# 2017 Draft Energy-Efficiency Forecast for 2021-2026

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SYSTEM PLANNING

# Acronyms

- EE—Energy Efficiency
- EEFWG—Energy-Efficiency Forecast Working Group
- FCM—Forward Capacity Market
- ICR — Installed Capacity Requirement
- PA—Program Administrator
- PAC—Planning Advisory Committee
- RGGI—Regional Greenhouse Gas Initiative
- SBC—System Benefit Charge
- CSO—Capacity Supply Obligation (FCM)
- RSP—Regional System Plan
- CELT—10-year forecast of capacity, energy, loads and transmission

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# Introduction

- This presentation contains the draft EE forecast for the period 2021-2026
- The forecast estimates reductions in energy and demand from state-sponsored EE programs in the New England control area by region and state (CT, MA, ME, NH, RI, VT)
- Data used to create the forecast originates from state-sponsored EE Program Administrators and state regulatory agencies
- Excludes results of FCA #11 - **Will be included in final forecast**

# Introduction

*Process*

- This forecast follows the same fundamental forecast process and methodology used in the five preceding forecast 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 ISO New England's Energy-Efficiency Forecast Working Group EEFWG provided input during two prior meetings on August 5th and December 16th of 2016
- The EE forecast updated annually
- The Final EE forecast will be incorporated into the CELT report

# Introduction

*Impacts*

- The EE forecast is used in ISO studies looking beyond the FCM timeframe such as:
  - Long-term transmission planning studies
  - Economic planning studies
  - Other planning studies
- In the near term (0-3 years), EE is integrated into the planning processes as qualified capacity delivered by regulated utilities through the ISO-NE Forward Capacity Market and merchant EE providers
- 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)
  - Any System Operations analysis across the four-year FCM window

# Introduction

*Looking Forward*

- The ISO will accept formal public comments on this draft forecast through March 6, 2017
  - 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 plans to issue the final EE forecast May 1, 2017 as an updated slide deck
- Publication of the forecast in a report form will not be repeated this year. A generalized characterization of the forecast process can be found at http://www.iso-ne.com/eefwg

# DRAFT 2017 ENERGY-EFFICIENCY FORECAST SUMMARY OF ASSUMPTIONS

# 2017 Forecast Update to Assumptions

*Production Cost Escalation Rate*

- The 2017 forecast results in more EE savings than the 2016 forecast
- The use of a static production cost escalation rate of 5% has been discontinued
- The 2017 forecast utilizes a graduated production cost escalator of 1.25% that begins in the second year of the forecast

| Year | Inflation | Graduated Escalation Rate | Total Escalation Rate |
|---|---|---|---|
| 2017 | 2.50% | 0.00% | 2.50% |
| 2018 | 2.50% | 1.25% | 3.75% |
| 2019 | 2.50% | 1.25% + 1.25% | 5.00% |
| 2020 | 2.50% | 1.25% + 1.25% + 1.25% | 6.25% |
| 2021 | 2.50% | 1.25% + 1.25% + 1.25% + 1.25% | 7.50% |
| … | … | … | … |
| 2026 | 2.5% | 9 * 1.25% | 13.75% |

# 2017 Forecast Update to Assumptions

*Production Cost Escalation Rate - Example*

**Starting Production Cost:** **$1/MWh**
**Annual Budget:** **$1000**

| Static Escalation Rate | | | |
|---|---|---|---|
| Year | Production Cost Multiplier | Production Cost ($/MWh) | Energy (MWh) |
| 2017 | 107.50% | 1.075 | 930 |
| 2018 | 107.50% | 1.156 | 865 |
| 2019 | 107.50% | 1.242 | 805 |
| 2020 | 107.50% | 1.335 | 749 |
| 2021 | 107.50% | 1.436 | 697 |
| 2022 | 107.50% | 1.543 | 648 |
| 2023 | 107.50% | 1.659 | 603 |
| 2024 | 107.50% | 1.783 | 561 |
| 2025 | 107.50% | 1.917 | 522 |
| 2026 | 107.50% | 2.061 | 485 |
| | | | |
| Total Energy | | | 6,864 |

| Graduated Escalation Rate | | | |
|---|---|---|---|
| Year | Production Cost Multiplier | Production Cost ($/MWh) | Energy (MWh) |
| 2017 | 102.50% | 1.025 | 976 |
| 2018 | 103.75% | 1.063 | 940 |
| 2019 | 105.00% | 1.117 | 896 |
| 2020 | 106.25% | 1.186 | 843 |
| 2021 | 107.50% | 1.275 | 784 |
| 2022 | 108.75% | 1.387 | 721 |
| 2023 | 110.00% | 1.526 | 655 |
| 2024 | 111.25% | 1.697 | 589 |
| 2025 | 112.50% | 1.909 | 524 |
| 2026 | 113.75% | 2.172 | 460 |
| | | | |
| Total Energy | | | 7,388 |

# 2017 Forecast Update to Assumptions

*Inputs*

- 2016 CELT Energy Forecast
- 2016 CELT FCM CSOs and FCA #10 Clearing Price for calculating budget - **Will be updated in final forecast**
- Production Cost: Updated with PA 2013-2015 average
- Peak-to-Energy Ratio: Updated with PA 2013-2015 average
- Production Cost Escalation Rate: 2.5% inflation + 1.25% graduated rate (starting in year 2)
- No Budget Spend Rate deduction

# 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

*Assumptions Regarding Forward Capacity Market*

- FCM capacity clearing price was held constant at $7.03/kW-month,† the latest FCA clearing price for Capacity Commitment Period 2019-2020 - **Will be updated in final forecast**
- 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*

## 1) MWh = [ (1-BSR) * Budget $ ] / [ $/MWh * PCINCR ]

Where:

| | |
|---|---|
| Budget $ | = an estimate of the dollars to be spent on EE ($) (System Benefit Charge + RGGI + FCM + Policy) |
| BSR | = budget spend rate modifier (%) |
| $/MWh | = production cost ($/MWh) |
| PCINCR | = production cost increases (%) |

## 2) MW = MWh * PER

Where:

| | |
|---|---|
| PER | = peak-to-energy ratio (MW/MWh) |

# ENERGY-EFFICIENCY PROGRAM DATA SUMMARY

# Summary of Program Performance Changes

- Production Cost
  - ME, VT and CT saw an increase, resulting in a decrease in energy reductions from equivalent budget
  - NH and RI remained constant
  - MA costs fell slightly
- Peak-to-Energy Ratio
  - Decreased in RI and VT
  - Increased in the remainder of the region
- Budget Spend Rate
  - Modest increase across the region
  - Significant improvement in ME

# Program Administrator Data Summary

| | Budget $1000's | Total Costs $1000's | Achieved Annual Energy (MWh) | Dollars per MWh | Achieved Summer Peak (MW) | Achieved Winter Peak (MW) | Dollars per MW | % Energy Achieved | % Budget Spent | % Peak Achieved | Peak to Energy Ratio Summer MW/GWh | Peak to Energy Ratio Winter MW/GWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **New England** | | | | | | | | | | | | |
| 2010 | 524,416 | 501,121 | 1,381,006 | 363 | 194 | 241 | 2,580,761 | 103% | 96% | 95% | 0.141 | 0.175 |
| 2011 | 665,087 | 518,865 | 1,575,302 | 329 | 200 | 266 | 2,588,882 | 90% | 78% | 75% | 0.127 | 0.169 |
| 2012 | 745,761 | 648,848 | 1,723,357 | 377 | 221 | 290 | 2,930,052 | 98% | 87% | 86% | 0.128 | 0.168 |
| 2013 | 727,655 | 707,777 | 1,833,731 | 386 | 254 | 315 | 2,787,062 | 109% | 97% | 105% | 0.138 | 0.172 |
| 2014 | 857,984 | 862,384 | 2,063,624 | 418 | 275 | 338 | 3,140,299 | 139% | 101% | 100% | 0.133 | 0.164 |
| 2015 | 894,763 | 923,912 | 2,379,720 | 388 | 333 | 354 | 2,775,434 | 123% | 103% | 127% | 0.140 | 0.149 |
| Avg 2012-2014 | 777,133 | 739,670 | 1,873,570 | 393 | 250 | 314 | 2,952,471 | 115% | 95% | 97% | 0.133 | 0.168 |
| Avg 2013-2015 | 826,801 | 831,358 | 2,092,358 | 397 | 287 | 336 | 2,900,931 | 123% | 100% | 111% | 0.137 | 0.161 |
| **Connecticut** | | | | | | | | | | | | |
| 2010 | 143,544 | 144,938 | 405,043 | 358 | 50 | 85 | 2,907,365 | 113% | 101% | 105% | 0.123 | 0.211 |
| 2011 | 129,909 | 119,426 | 381,974 | 313 | 43 | 73 | 2,769,490 | 93% | 92% | 87% | 0.113 | 0.192 |
| 2012 | 120,177 | 121,826 | 308,428 | 395 | 40 | 58 | 3,032,738 | 131% | 101% | 124% | 0.130 | 0.188 |
| 2013 | 97,955 | 121,612 | 271,480 | 448 | 33 | 51 | 3,648,317 | 139% | 124% | 130% | 0.123 | 0.189 |
| 2014 | 174,992 | 176,459 | 377,073 | 468 | 50 | 68 | 3,507,071 | 103% | 101% | 106% | 0.133 | 0.181 |
| 2015 | 181,980 | 179,351 | 411,055 | 436 | 64 | 69 | 2,816,838 | 108% | 99% | 113% | 0.155 | 0.167 |
| Avg 2012-2014 | 131,041 | 139,966 | 318,994 | 437 | 41 | 59 | 3,396,042 | 125% | 109% | 120% | 0.129 | 0.186 |
| Avg 2013-2015 | 151,642 | 159,141 | 353,203 | 451 | 49 | 63 | 3,324,075 | 117% | 108% | 117% | 0.137 | 0.179 |
| **Maine** | | | | | | | | | | | | |
| 2010 | - | 16,989 | 84,007 | 202 | 10 | 28 | 1,637,446 | 101% | 0% | 101% | 0.124 | 0.339 |
| 2011 | - | 22,817 | 152,663 | 149 | 18 | 38 | 1,248,326 | 117% | 0% | 100% | 0.120 | 0.247 |
| 2012 | - | 23,712 | 143,532 | 165 | 12 | 15 | 1,904,497 | 101% | 0% | 114% | 0.087 | 0.106 |
| 2013 | - | 24,127 | 141,825 | 170 | 15 | 36 | 1,596,895 | 0% | 0% | 0% | 0.107 | 0.253 |
| 2014 | 26,976 | 21,972 | 115,847 | 190 | 14 | 24 | 1,621,745 | 0% | 81% | 0% | 0.117 | 0.208 |
| 2015 | 41,991 | 45,493 | 166,500 | 273 | 21 | 22 | 2,124,405 | 0% | 108% | 0% | 0.129 | 0.135 |
| Avg 2012-2014 | 34,483 | 23,270 | 133,735 | 175 | 14 | 25 | 1,707,712 | 34% | 27% | 38% | 0.103 | 0.189 |
| Avg 2013-2015 | 34,483 | 30,530 | 141,391 | 211 | 17 | 27 | 1,781,015 | 0% | 63% | 0% | 0.117 | 0.198 |

# Program Administrator Data Summary

| | Budget $1000's | Total Costs $1000's | Achieved Annual Energy (MWh) | Dollars per MWh | Achieved Summer Peak (MW) | Achieved Winter Peak (MW) | Dollars per MW | % Energy Achieved | % Budget Spent | % Peak Achieved | Peak to Energy Ratio Summer MW/GWh | Peak to Energy Ratio Winter MW/GWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Massachusetts** | | | | | | | | | | | | |
| 2010 | 294,315 | 253,086 | 619,638 | 408 | 91 | 82 | 2,769,183 | 99% | 86% | 90% | 0.147 | 0.132 |
| 2011 | 432,796 | 283,898 | 777,100 | 365 | 101 | 112 | 2,823,162 | 86% | 66% | 67% | 0.129 | 0.145 |
| 2012 | 508,987 | 400,607 | 980,105 | 409 | 125 | 165 | 3,198,050 | 88% | 79% | 75% | 0.128 | 0.168 |
| 2013 | 499,584 | 438,951 | 1,116,236 | 393 | 160 | 173 | 2,737,910 | 93% | 88% | 92% | 0.144 | 0.155 |
| 2014 | 511,262 | 517,796 | 1,217,150 | 425 | 166 | 188 | 3,115,182 | 151% | 101% | 103% | 0.137 | 0.154 |
| 2015 | 518,345 | 541,862 | 1,401,042 | 387 | 196 | 204 | 2,771,610 | 117% | 105% | 129% | 0.140 | 0.145 |
| Avg 2012-2014 | 506,611 | 452,451 | 1,104,497 | 409 | 151 | 175 | 3,017,047 | 111% | 89% | 90% | 0.136 | 0.159 |
| Avg 2013-2015 | 509,730 | 499,536 | 1,244,809 | 402 | 174 | 188 | 2,874,901 | 120% | 98% | 108% | 0.140 | 0.152 |
| **New Hampshire** | | | | | | | | | | | | |
| 2010 | 21,866 | 21,763 | 73,710 | 295 | 12 | 12 | 1,759,990 | 121% | 100% | 117% | 0.168 | 0.163 |
| 2011 | 17,667 | 18,904 | 58,042 | 326 | 10 | 10 | 1,910,689 | 123% | 107% | 121% | 0.170 | 0.173 |
| 2012 | 19,673 | 18,703 | 53,973 | 347 | 8 | 9 | 2,376,052 | 106% | 95% | 101% | 0.146 | 0.165 |
| 2013 | 26,442 | 25,552 | 58,833 | 434 | 8 | 8 | 3,207,104 | 111% | 97% | 107% | 0.135 | 0.139 |
| 2014 | 26,298 | 25,826 | 63,384 | 407 | 10 | 10 | 2,622,172 | 124% | 98% | 76% | 0.155 | 0.161 |
| 2015 | 23,894 | 25,877 | 73,499 | 352 | 12 | 12 | 2,240,227 | 129% | 108% | 119% | 0.157 | 0.160 |
| Avg 2012-2014 | 24,138 | 23,360 | 58,730 | 396 | 9 | 9 | 2,735,110 | 114% | 97% | 95% | 0.146 | 0.155 |
| Avg 2013-2015 | 25,545 | 25,752 | 65,239 | 398 | 10 | 10 | 2,689,834 | 121% | 101% | 101% | 0.149 | 0.153 |

# Program Administrator Data Summary

| | Budget $1000's | Total Costs $1000's | Achieved Annual Energy (MWh) | Dollars per MWh | Achieved Summer Peak (MW) | Achieved Winter Peak (MW) | Dollars per MW | % Energy Achieved | % Budget Spent | % Peak Achieved | Peak to Energy Ratio Summer MW/GWh | Peak to Energy Ratio Winter MW/GWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rhode Island** | | | | | | | | | | | | |
| 2010 | 30,366 | 27,581 | 81,275 | 339 | 13 | 12 | 2,163,694 | 107% | 91% | 78% | 0.157 | 0.146 |
| 2011 | 48,649 | 36,494 | 96,009 | 380 | 14 | 13 | 2,673,405 | 94% | 75% | 71% | 0.142 | 0.136 |
| 2012 | 61,246 | 48,870 | 119,666 | 408 | 20 | 19 | 2,504,009 | 93% | 80% | 82% | 0.163 | 0.162 |
| 2013 | 64,179 | 61,547 | 149,033 | 413 | 25 | 29 | 2,453,415 | 104% | 96% | 123% | 0.168 | 0.193 |
| 2014 | 73,766 | 74,537 | 193,613 | 385 | 24 | 30 | 3,161,426 | 107% | 101% | 62% | 0.122 | 0.157 |
| 2015 | 83,917 | 84,731 | 214,512 | 395 | 27 | 27 | 3,081,647 | 116% | 101% | 96% | 0.128 | 0.128 |
| Avg 2012-2014 | 66,397 | 61,651 | 154,104 | 402 | 23 | 26 | 2,706,283 | 101% | 92% | 89% | 0.151 | 0.171 |
| Avg 2013-2015 | 73,954 | 73,605 | 185,720 | 398 | 25 | 29 | 2,898,829 | 109% | 99% | 94% | 0.139 | 0.159 |
| **Vermont** | | | | | | | | | | | | |
| 2010 | 34,326 | 36,764 | 117,334 | 313 | 17 | 21 | 2,107,775 | 88% | 107% | 93% | 0.149 | 0.182 |
| 2011 | 36,066 | 37,325 | 109,514 | 341 | 15 | 20 | 2,502,506 | 72% | 103% | 69% | 0.136 | 0.182 |
| 2012 | 35,678 | 35,130 | 117,653 | 299 | 16 | 23 | 2,172,427 | 119% | 98% | 109% | 0.137 | 0.197 |
| 2013 | 39,495 | 35,989 | 96,323 | 374 | 12 | 18 | 2,966,434 | 97% | 91% | 81% | 0.126 | 0.186 |
| 2014 | 44,690 | 45,795 | 96,557 | 474 | 11 | 17 | 4,121,184 | 113% | 102% | 74% | 0.115 | 0.181 |
| 2015 | 44,637 | 46,598 | 113,112 | 412 | 13 | 20 | 3,516,048 | 101% | 104% | 89% | 0.117 | 0.174 |
| Avg 2012-2014 | 39,954 | 38,971 | 103,511 | 382 | 13 | 20 | 3,086,681 | 110% | 97% | 88% | 0.126 | 0.188 |
| Avg 2013-2015 | 42,941 | 42,794 | 101,997 | 420 | 12 | 18 | 3,534,555 | 104% | 99% | 81% | 0.119 | 0.180 |

# ENERGY-EFFICIENCY FORECAST INPUT DATA

# FCM and RGGI Dollars

| RGGI Dollars ($1000's) - Applied to EE Annually | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ISONE | ME | NH | VT | CT | RI | MA |
| | 91,014 | 0 | 4,300 | 0 | 18,369 | 3,588 | 64,757 |
| **FCM MW** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2020 | 2,369 | 183 | 89 | 114 | 494 | 217 | 1,272 |
| **FCM Dollars ($1000's, clearing price of $7.03*)** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2020 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |
| **FCM Dollars for EE ($1000's)** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2021 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |
| 2022 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |
| 2023 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |
| 2024 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |
| 2025 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |
| 2026 | 136,720 | 0 | 5,866 | 0 | 32,620 | 14,312 | 83,922 |

* Auction clearing price for Rest-of-Pool

# Energy Forecast

**2016 RSP Energy Forecast (GWh)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 147,705 | 13,179 | 12,831 | 7,093 | 36,103 | 9,438 | 69,061 |
| 2022 | 148,983 | 13,273 | 12,939 | 7,145 | 36,317 | 9,490 | 69,819 |
| 2023 | 150,267 | 13,372 | 13,048 | 7,196 | 36,525 | 9,546 | 70,580 |
| 2024 | 151,514 | 13,470 | 13,154 | 7,247 | 36,718 | 9,606 | 71,319 |
| 2025 | 152,731 | 13,570 | 13,257 | 7,297 | 36,900 | 9,667 | 72,040 |
| 2026 | 153,948 | 13,670 | 13,360 | 7,347 | 37,082 | 9,728 | 72,761 |

**2016 RSP Energy Forecast - FCM Passive Demand Resources (GWh)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 132,794 | 11,916 | 12,211 | 6,287 | 33,133 | 8,127 | 61,120 |
| 2022 | 134,072 | 12,010 | 12,319 | 6,339 | 33,347 | 8,179 | 61,878 |
| 2023 | 135,356 | 12,109 | 12,428 | 6,390 | 33,555 | 8,235 | 62,639 |
| 2024 | 136,603 | 12,207 | 12,534 | 6,441 | 33,748 | 8,295 | 63,378 |
| 2025 | 137,820 | 12,307 | 12,637 | 6,491 | 33,930 | 8,356 | 64,099 |
| 2026 | 139,037 | 12,407 | 12,740 | 6,541 | 34,112 | 8,417 | 64,820 |

**SBC Eligible**

| | | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| | | 98.7% | 100% | 100% | 94.7% | 100% | 85.9% |

**SBC Eligible 2016 Energy Forecast - FCM Passive Demand Resources (GWh)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 122,265 | 11,761 | 12,211 | 6,287 | 31,377 | 8,127 | 52,502 |
| 2022 | 123,424 | 11,854 | 12,319 | 6,339 | 31,580 | 8,179 | 53,153 |
| 2023 | 124,588 | 11,952 | 12,428 | 6,390 | 31,777 | 8,235 | 53,807 |
| 2024 | 125,719 | 12,048 | 12,534 | 6,441 | 31,959 | 8,295 | 54,442 |
| 2025 | 126,824 | 12,147 | 12,637 | 6,491 | 32,132 | 8,356 | 55,061 |
| 2026 | 127,928 | 12,246 | 12,740 | 6,541 | 32,304 | 8,417 | 55,680 |

# Energy Sales and System Benefit Charge

**Sales (GWh)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 115,344 | 11,095 | 11,520 | 5,931 | 29,601 | 7,667 | 49,530 |
| 2022 | 116,437 | 11,183 | 11,622 | 5,980 | 29,792 | 7,716 | 50,145 |
| 2023 | 117,536 | 11,275 | 11,725 | 6,028 | 29,978 | 7,769 | 50,761 |
| 2024 | 118,603 | 11,366 | 11,825 | 6,076 | 30,150 | 7,825 | 51,360 |
| 2025 | 119,645 | 11,459 | 11,922 | 6,124 | 30,313 | 7,883 | 51,944 |
| 2026 | 120,687 | 11,553 | 12,019 | 6,171 | 30,476 | 7,941 | 52,529 |

**SBC Rate ($/kWh)**

| | | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| | | 0 | 0.0018 | 0 | 0.003 | 0.01074 | 0.0025 |

**SBC Dollars ($1000's)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 306,725 | 0 | 20,736 | 0 | 88,803 | 73,361 | 123,826 |
| 2022 | 308,735 | 0 | 20,919 | 0 | 89,376 | 73,078 | 125,361 |
| 2023 | 310,846 | 0 | 21,104 | 0 | 89,934 | 72,905 | 126,903 |
| 2024 | 312,979 | 0 | 21,284 | 0 | 90,451 | 72,844 | 128,400 |
| 2025 | 315,122 | 0 | 21,459 | 0 | 90,939 | 72,863 | 129,861 |
| 2026 | 317,333 | 0 | 21,634 | 0 | 91,427 | 72,951 | 131,322 |

# Impacts of New EE on Revenue Streams

**Lost SBC Dollars ($1000's)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 14,018 | 0 | 234 | 0 | 2,545 | 4,218 | 7,020 |
| 2022 | 20,262 | 0 | 339 | 0 | 3,677 | 6,103 | 10,142 |
| 2023 | 25,958 | 0 | 435 | 0 | 4,709 | 7,827 | 12,986 |
| 2024 | 31,096 | 0 | 522 | 0 | 5,639 | 9,387 | 15,549 |
| 2025 | 35,680 | 0 | 599 | 0 | 6,467 | 10,782 | 17,831 |
| 2026 | 39,723 | 0 | 668 | 0 | 7,196 | 12,017 | 19,842 |

**New FCM Dollars ($1000's)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 38,502 | 0 | 1,284 | 0 | 7,674 | 3,614 | 25,930 |
| 2022 | 55,635 | 0 | 1,858 | 0 | 11,087 | 5,229 | 37,460 |
| 2023 | 71,254 | 0 | 2,383 | 0 | 14,198 | 6,706 | 47,966 |
| 2024 | 85,332 | 0 | 2,857 | 0 | 17,000 | 8,043 | 57,431 |
| 2025 | 97,879 | 0 | 3,282 | 0 | 19,497 | 9,238 | 65,862 |
| 2026 | 108,939 | 0 | 3,657 | 0 | 21,696 | 10,296 | 73,290 |

# Policy Dollars and Total Budgets

**Policy Dollars ($1000's)***

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 613,464 | 39,494 | 0 | 60,795 | 87,789 | 0 | 425,386 |
| 2022 | 605,338 | 39,494 | 0 | 62,613 | 87,789 | 0 | 415,442 |
| 2023 | 598,031 | 39,494 | 0 | 64,510 | 87,789 | 0 | 406,238 |
| 2024 | 591,468 | 39,494 | 0 | 66,346 | 87,789 | 0 | 397,839 |
| 2025 | 587,297 | 39,494 | 0 | 69,785 | 87,789 | 0 | 390,229 |
| 2026 | 582,449 | 39,494 | 0 | 71,814 | 87,789 | 0 | 383,352 |

**Total Budget Dollars ($1000's)**

| | ISONE | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|---|
| 2021 | 1,172,406 | 39,494 | 31,951 | 60,795 | 232,709 | 90,657 | 716,801 |
| 2022 | 1,177,179 | 39,494 | 32,604 | 62,613 | 235,564 | 90,104 | 716,801 |
| 2023 | 1,181,907 | 39,494 | 33,218 | 64,510 | 238,200 | 89,685 | 716,801 |
| 2024 | 1,186,416 | 39,494 | 33,786 | 66,346 | 240,590 | 89,400 | 716,801 |
| 2025 | 1,192,352 | 39,494 | 34,307 | 69,785 | 242,746 | 89,219 | 716,801 |
| 2026 | 1,196,731 | 39,494 | 34,789 | 71,814 | 244,704 | 89,130 | 716,801 |

* Policy Dollars are funds not from SBC, RGGI and 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 lower portion of budget coming from SBC due to higher FCM revenue

# Production Costs and Peak-to-Energy Ratio

**Production Cost Multiplier (includes inflation)**

| | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|
| 2016 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | 1.0250 |
| 2017 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | 1.0250 | 1.0250 |
| 2018 | 1.0375 | 1.0375 | 1.0375 | 1.0375 | 1.0375 | 1.0375 |
| 2019 | 1.0500 | 1.0500 | 1.0500 | 1.0500 | 1.0500 | 1.0500 |
| 2020 | 1.0625 | 1.0625 | 1.0625 | 1.0625 | 1.0625 | 1.0625 |
| 2021 | 1.0750 | 1.0750 | 1.0750 | 1.0750 | 1.0750 | 1.0750 |
| 2022 | 1.0875 | 1.0875 | 1.0875 | 1.0875 | 1.0875 | 1.0875 |
| 2023 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| 2024 | 1.1125 | 1.1125 | 1.1125 | 1.1125 | 1.1125 | 1.1125 |
| 2025 | 1.1250 | 1.1250 | 1.1250 | 1.1250 | 1.1250 | 1.1250 |
| 2026 | 1.1375 | 1.1375 | 1.1375 | 1.1375 | 1.1375 | 1.1375 |

**Production Cost $/MWh**

| year | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|
| 2016 | 216 | 408 | 430 | 462 | 408 | 412 |
| 2017 | 222 | 418 | 441 | 474 | 418 | 422 |
| 2018 | 230 | 434 | 458 | 491 | 433 | 438 |
| 2019 | 241 | 455 | 455 | 516 | 455 | 460 |
| 2020 | 257 | 484 | 511 | 548 | 484 | 489 |
| 2021 | 276 | 520 | 549 | 589 | 520 | 525 |
| 2022 | 300 | 566 | 597 | 641 | 565 | 571 |
| 2023 | 330 | 622 | 657 | 705 | 622 | 628 |
| 2024 | 367 | 692 | 731 | 784 | 692 | 699 |
| 2025 | 413 | 779 | 822 | 882 | 778 | 786 |
| 2026 | 470 | 886 | 935 | 1,004 | 885 | 895 |

**Peak-to-Energy Ratio (MW/GWh)**

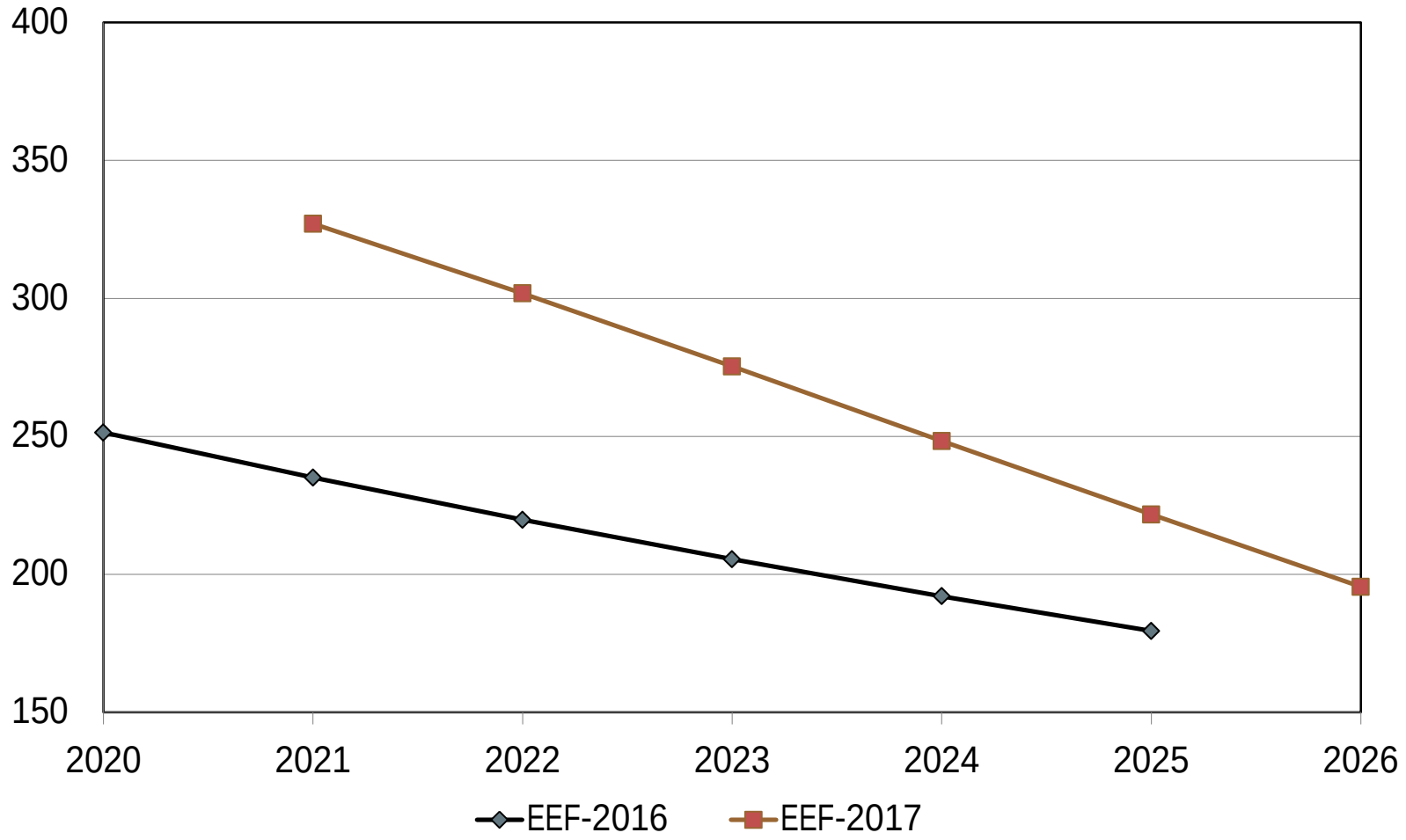
| | ME | NH | VT | CT | RI | MA |
|---|---|---|---|---|---|---|
| | 0.1174 | 0.1493 | 0.1194 | 0.137 | 0.1394 | 0.1399 |

# DRAFT ENERGY-EFFICIENCY FORECAST

*New England*

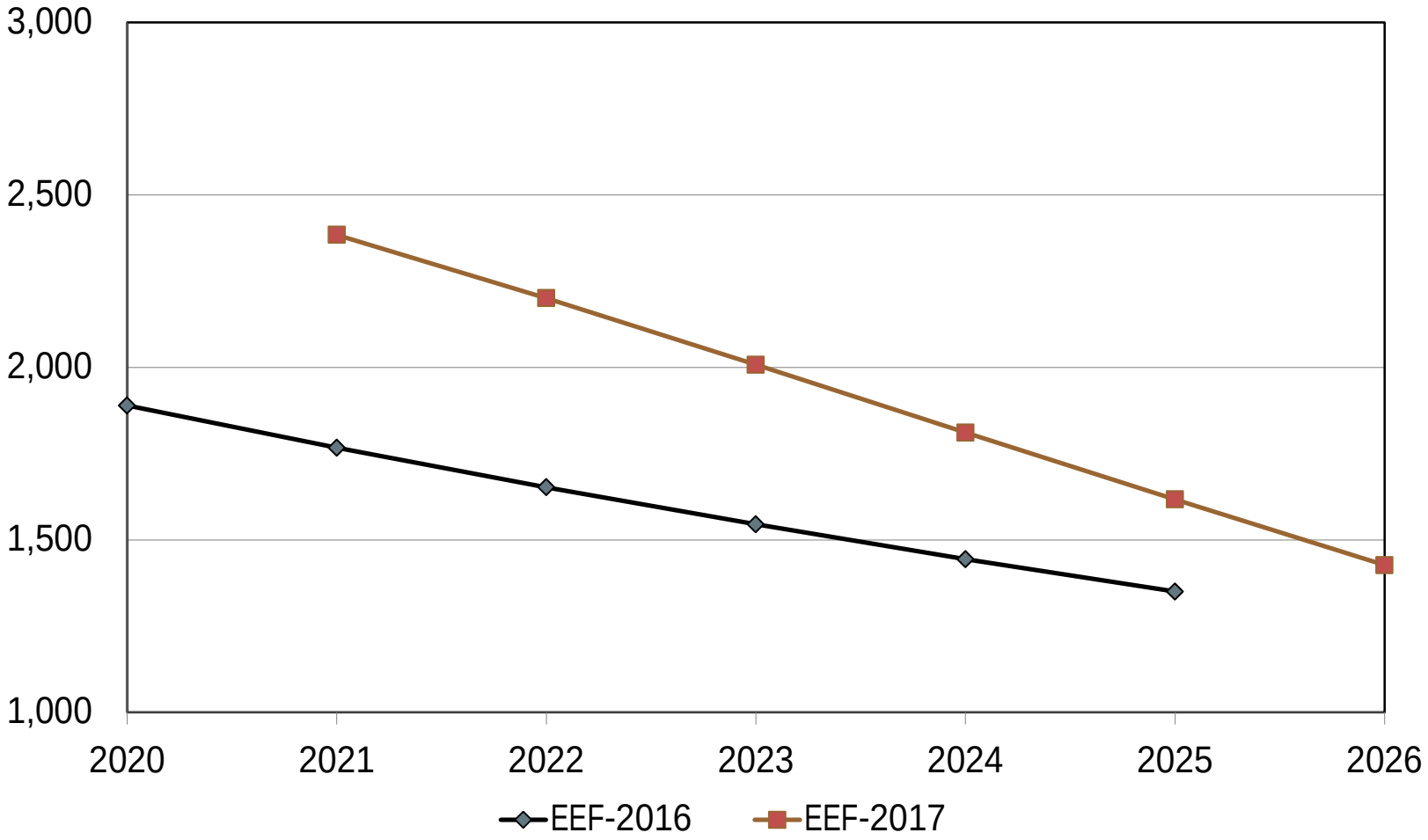
# New England

*Efficiency on Summer Peak (MW)*



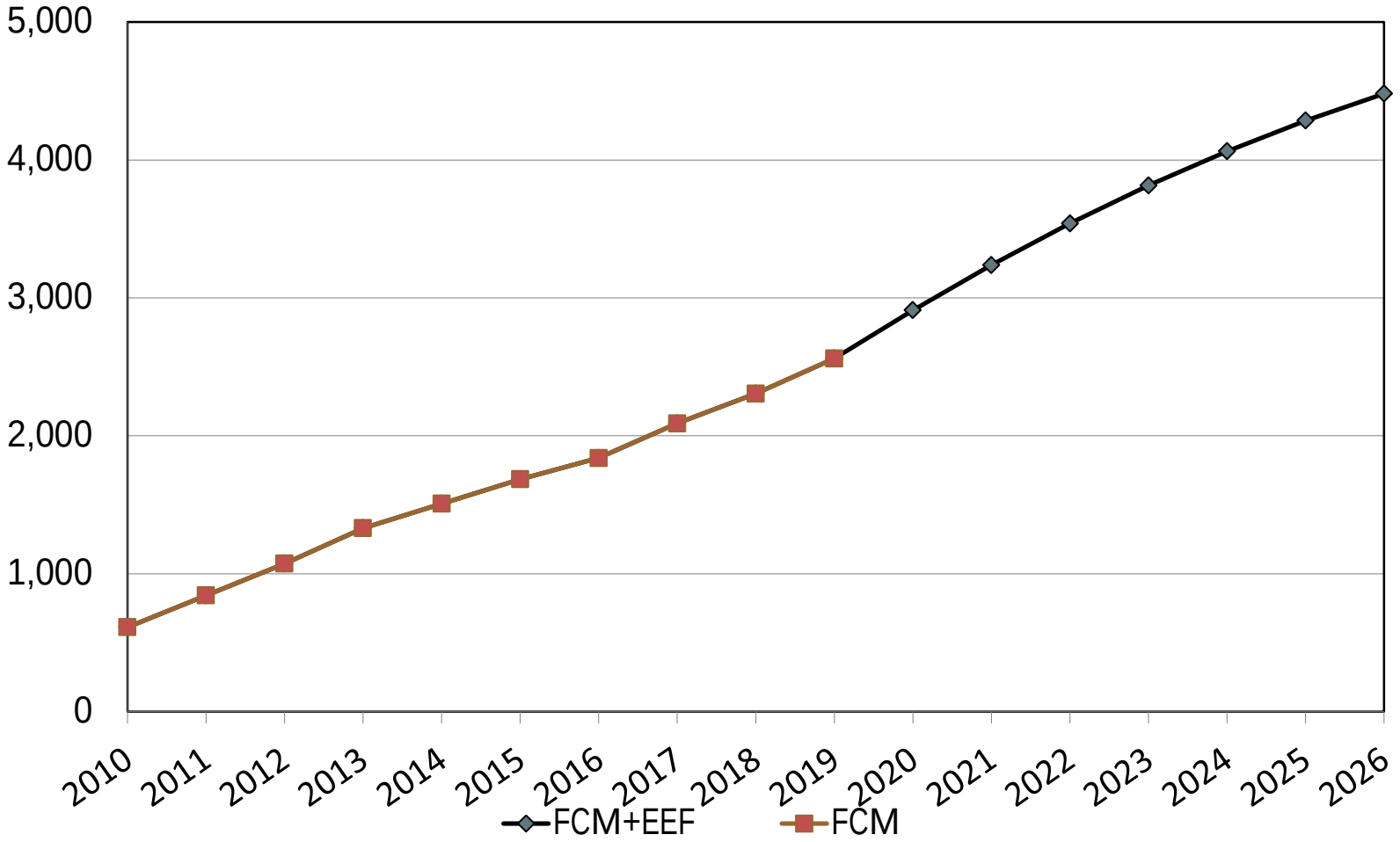
# New England

*Efficiency on Annual Energy (GWh)*



# New England

*Energy Efficiency on Summer Peak (MW)*



# Energy and Summer Peak EE Forecast Data

| GWh Savings | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2021 | 2,384 | 152 | 65 | 117 | 419 | 185 | 1,447 |
| 2022 | 2,201 | 140 | 61 | 111 | 390 | 169 | 1,330 |
| 2023 | 2,008 | 127 | 57 | 104 | 358 | 153 | 1,209 |
| 2024 | 1,811 | 114 | 52 | 96 | 325 | 137 | 1,087 |
| 2025 | 1,617 | 101 | 47 | 90 | 292 | 122 | 966 |
| 2026 | 1,427 | 89 | 42 | 81 | 258 | 107 | 849 |
| Total 2021-2026 | 11,448 | 723 | 323 | 600 | 2,042 | 872 | 6,888 |
| Average | 1,908 | 120 | 54 | 100 | 340 | 145 | 1,148 |
| **MW Savings** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2021 | 327 | 18 | 10 | 14 | 57 | 26 | 202 |
| 2022 | 302 | 16 | 9 | 13 | 53 | 24 | 186 |
| 2023 | 275 | 15 | 8 | 12 | 49 | 21 | 169 |
| 2024 | 248 | 13 | 8 | 11 | 45 | 19 | 152 |
| 2025 | 222 | 12 | 7 | 11 | 40 | 17 | 135 |
| 2026 | 196 | 10 | 6 | 10 | 35 | 15 | 119 |
| Total 2021-2026 | 1,570 | 84 | 48 | 71 | 279 | 122 | 963 |
| Average | 262 | 14 | 8 | 12 | 47 | 20 | 161 |

# Forecast Comparison

| PA Average PRODUCTION COST ($/MWh) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2016 EE Forecast | | 174 | 398 | 375 | 439 | 400 | 410 |
| 2017 EE Forecast | | 211 | 398 | 420 | 451 | 398 | 402 |
| **PA Average PEAK-ENERGY RATIO (MW/GWh)** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2016 EE Forecast | | 0.1025 | 0.1458 | 0.1265 | 0.1294 | 0.1475 | 0.1364 |
| 2017 EE Forecast | | 0.1174 | 0.1493 | 0.1194 | 0.1370 | 0.1394 | 0.1399 |
| **Total EE Dollars (1000s)** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2016 EE Forecast | | | | | | | |
| Total 2020-2025 | 6,606,107 | 214,734 | 205,461 | 381,384 | 1,458,578 | 517,568 | 3,828,384 |
| Average | 1,101,018 | 35,789 | 34,244 | 63,564 | 243,096 | 86,261 | 638,064 |
| 2017 EE Forecast | | | | | | | |
| Total 2021-2026 | 7,106,996 | 236,964 | 200,655 | 395,863 | 1,434,513 | 538,195 | 4,300,806 |
| Average | 1,184,499 | 39,494 | 33,443 | 65,977 | 239,086 | 89,699 | 716,801 |
| **ANNUAL EE ENERGY IMPACTS (GWh)** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2016 EE Forecast | | | | | | | |
| Total 2020-2025 | 9,648 | 713 | 297 | 584 | 1,914 | 747 | 5,394 |
| Average | 1,608 | 119 | 49 | 97 | 319 | 125 | 899 |
| 2017 EE Forecast | | | | | | | |
| Total 2021-2026 | 11,448 | 723 | 323 | 600 | 2,042 | 872 | 6,888 |
| Average | 1,908 | 120 | 54 | 100 | 340 | 145 | 1,148 |
| **SUMMER EE PEAK IMPACTS (MW)** | | | | | | | |
| | ISONE | ME | NH | VT | CT | RI | MA |
| 2016 EE Forecast | | | | | | | |
| Total 2020-2025 | 1,284 | 73 | 43 | 74 | 247 | 110 | 736 |
| Average | 214 | 12 | 7 | 12 | 41 | 18 | 122 |
| 2017 EE Forecast | | | | | | | |
| Total 2021-2026 | 1,571 | 85 | 48 | 72 | 280 | 122 | 964 |
| Average | 262 | 14 | 8 | 12 | 47 | 20 | 161 |

# DRAFT 2017 ENERGY-EFFICIENCY FORECAST

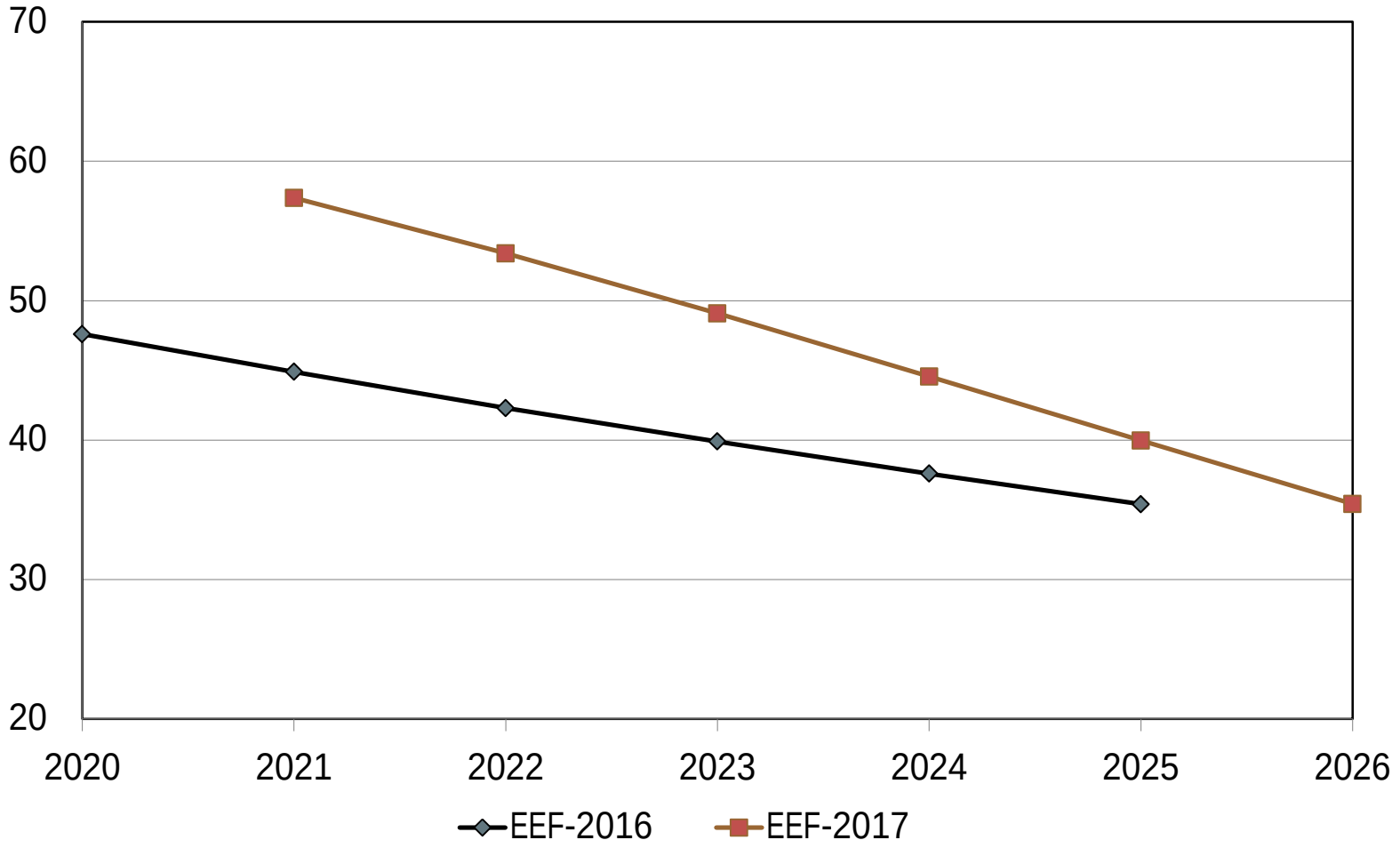
*States*

# Explanation of State Forecast Graphs

- A graphic comparison between the 2016 EE forecast and the 2017 EE forecast of demand reductions (MW)
- A graphic comparison between the 2016 EE forecast and the 2017 EE forecast of energy reductions (MWh)
- A graphic representation of the EE capacity reductions qualified in the Forward Capacity Market (2010-2019) and the extended 2017 EE forecast

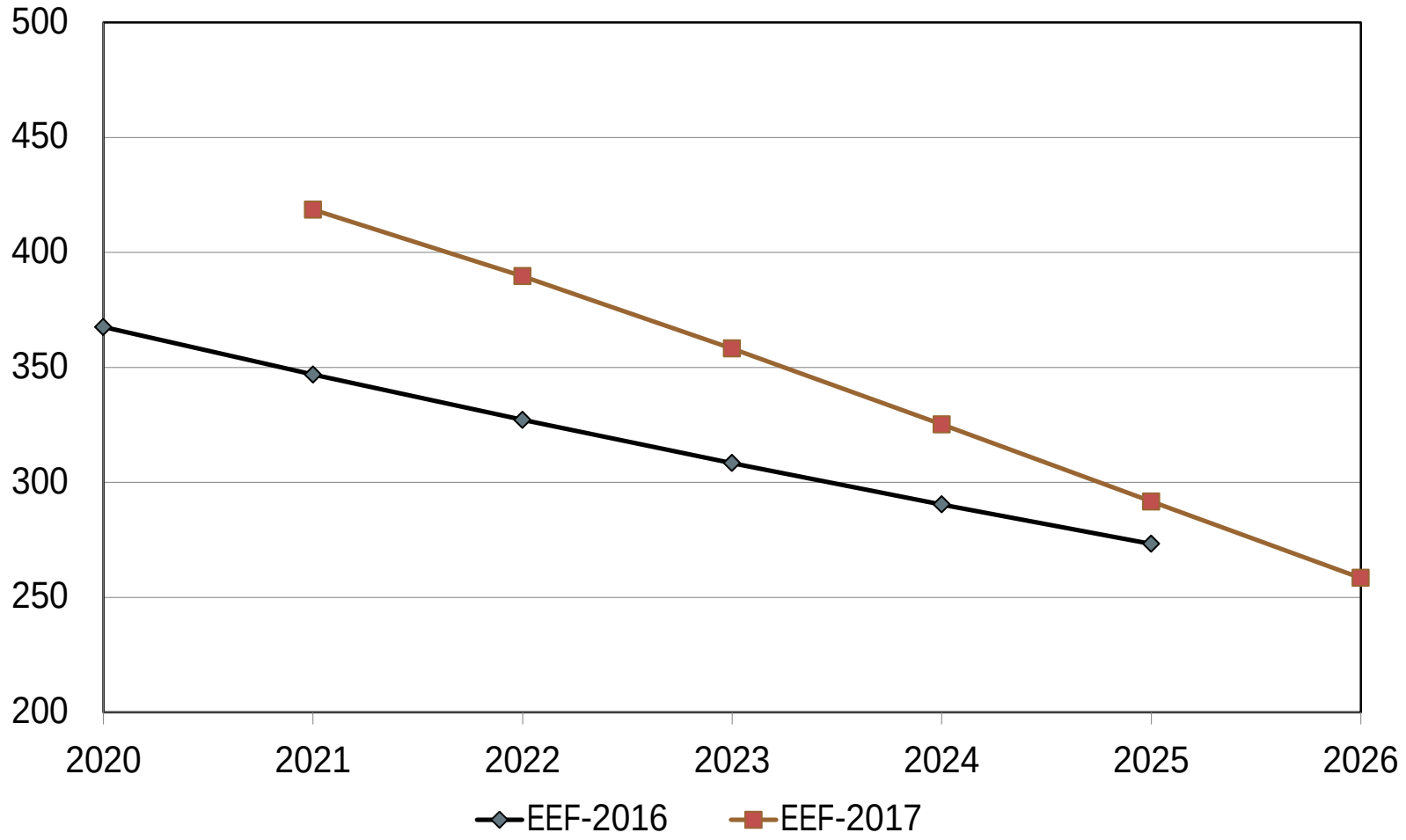
# Connecticut

*Energy Efficiency on Summer Peak (MW)*



# Connecticut

*Efficiency on Annual Energy (GWh)*



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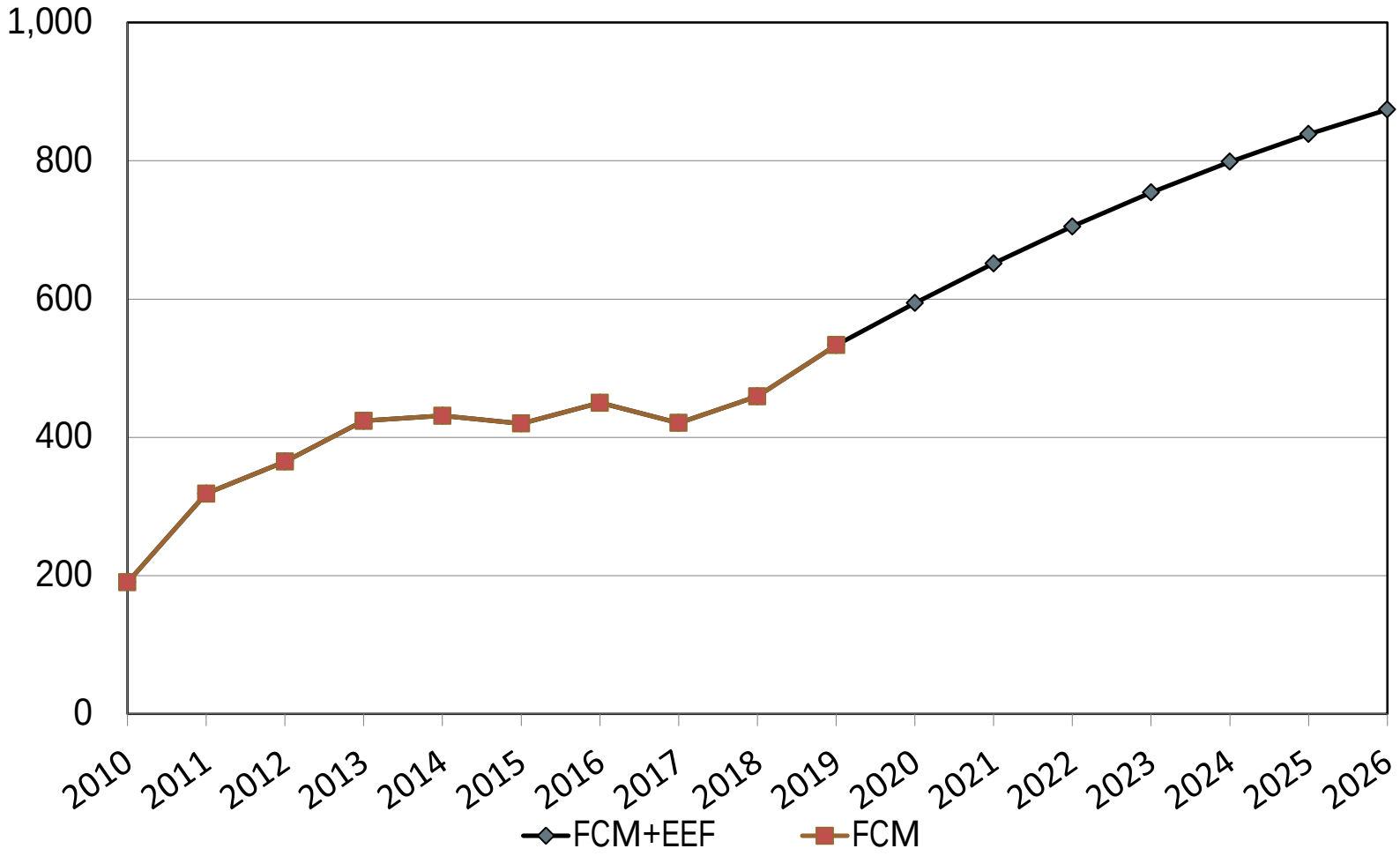
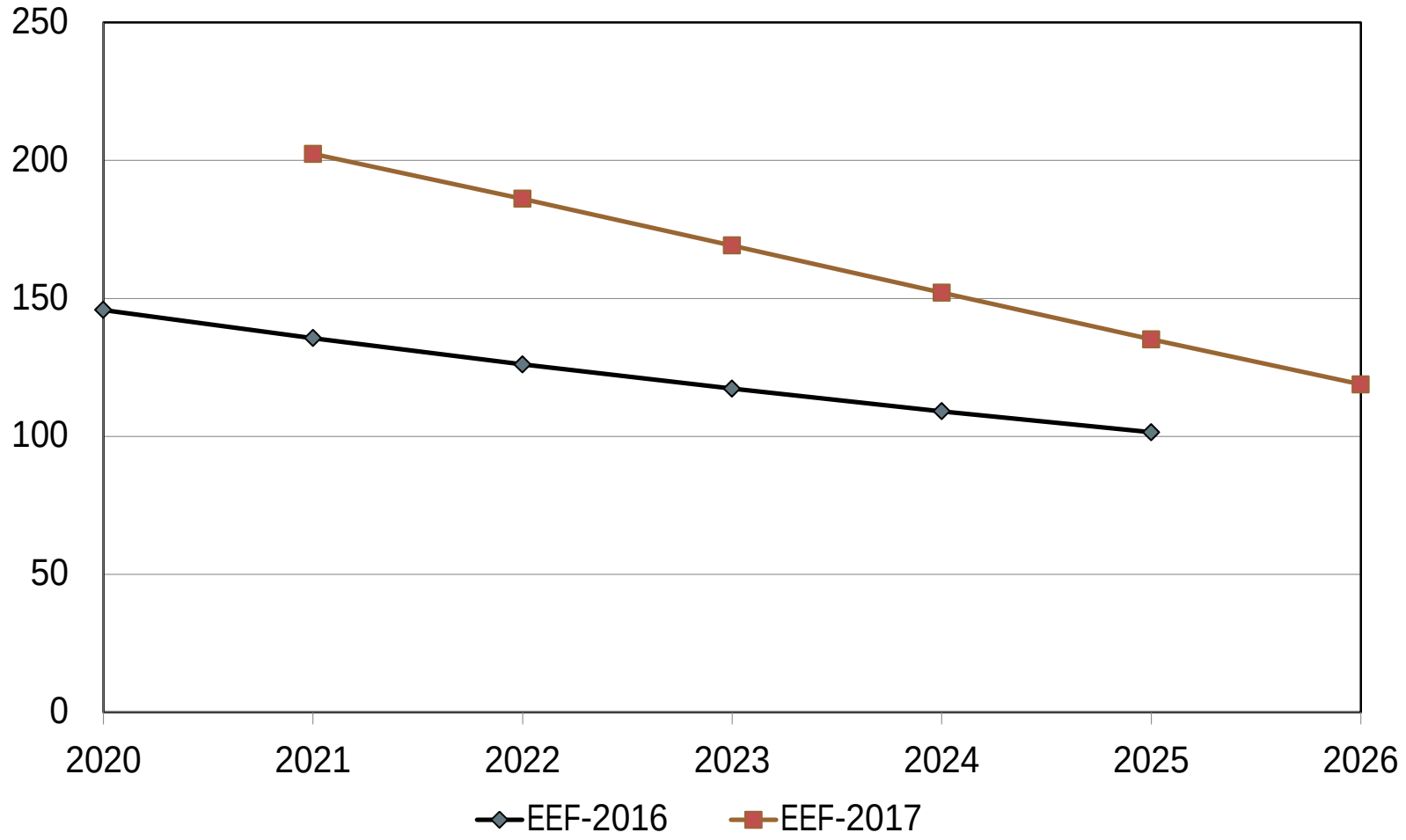


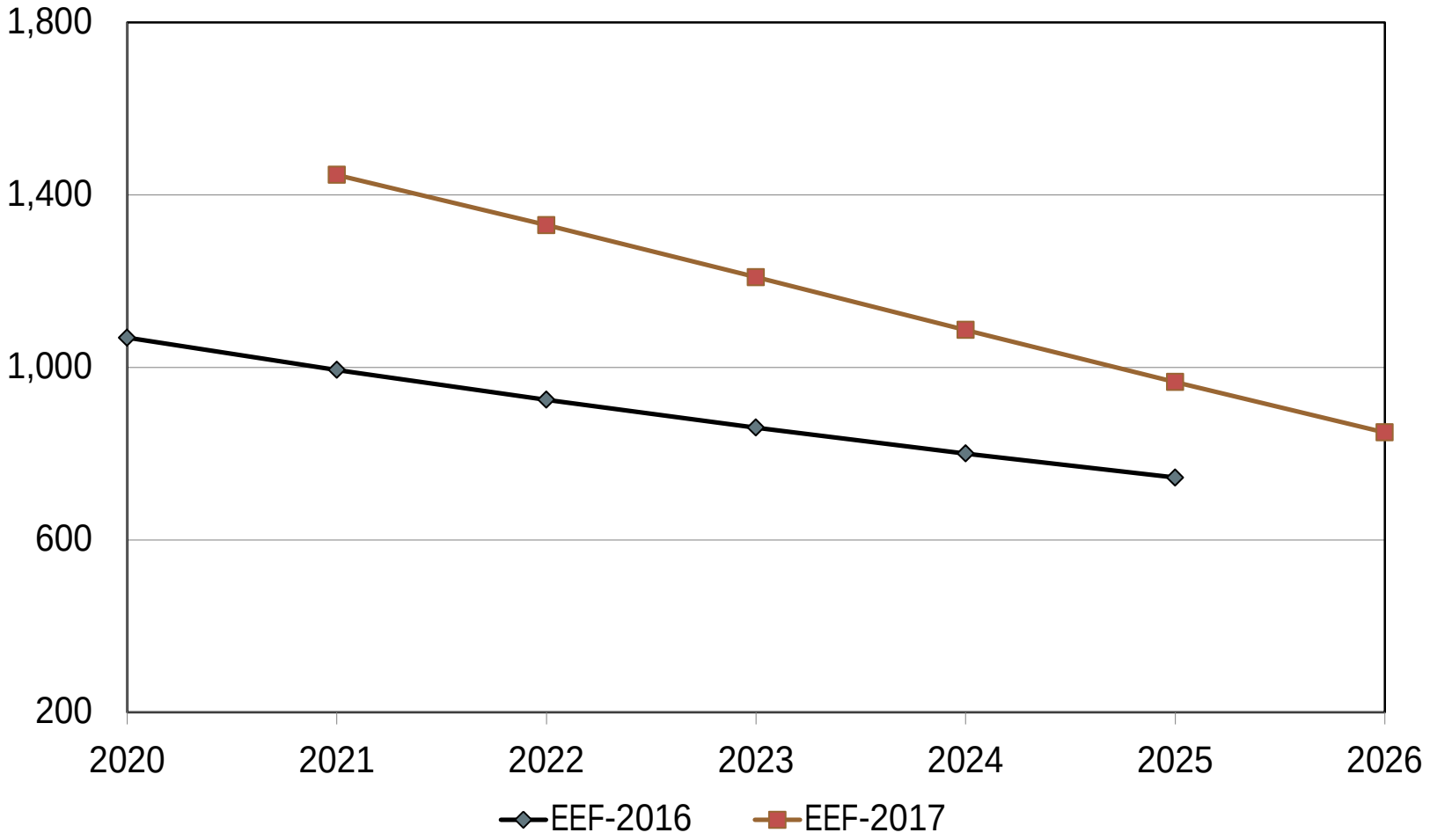
# Massachusetts

*Energy Efficiency on Summer Peak (MW)*



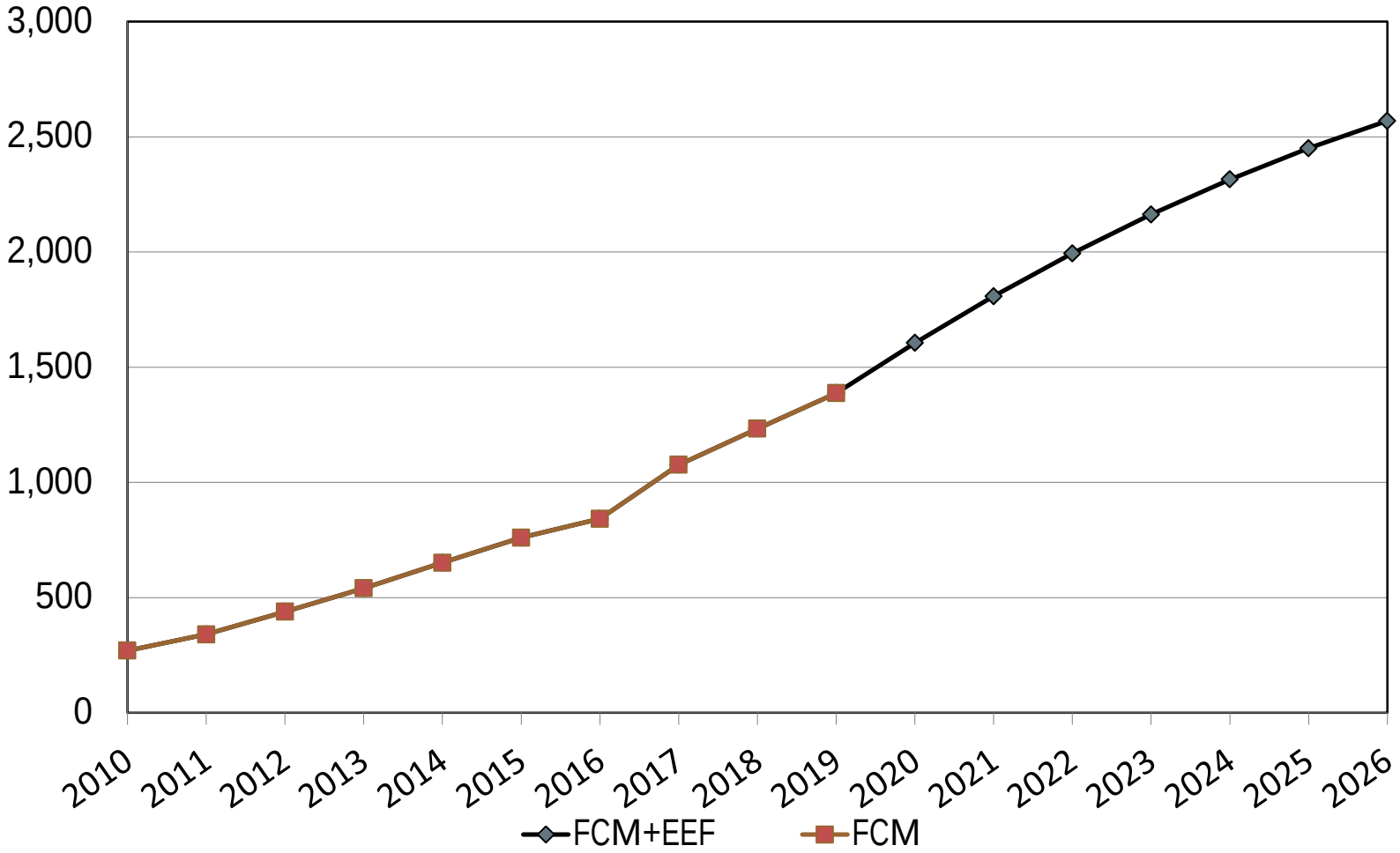
# Massachusetts

*Energy Efficiency on Annual Energy (GWh)*



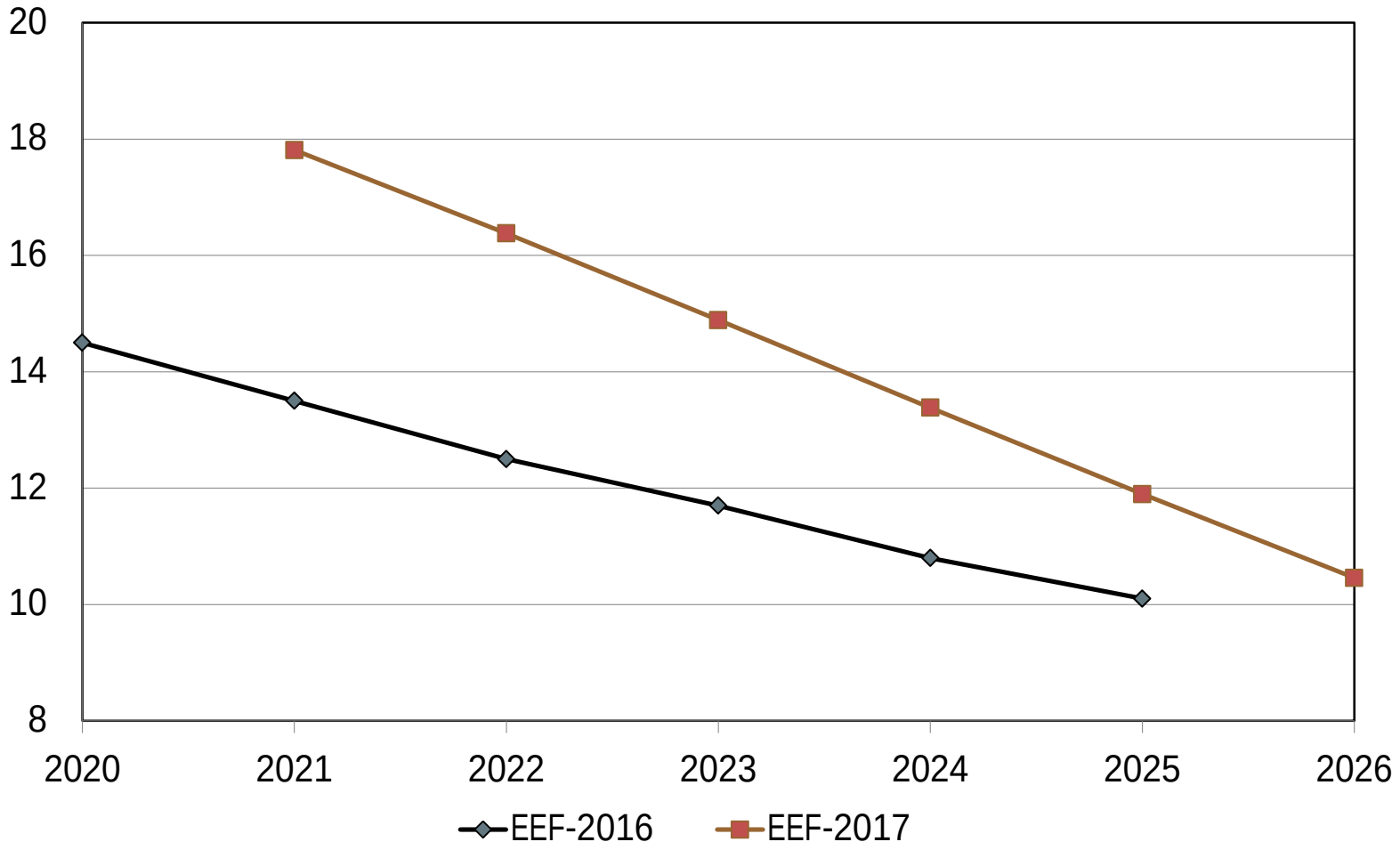
# Massachusetts

*Energy Efficiency on Summer Peak (MW)*



# Maine

*Energy Efficiency on Summer Peak (MW)*



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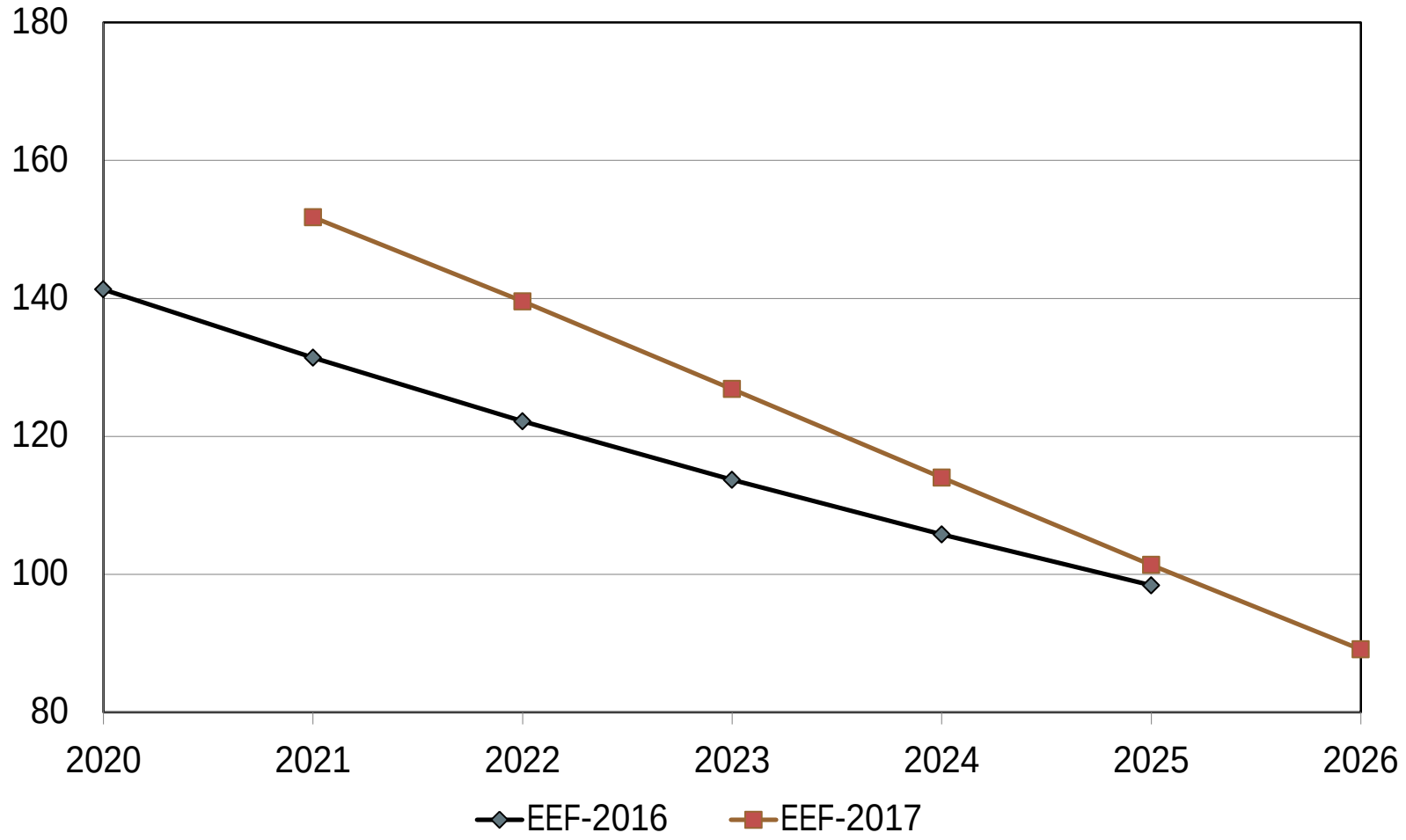

# Maine

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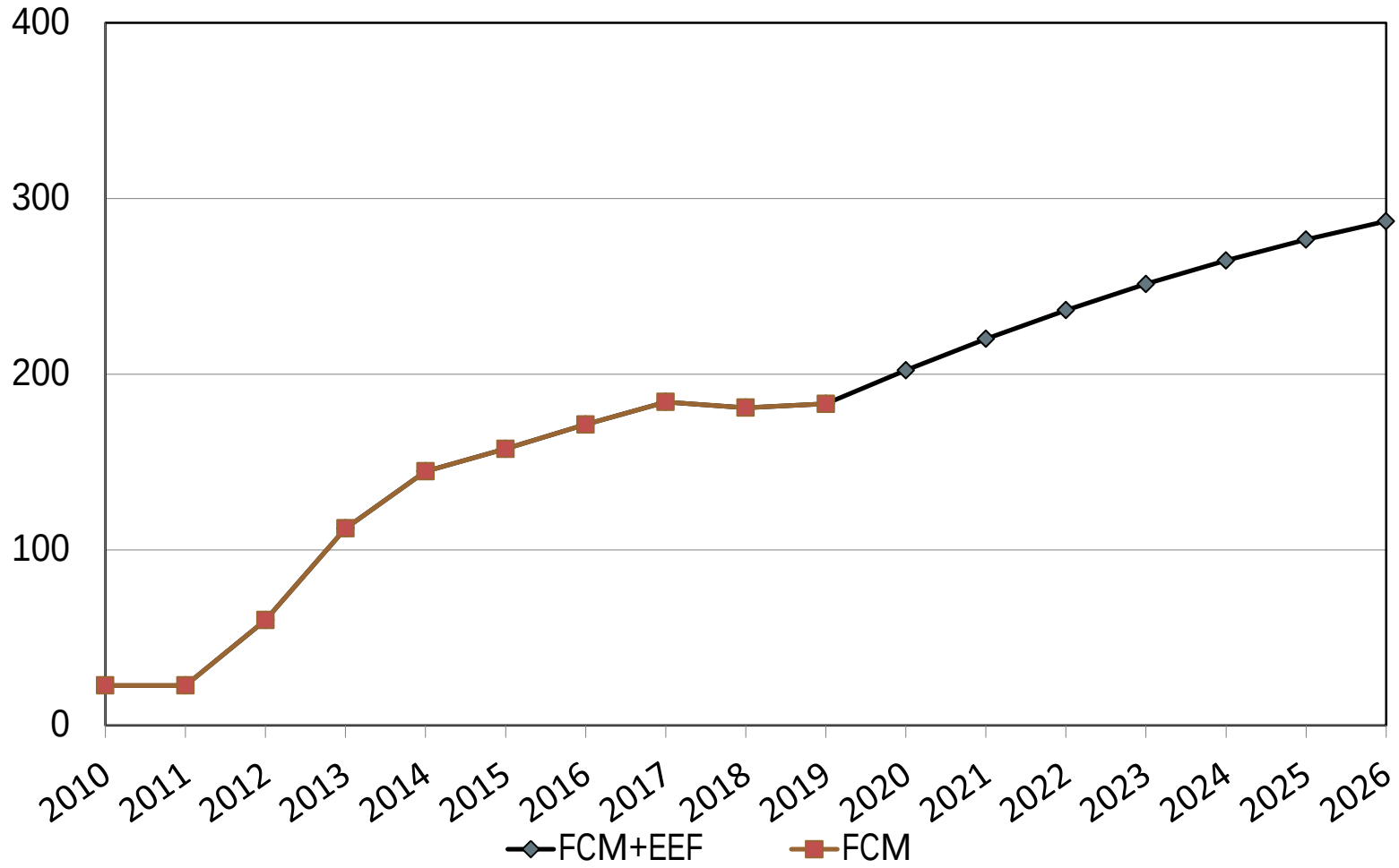
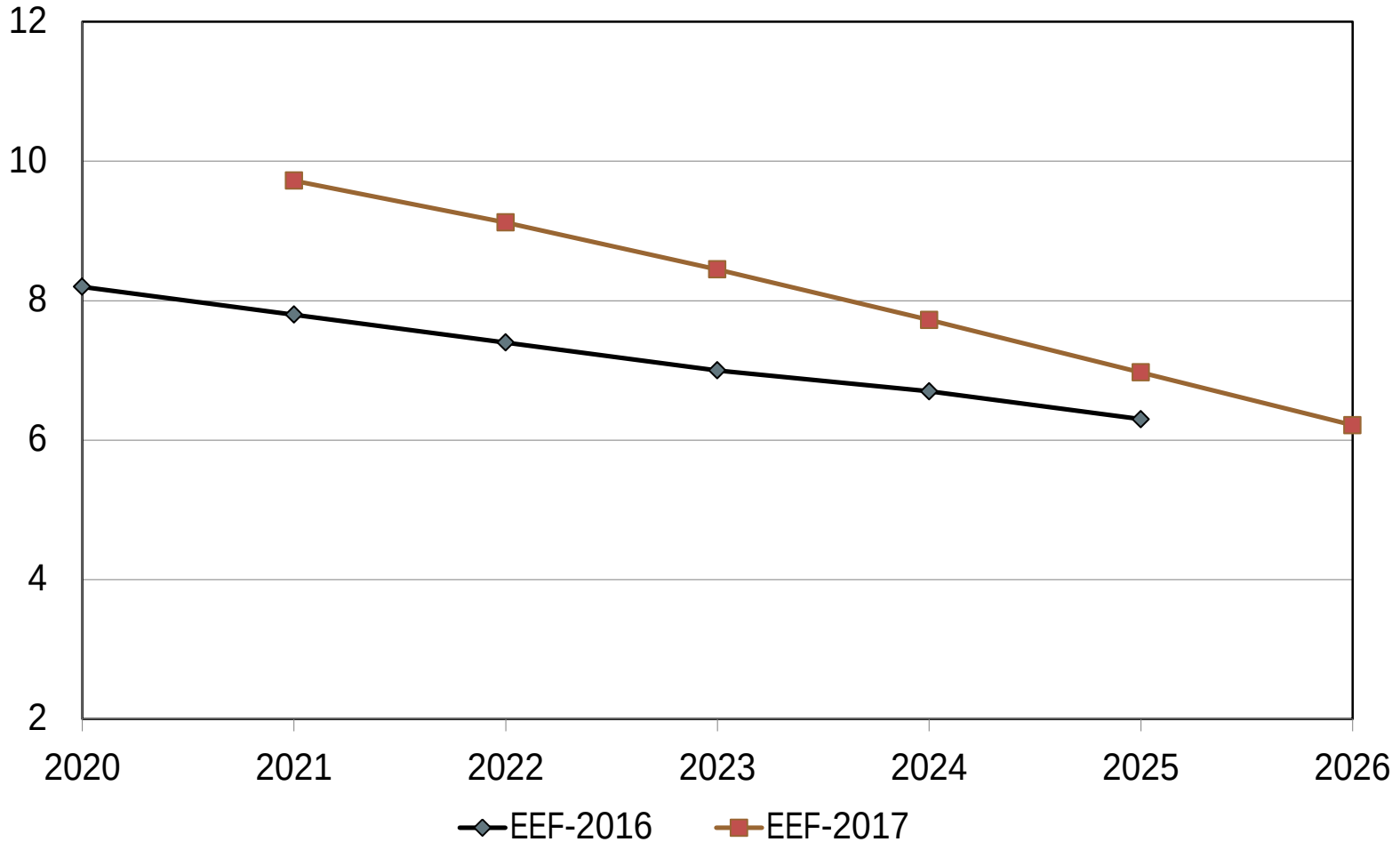


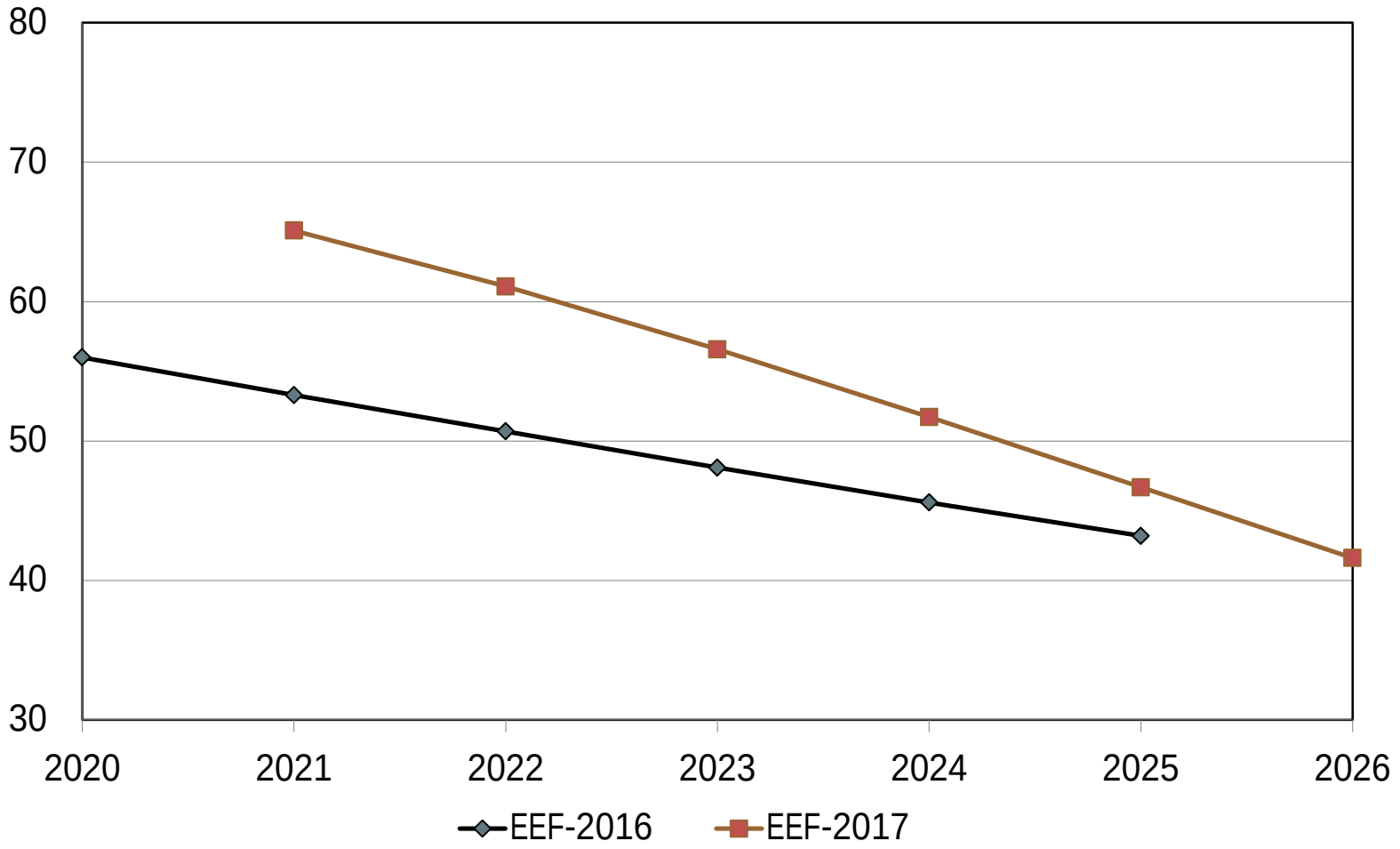
# New Hampshire

*Energy Efficiency on Summer Peak (MW)*



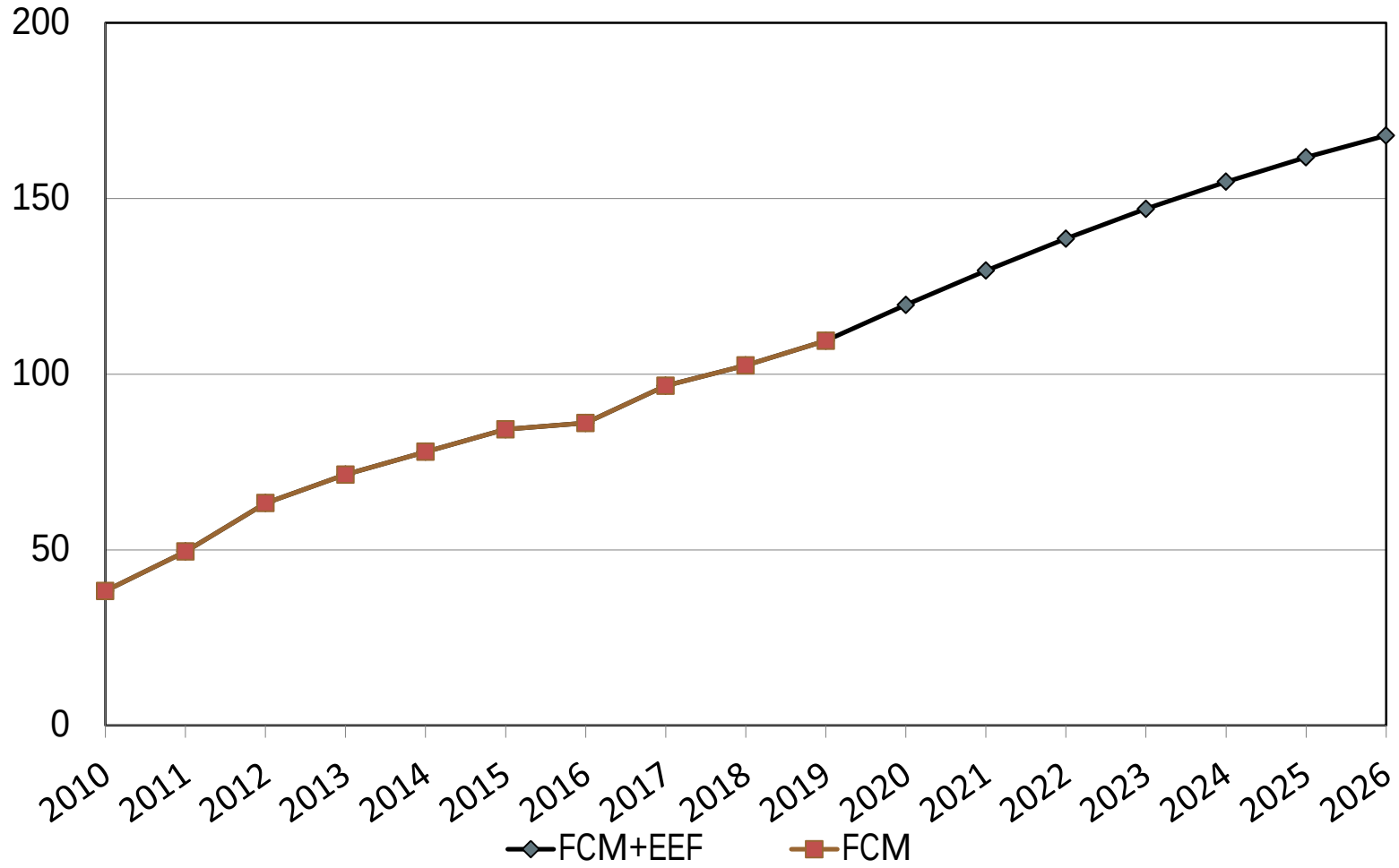
# New Hampshire

*Energy Efficiency on Annual Energy (GWh)*



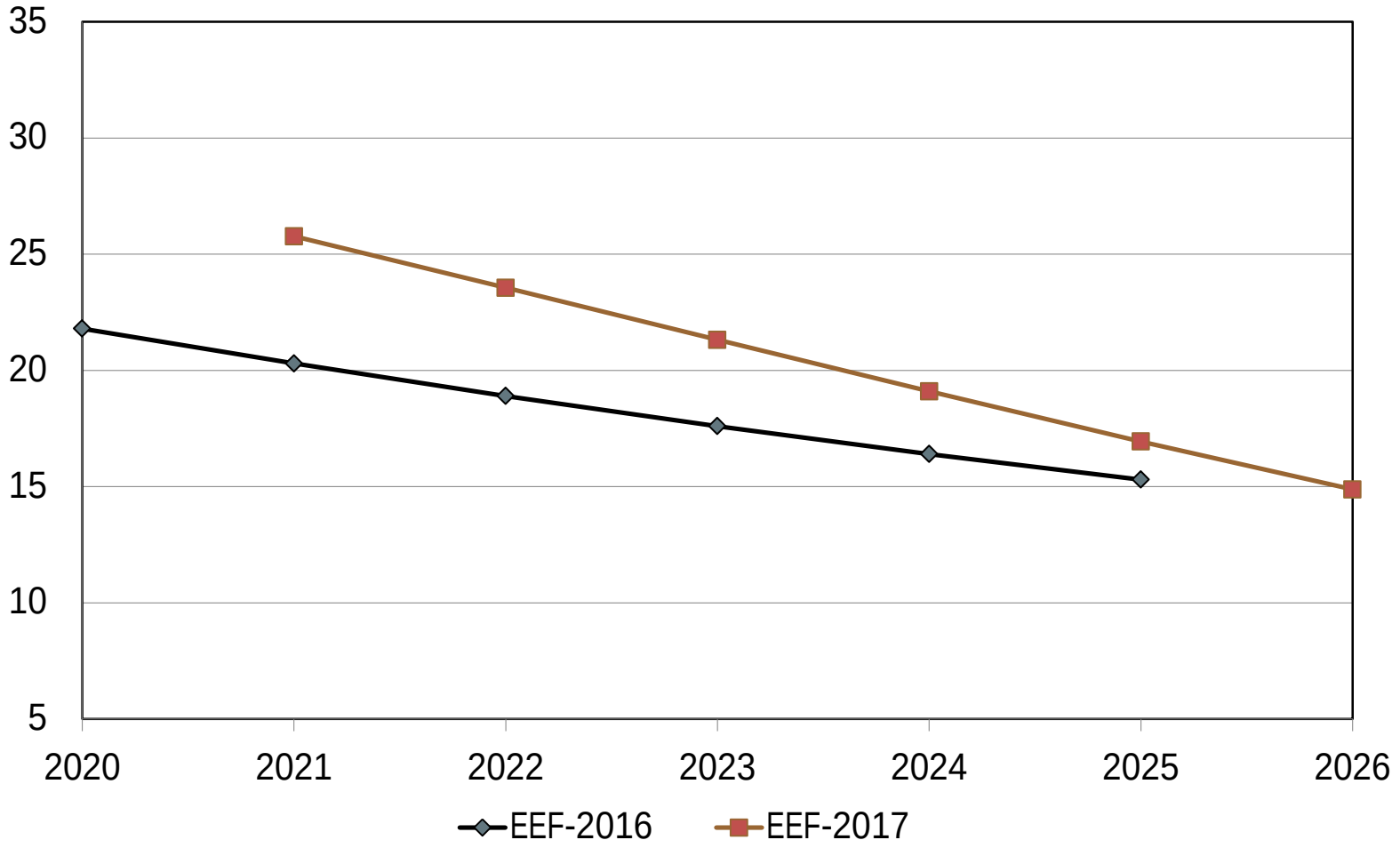
# New Hampshire

*Energy Efficiency on Summer Peak (MW)*



# Rhode Island

*Energy Efficiency on Summer Peak (MW)*



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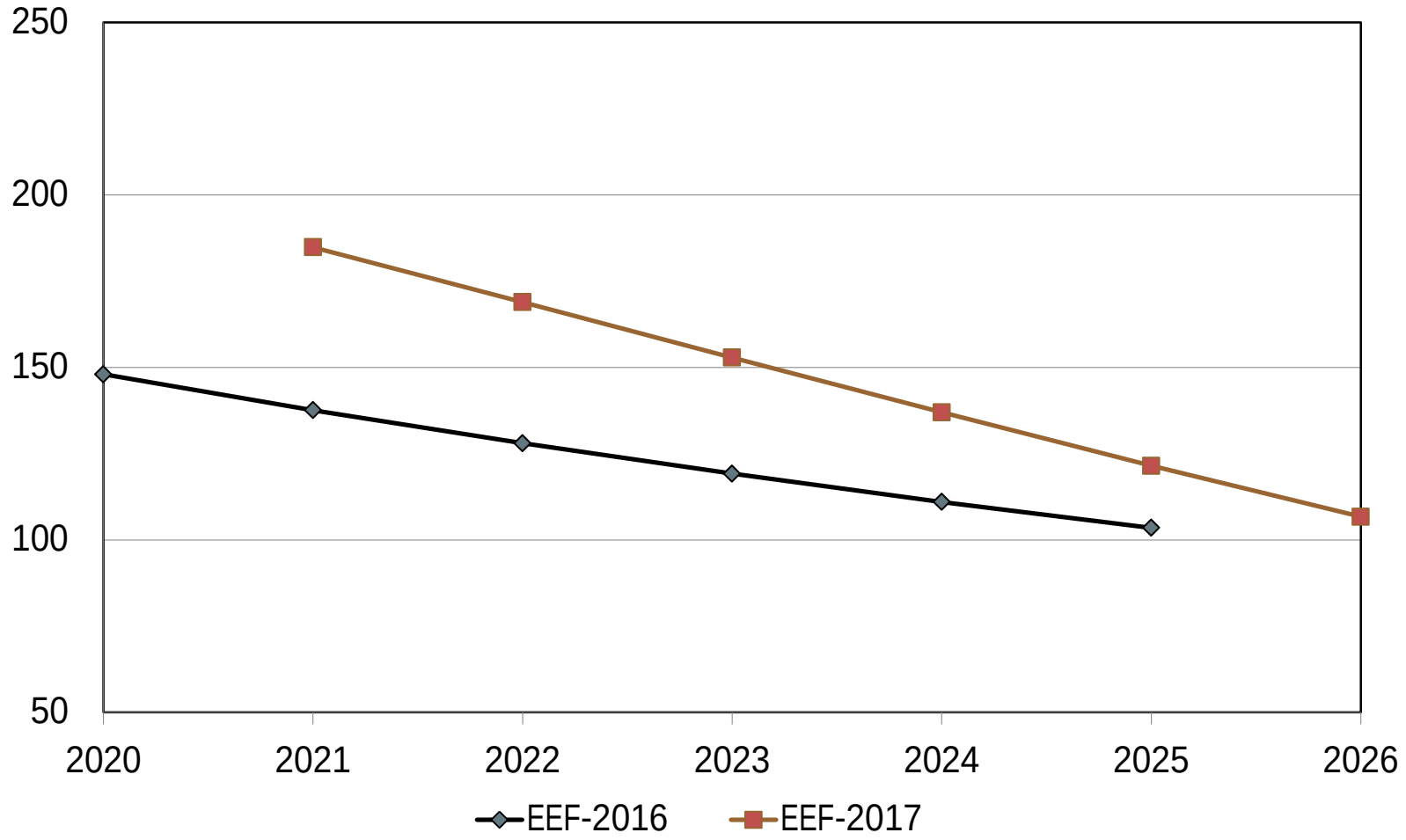

# Rhode Island

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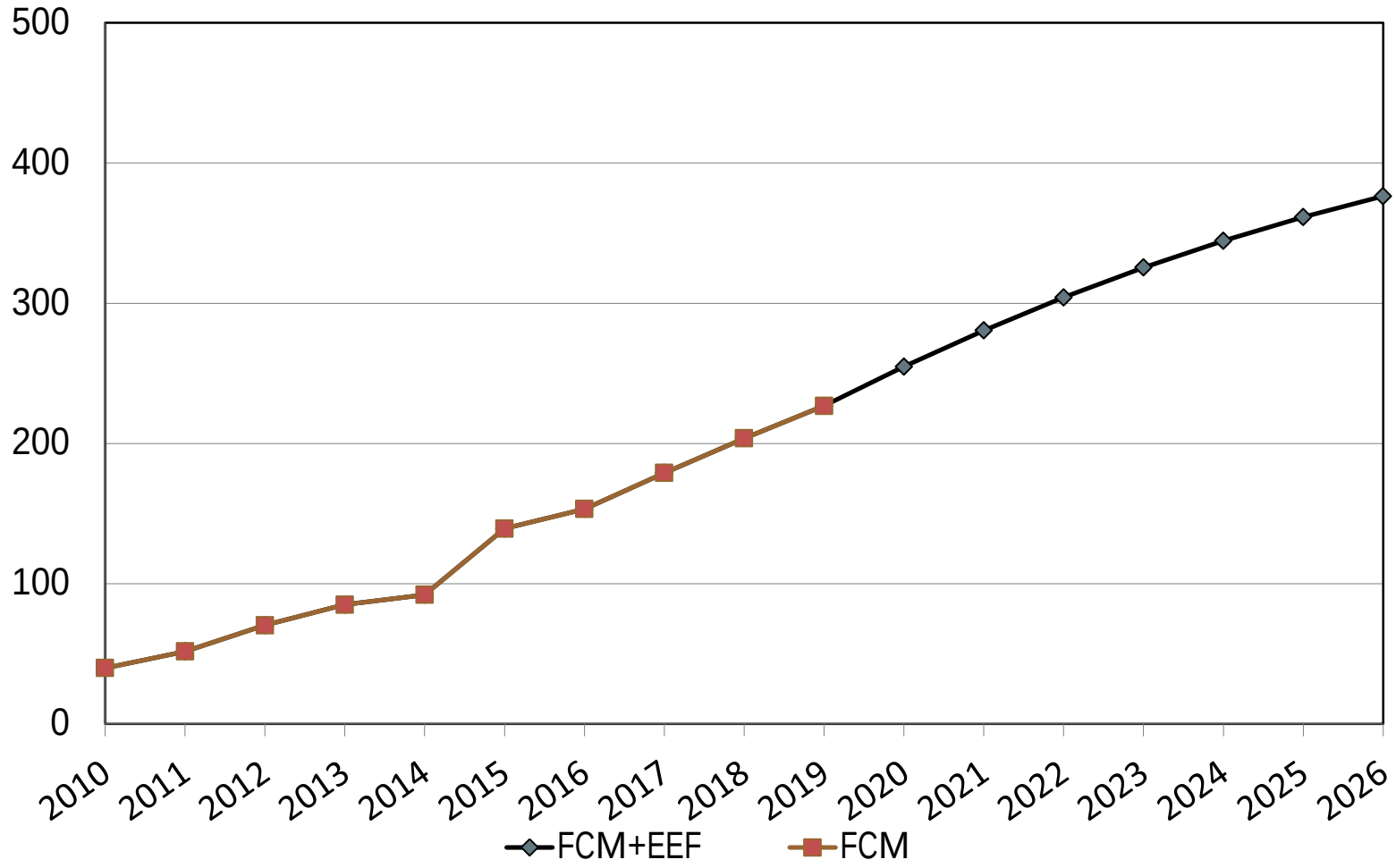
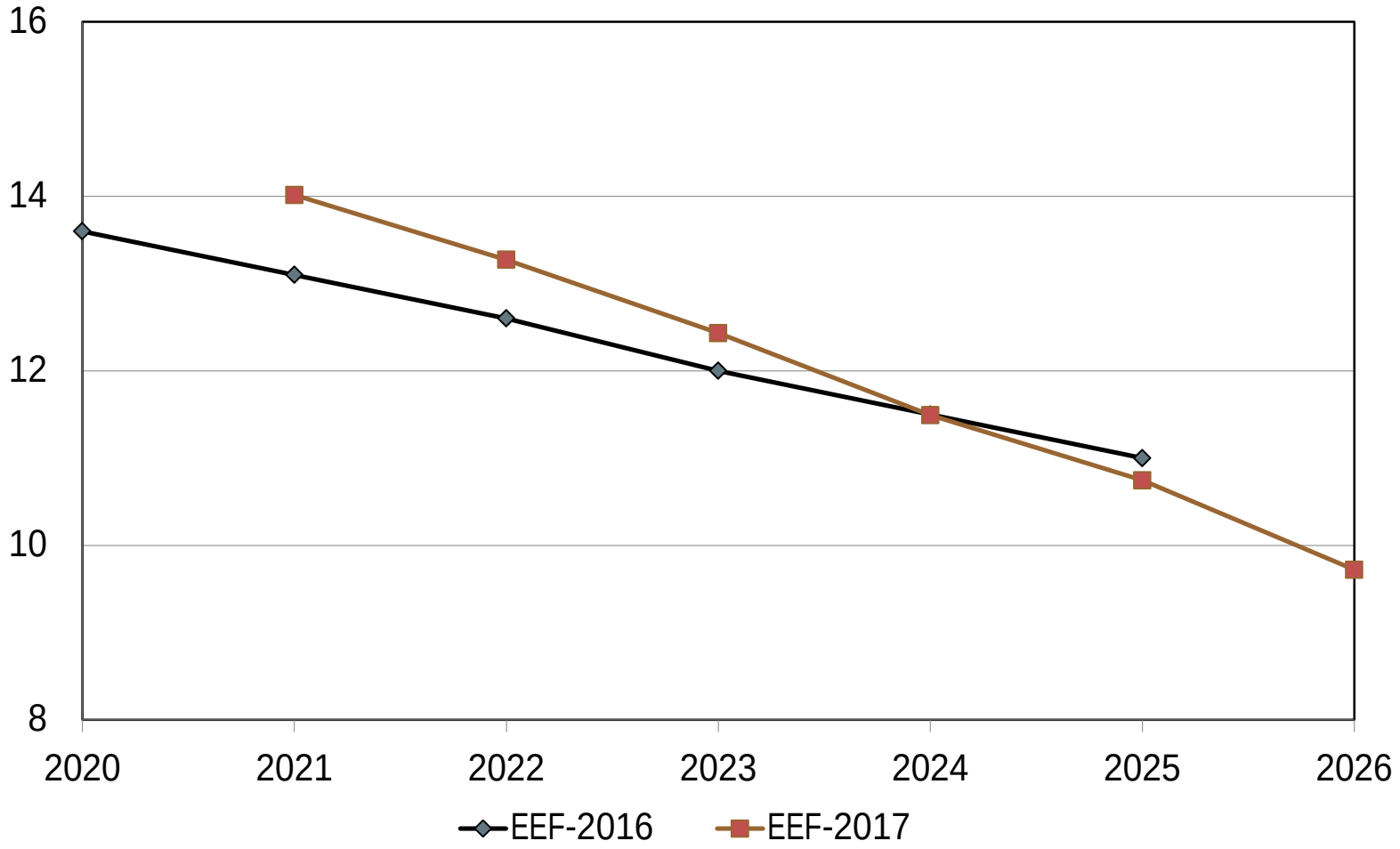


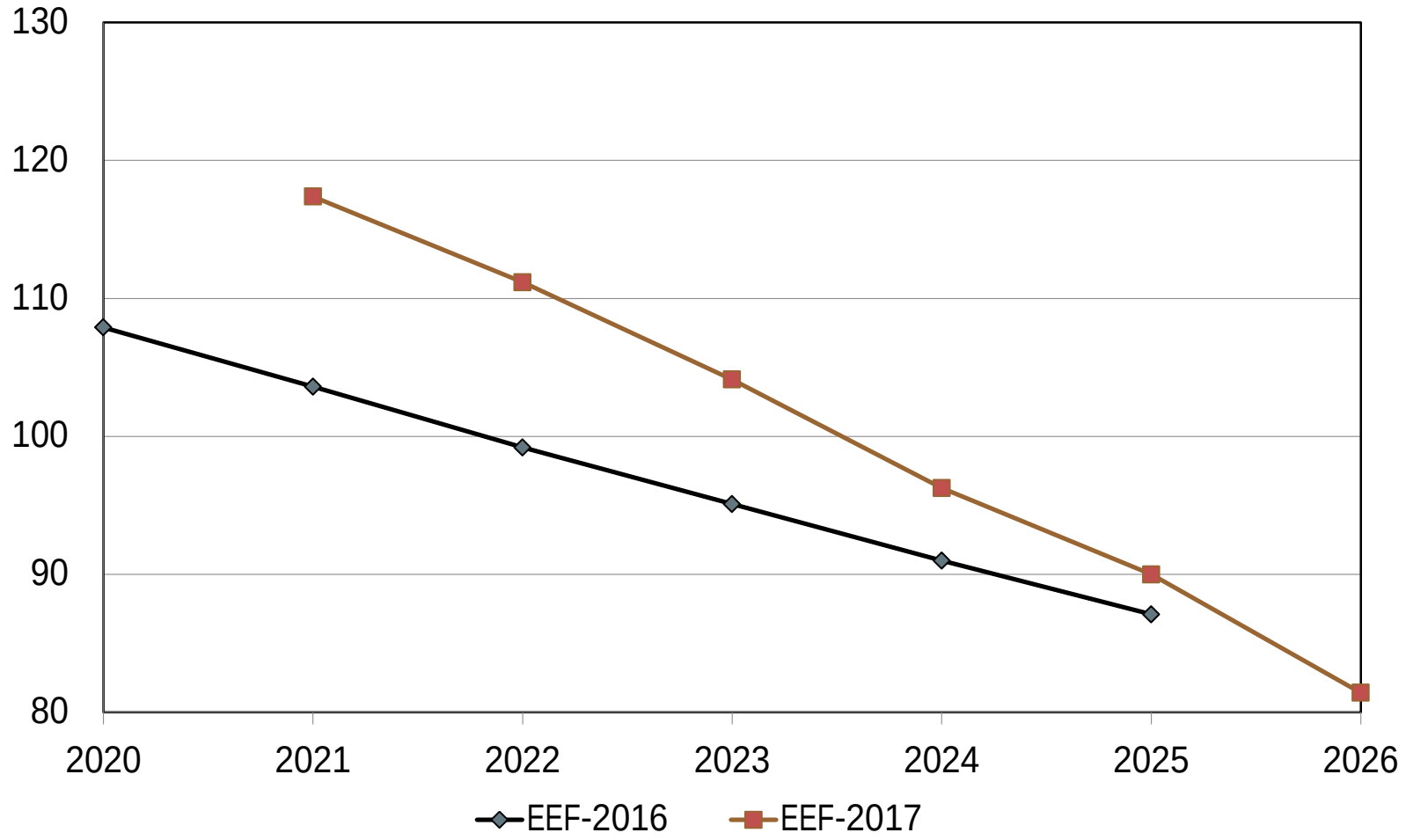
# Vermont

*Energy Efficiency on Summer Peak (MW)*



# Vermont

*Energy Efficiency on Annual Energy (GWh)*



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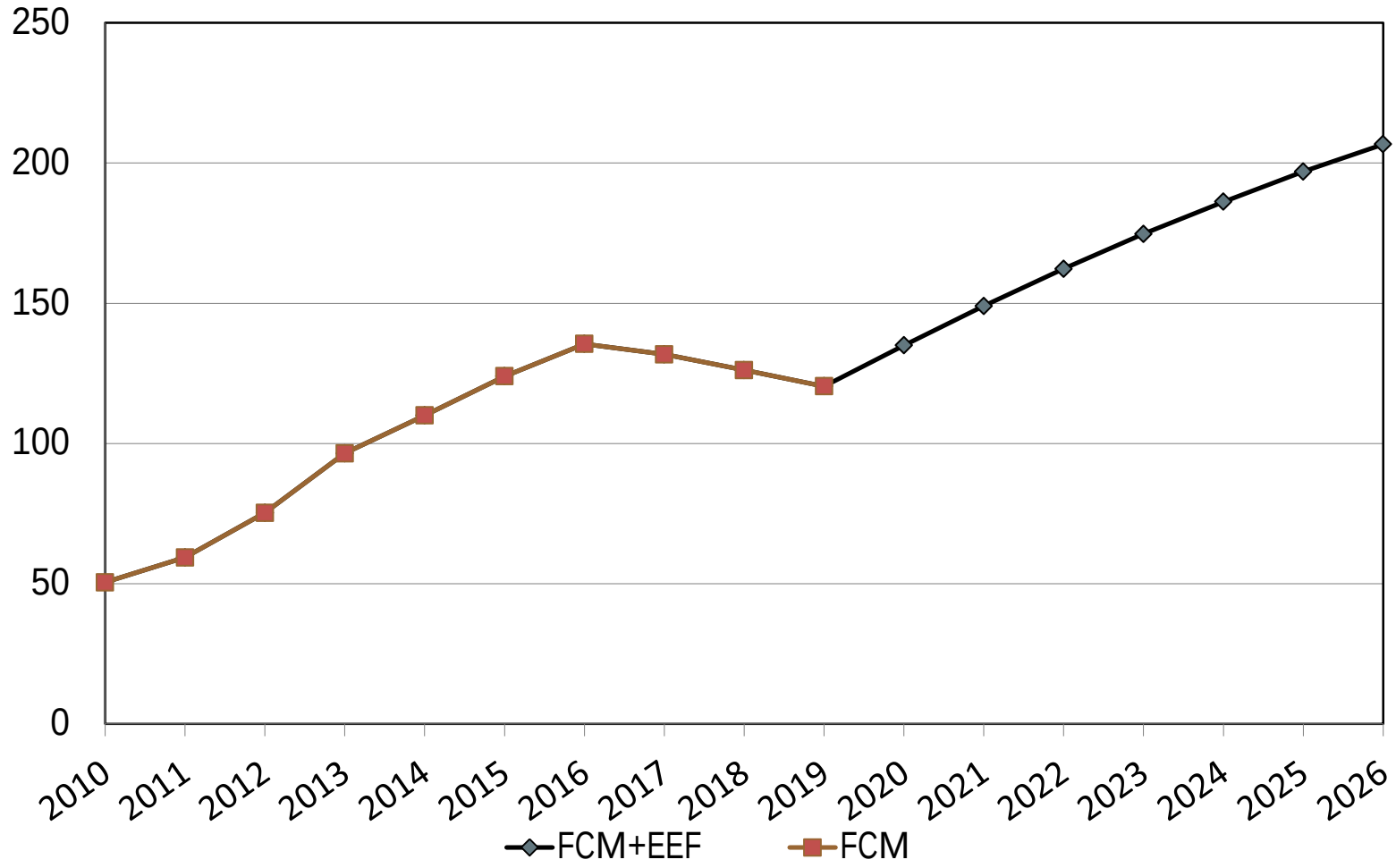

# FORECAST SCHEDULE AND NEXT STEPS

# 2017 Draft Schedule

*Energy-Efficiency Forecast for 2021-2026*

# Looking Ahead

- **March 6, 2017** – Comments on Draft EE Forecast due to ISO New England (eeforecast@iso-ne.com)
- **March 20, 2017** –Comments on Draft EE Forecast Discussion - *Energy- Efficiency Working Group Meeting*
- **March 22-23, 2017** – Presentation of Draft EE Forecast to PAC
- **May 1, 2017** – Final EE Forecast Released by ISO-NE

# Additional Processes

- The final forecast will incorporate the FCA #11 results
- EE Forecast will be incorporated into the CELT to be released in early May 2017

# Questions