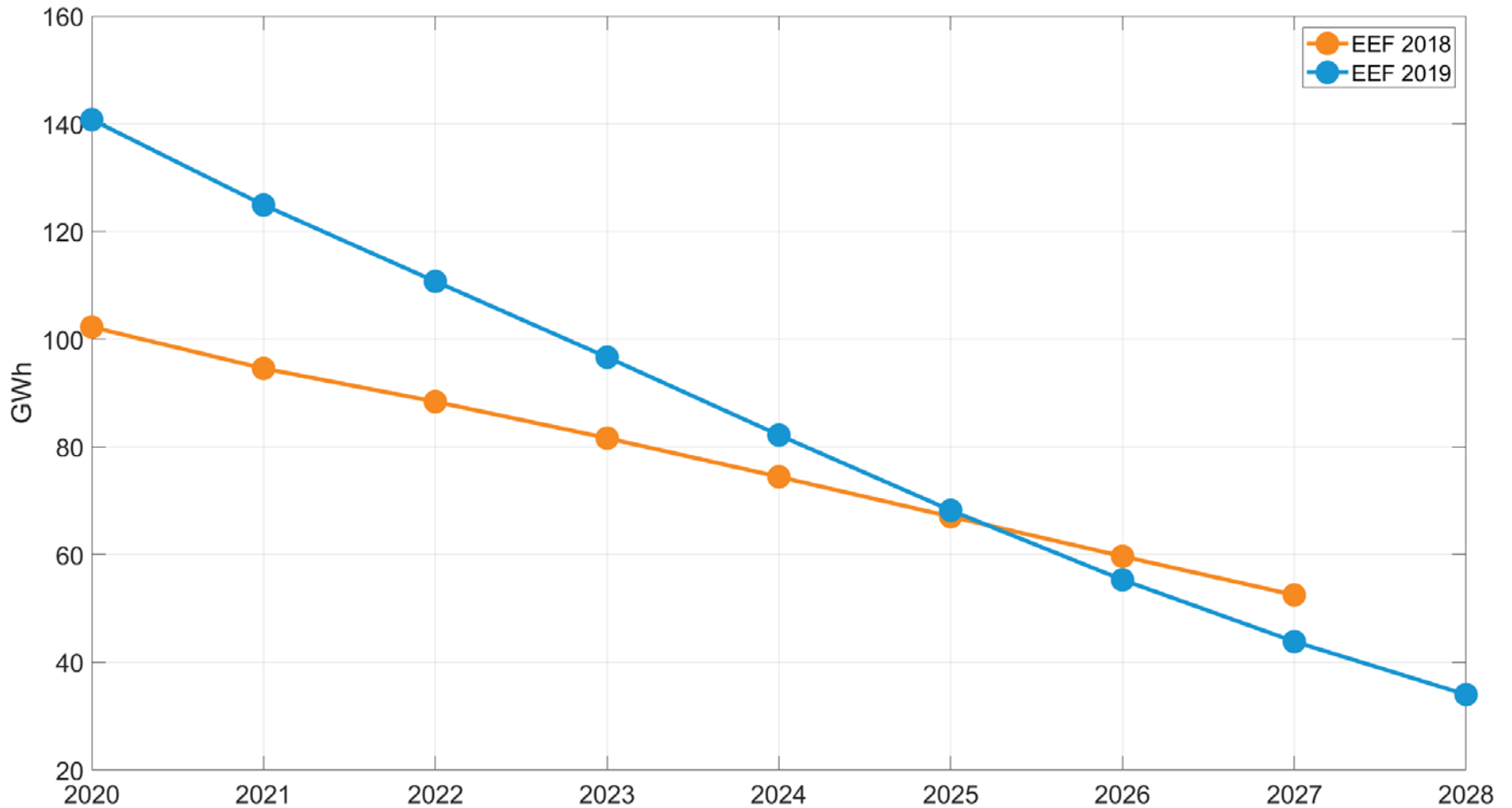
New Hampshire

Energy Efficiency on Summer Peak



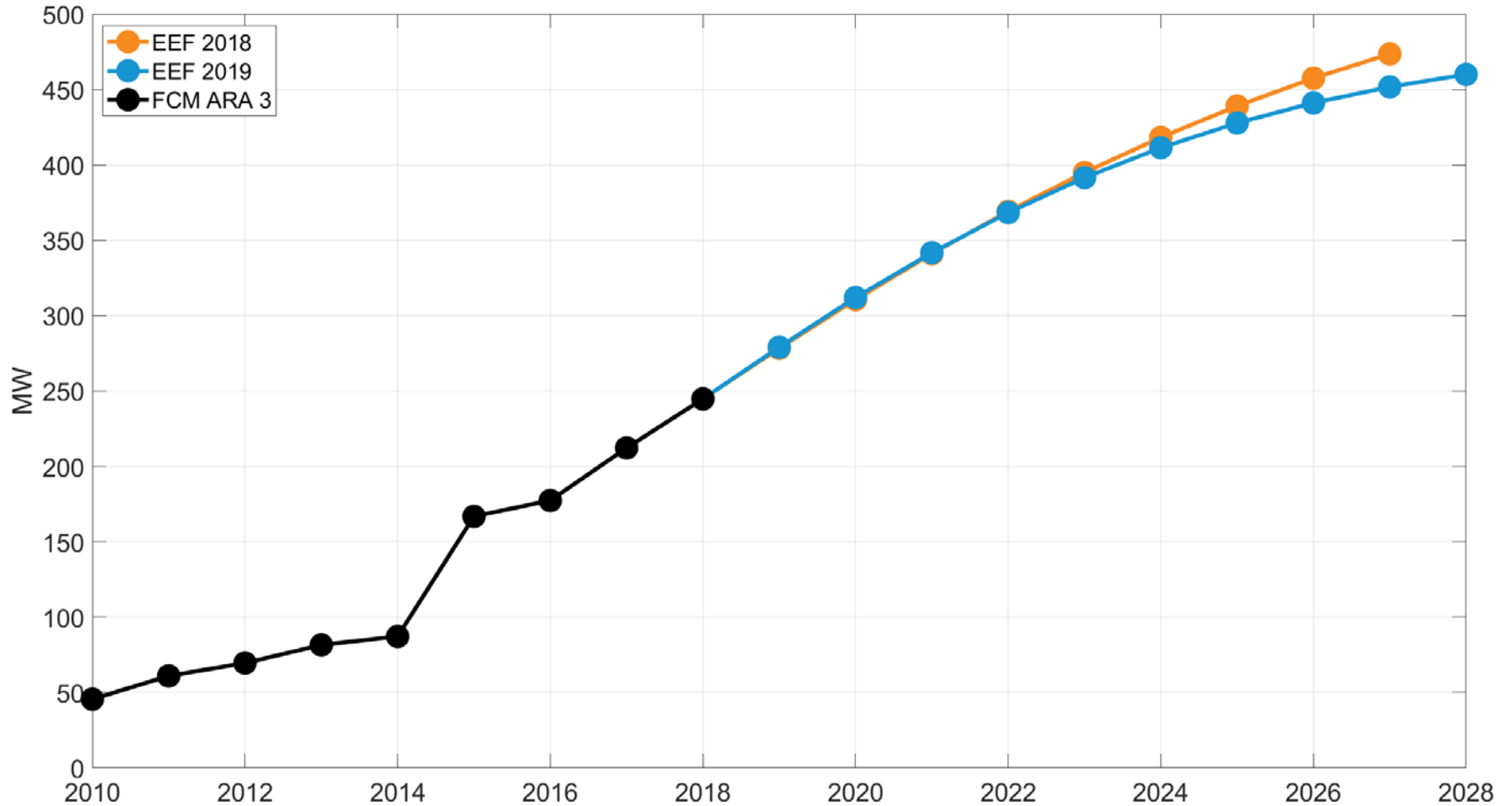
New Hampshire

Energy Efficiency on Annual Energy



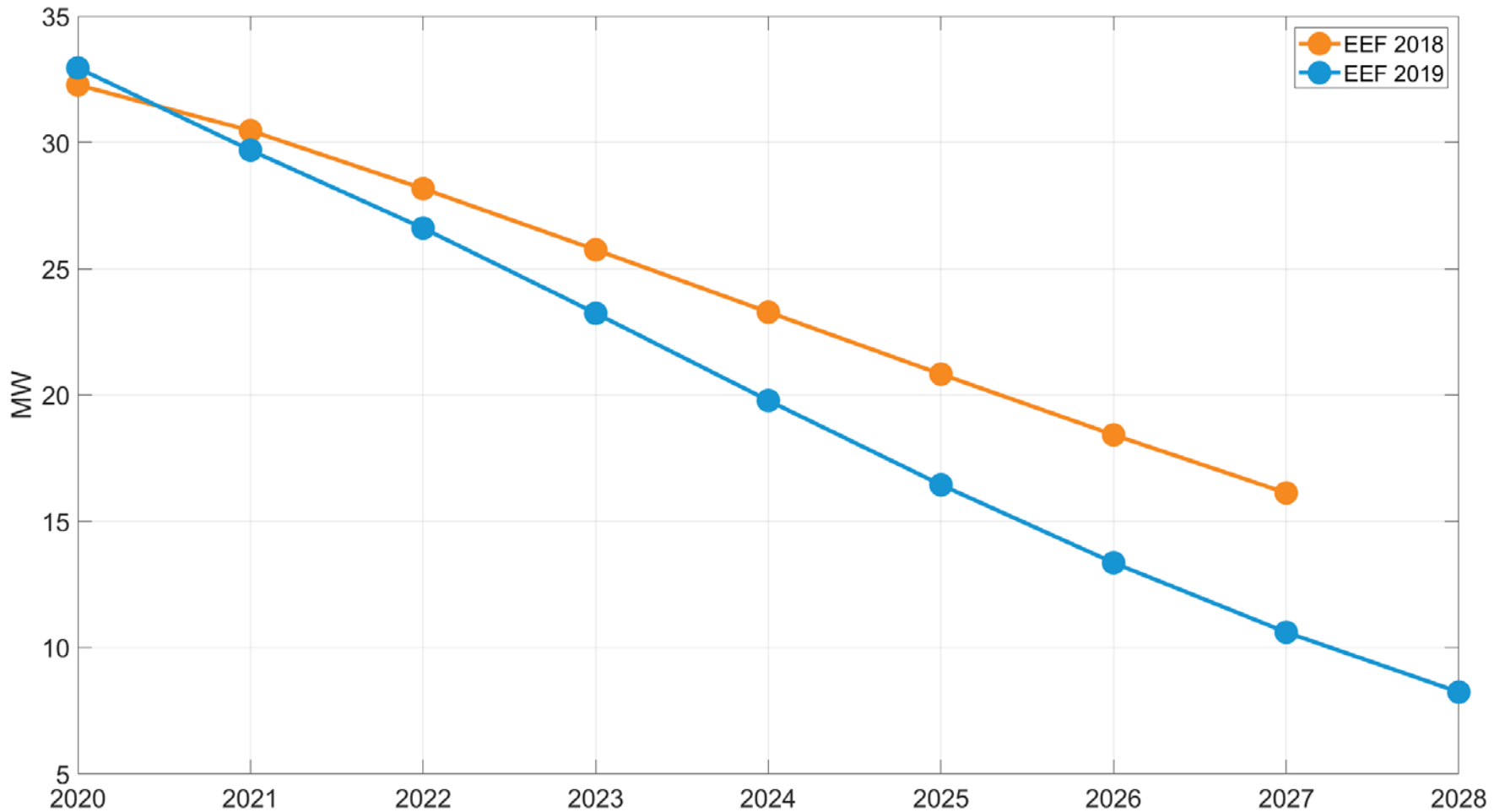
Rhode Island

Energy Efficiency on Summer Peak



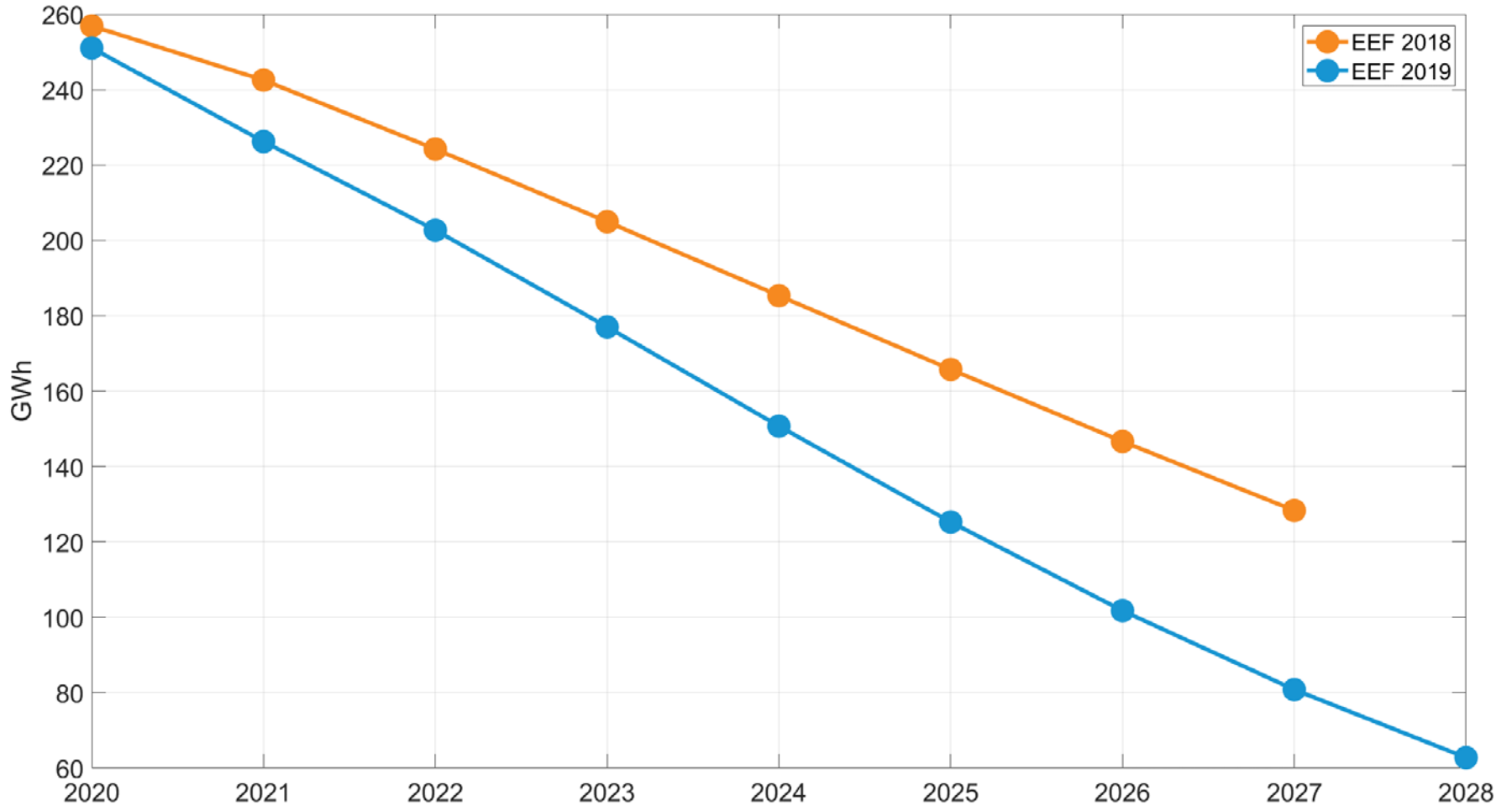
Rhode Island

Energy Efficiency on Summer Peak



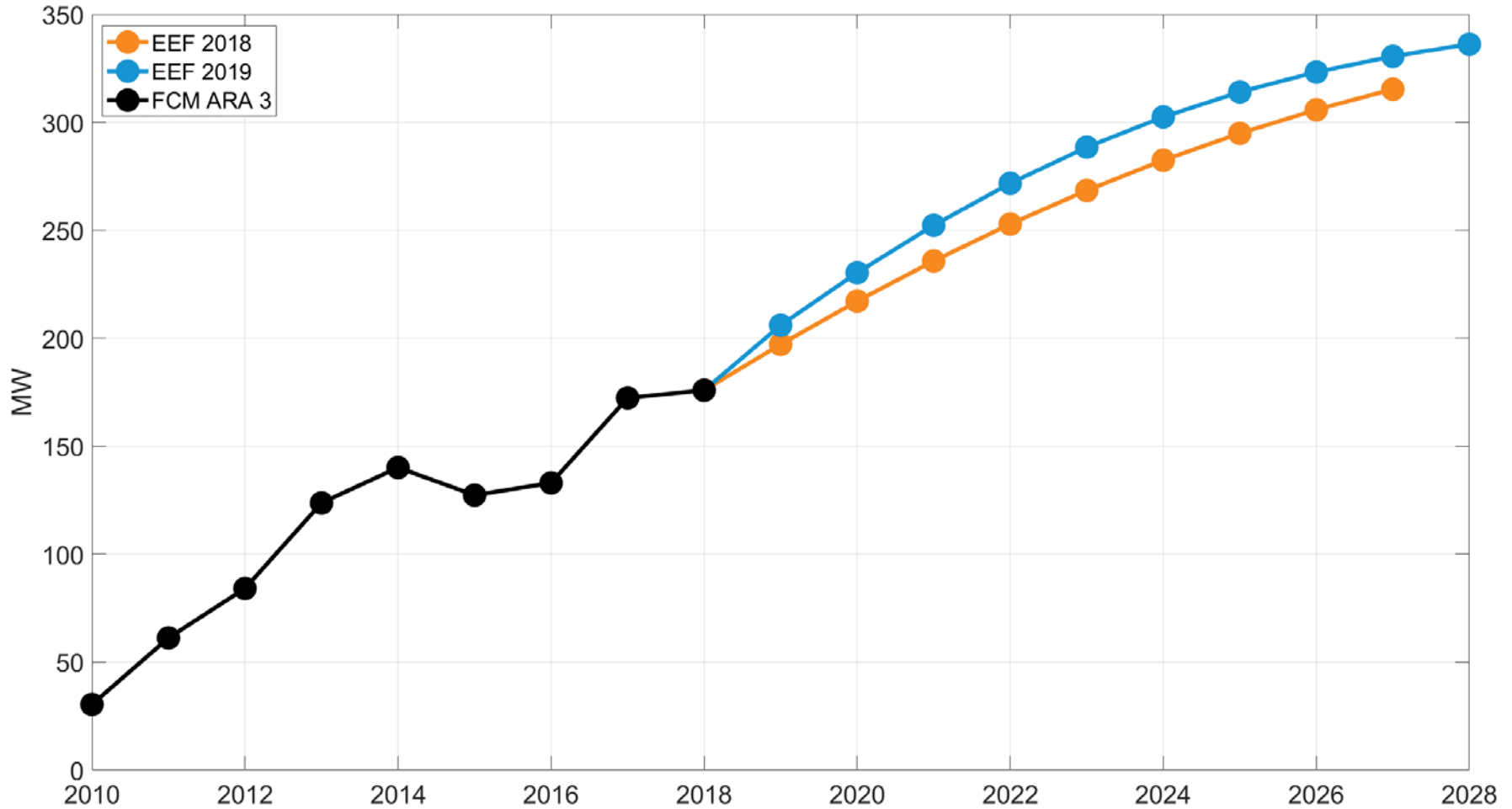
Rhode Island

Energy Efficiency on Annual Energy



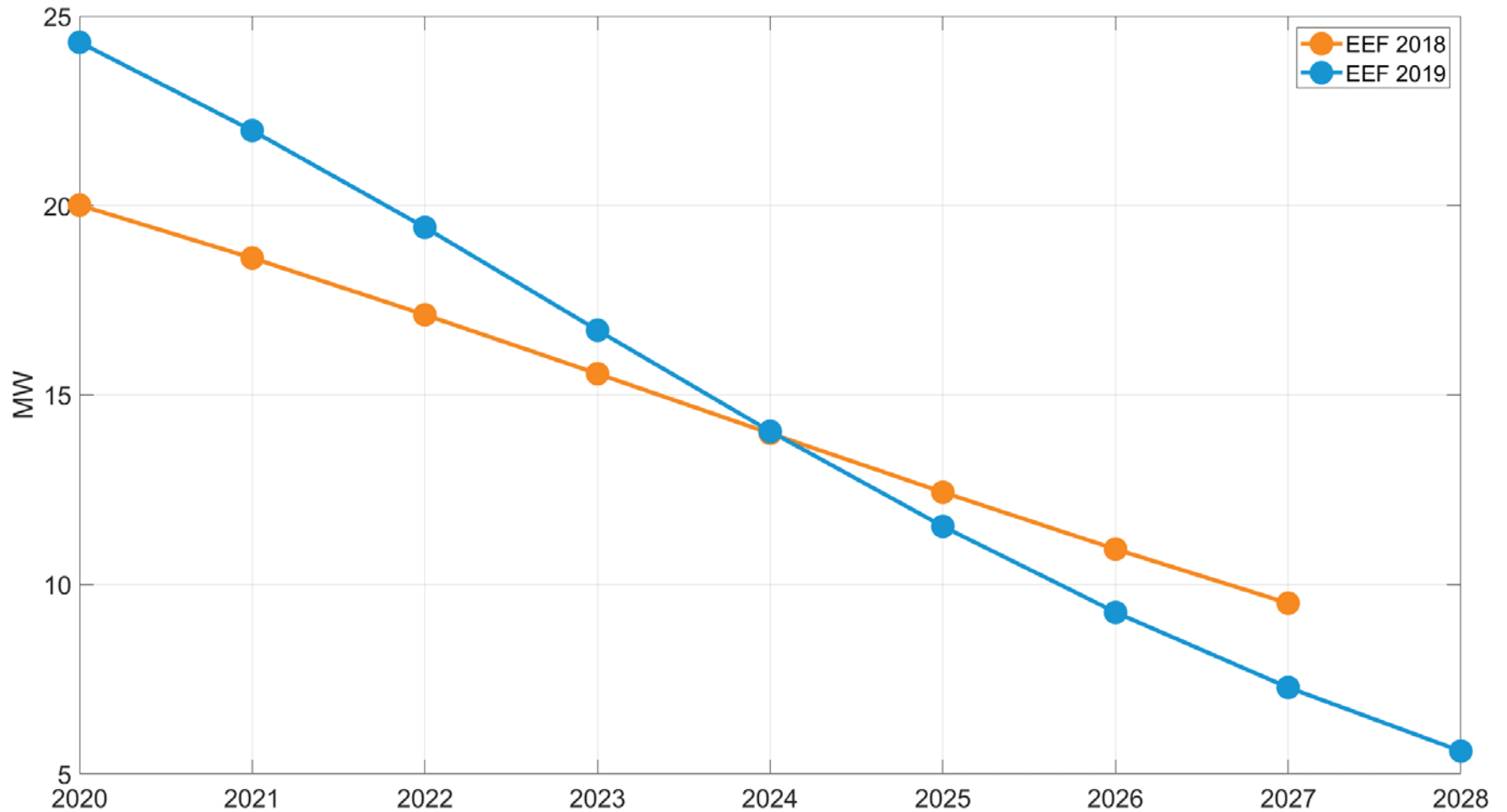
Maine

Energy Efficiency on Summer Peak



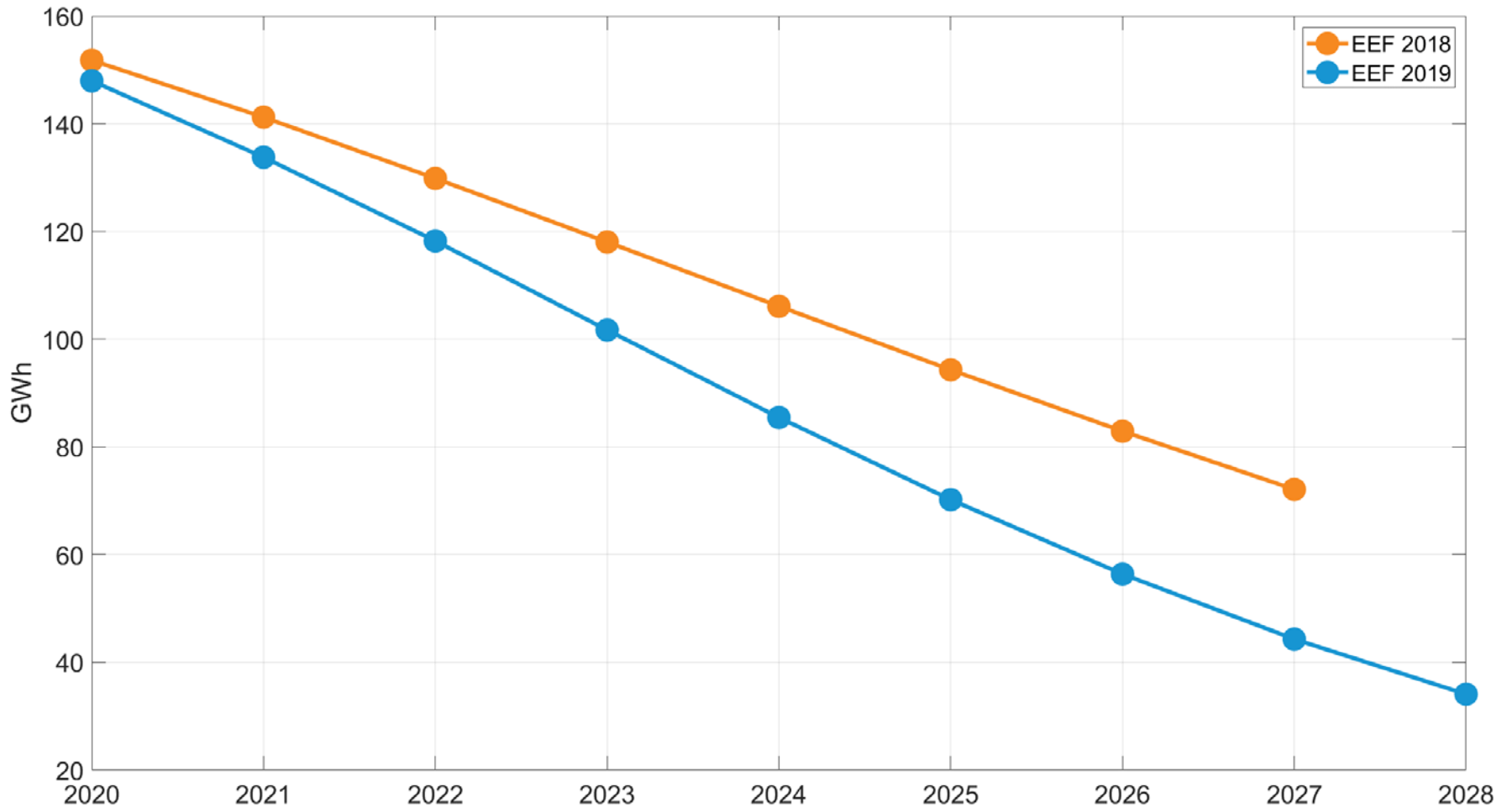
Maine

Energy Efficiency on Summer Peak



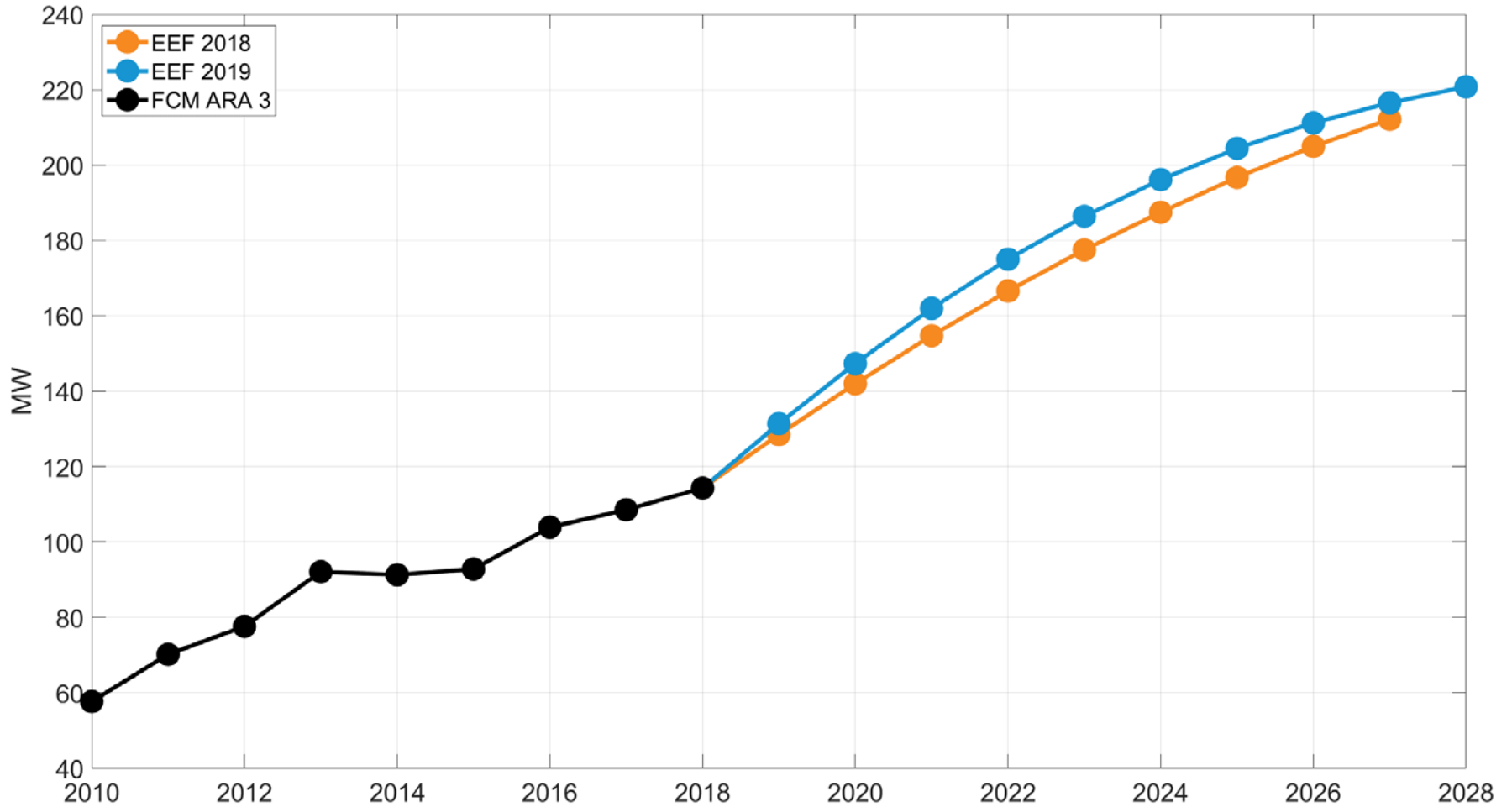
Maine

Energy Efficiency on Annual Energy



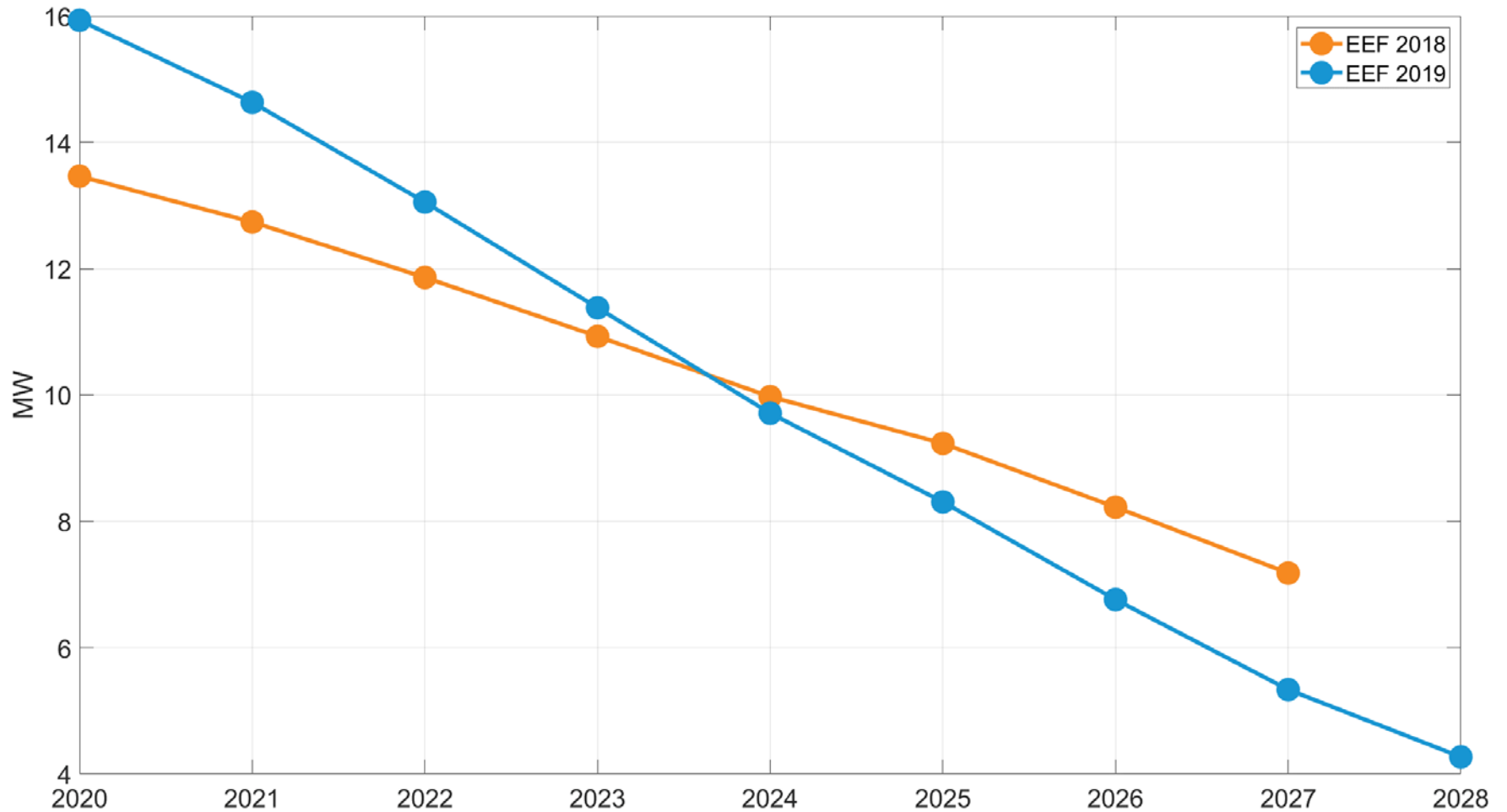
Vermont

Energy Efficiency on Summer Peak



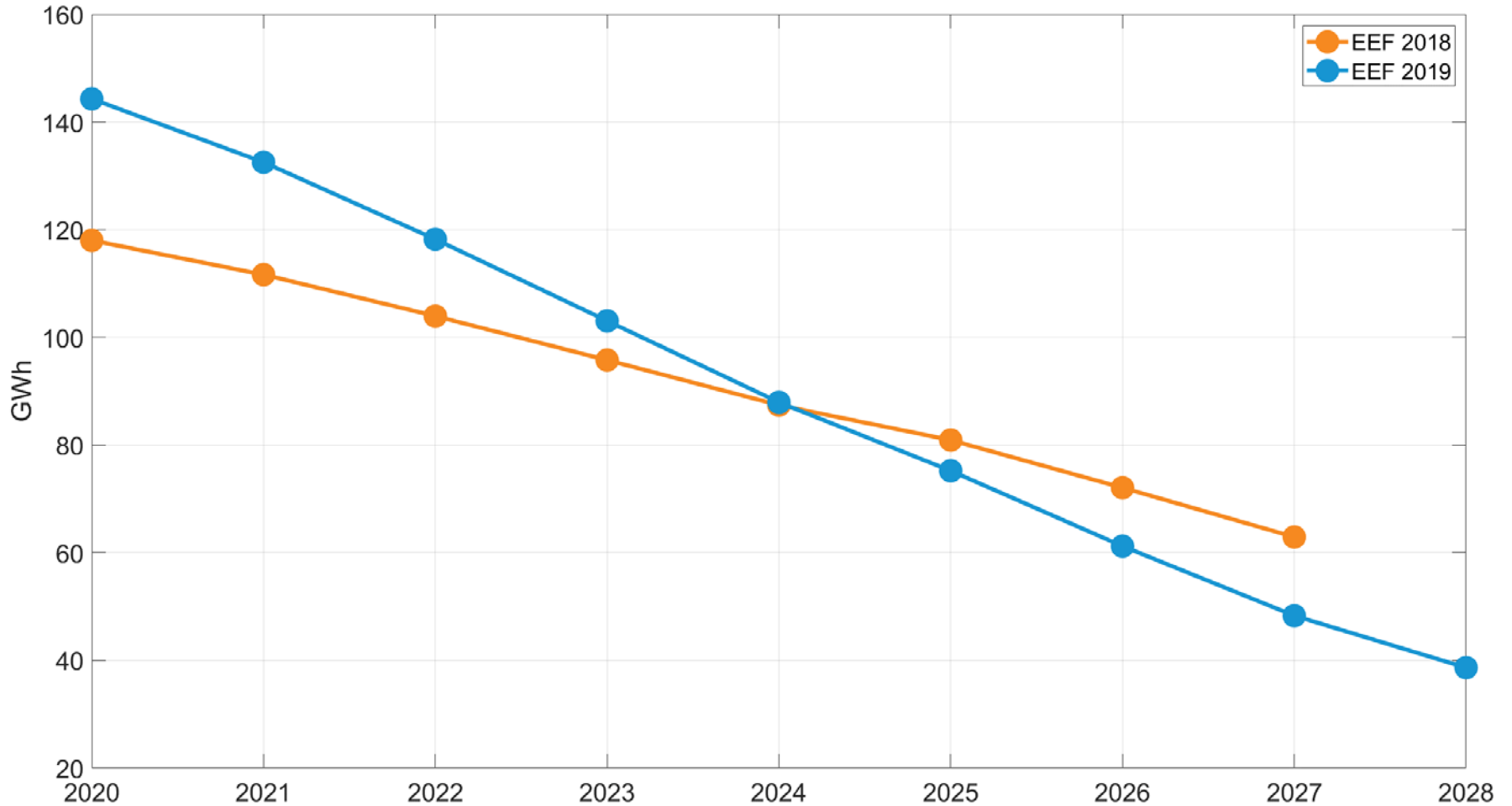
Vermont

Energy Efficiency on Summer Peak



Vermont

Energy Efficiency on Summer Peak



NEXT STEPS

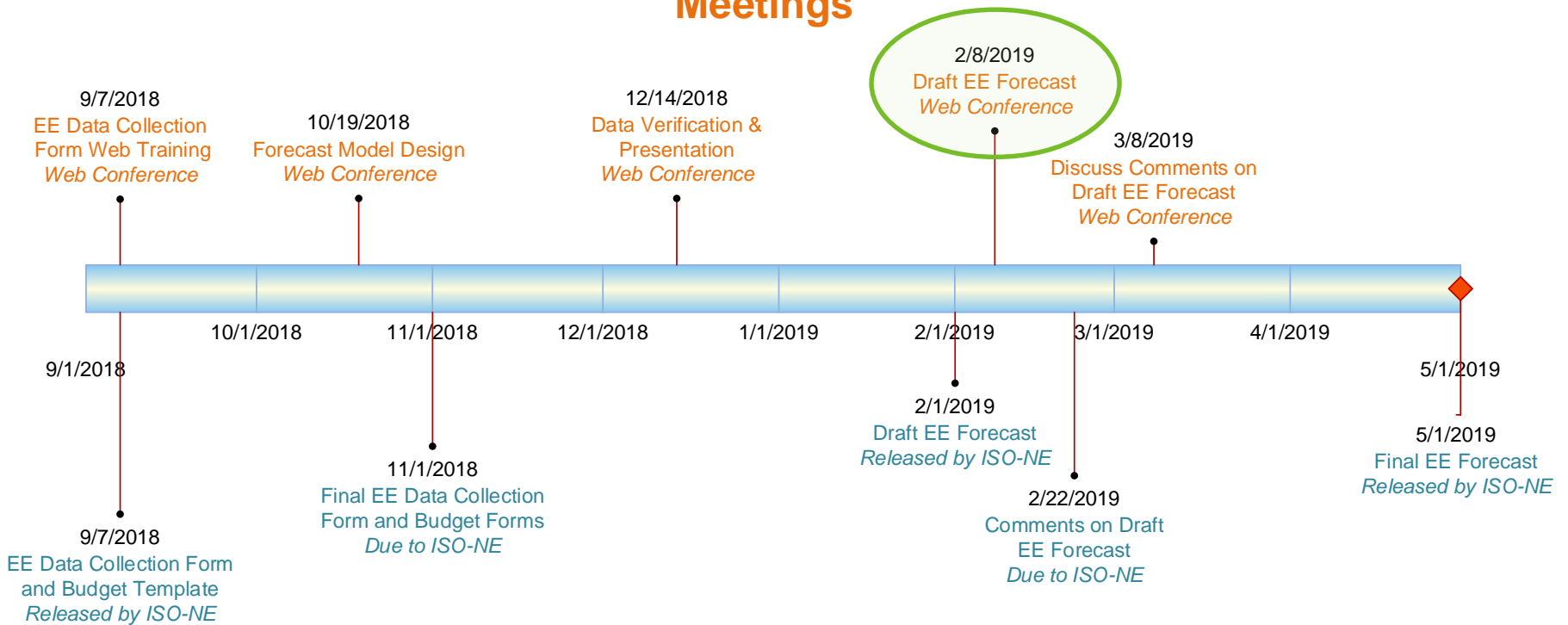


Looking Ahead

- **February 22, 2019** – Comments on the Draft EE Forecast due to ISO New England (eeforecast@iso-ne.com)
- **March 8, 2019** – Energy Efficiency Forecast Working Group (EEFWG) meeting to discuss comments on the Draft EE Forecast
- **March 21, 2019** - Presentation of the Draft EE Forecast to the Planning Advisory Committee
- **May 1, 2019** – Final EE Forecast released by ISO New England

2019 Energy Efficiency Forecast Schedule

Meetings



Milestones

Effective: 08-03-2018
(Schedule subject to change)

Questions

