

# Tab 5

# Final 2017 Energy-Efficiency Forecast for 2021-2026

---



# 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)
- CELT—10-year forecast of capacity, energy, loads and transmission



# Table of Contents

<u>Topic</u>	<u>Slide</u>
• Introduction	4
• EE Forecast Summary of Assumptions	7
• EE Program Data Summary	14
• EE Forecast Input Data	19
• Final EE Forecast – New England	26
• Final EE Forecast – States	32
• Forecast Schedule	52

# Introduction

- This presentation contains the final 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



# 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 EE forecast is updated annually and is incorporated into the CELT report
- A generalized characterization of the forecast process can be found at <http://www.iso-ne.com/eefwg>



# 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



# 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 – Final Values*

Year	Inflation	Graduated Escalation Rate	Total Escalation Rate
2017	2.50%	0%	2.50%
2018	2.50%	1.25%	3.75%
2019	2.50%	2.50%	5.00%
2020	2.50%	3.75%	6.25%
2021	2.50%	5.00%	7.50%
2022	2.50%	6.25%	8.75%
2023	2.50%	7.50%	10.00%
2024	2.50%	8.75%	11.25%
2025	2.50%	10.00%	12.50%
2026	2.50%	11.25%	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
<b>Total Energy</b>			<b>6,864</b>

### 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
<b>Total Energy</b>			<b>7,388</b>

# 2017 Forecast Update to Assumptions

## *Inputs*

- 2016 CELT Energy Forecast
- 2016 CELT FCM CSOs
- FCA #11 Clearing Price
- 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 two)
- 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 is 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 the Forward Capacity Market*

- FCM capacity clearing price was held constant at \$5.30/kW-month,<sup>†</sup> the latest FCA clearing price for Capacity Commitment Period 2020-2021
- ISO assumes that all achieved EE capacity will be bid into and clear in future FCA's<sup>‡</sup>

<sup>†</sup> FCA clearing price used is for modeling purposes only and should not be considered an indication of future clearing prices.

<sup>‡</sup> 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*

$$1) \text{ MWh} = [ (1\text{-BSR}) * \text{Budget \$} ] / [ \$/\text{MWh} * \text{PCINCR} ]$$

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 increase (%)

$$2) \text{ MW} = \text{MWh} * \text{PER}$$

Where:

PER	= peak-to-energy ratio (MW/GWh)
-----	---------------------------------



# SUMMARY OF ENERGY-EFFICIENCY PROGRAM DATA



# Summary of Program Performance Changes

- **Production Cost**
  - ME, VT and CT saw an increase, resulting in a decrease in energy reductions from equivalent budgets
  - NH and RI remained constant
  - MA 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
<b>New England</b>												
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
<b>Connecticut</b>												
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
<b>Maine</b>												
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
<b>Massachusetts</b>												
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
<b>New Hampshire</b>												
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
<b>Rhode Island</b>												
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
<b>Vermont</b>												
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

# FORECAST INPUT DATA

# FCM and RGGI Dollars

<b>RGGI Dollars (\$1000's) - Applied to EE Annually</b>							
	ISONE	ME	NH	VT	CT	RI	MA
	91,014	0	4,300	0	18,369	3,588	64,757
<b>FCM MW</b>							
	ISONE	ME	NH	VT	CT	RI	MA
2020	2,791	139	120	98	621	267	1,546
<b>FCM Dollars (\$1000's, Clearing Price of \$5.30*)</b>							
	ISONE	ME	NH	VT	CT	RI	MA
2020	162,353	0	7,641	0	39,448	16,964	98,301
<b>FCM Dollars for EE (\$1000's)</b>							
	ISONE	ME	NH	VT	CT	RI	MA
2021	162,353	0	7,641	0	39,448	16,964	98,301
2022	162,353	0	7,641	0	39,448	16,964	98,301
2023	162,353	0	7,641	0	39,448	16,964	98,301
2024	162,353	0	7,641	0	39,448	16,964	98,301
2025	162,353	0	7,641	0	39,448	16,964	98,301
2026	162,353	0	7,641	0	39,448	16,964	98,301

\* Auction clearing price for Rest-of-Pool

# Energy Forecast

2016 CELT 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 CELT 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	305,824	0	20,736	0	88,803	72,460	123,826	
2022	307,881	0	20,919	0	89,376	72,224	125,361	
2023	310,035	0	21,104	0	89,934	72,094	126,903	
2024	312,206	0	21,284	0	90,451	72,071	128,400	
2025	314,383	0	21,459	0	90,939	72,124	129,861	
2026	316,625	0	21,634	0	91,427	72,243	131,322	



# Impacts of New EE on Revenue Streams

Lost SBC Dollars (\$1000's)								
	ISONE	ME	NH	VT	CT	RI	MA	
2021	14,334	0	248	0	2,622	4,293	7,171	
2022	20,717	0	359	0	3,788	6,211	10,359	
2023	26,540	0	460	0	4,850	7,966	13,264	
2024	31,793	0	552	0	5,808	9,552	15,881	
2025	36,478	0	634	0	6,660	10,972	18,212	
2026	40,610	0	706	0	7,411	12,227	20,266	
New FCM Dollars (\$1000's)								
	ISONE	ME	NH	VT	CT	RI	MA	
2021	37,971	0	1,308	0	7,612	3,543	25,508	
2022	54,866	0	1,892	0	10,998	5,126	36,850	
2023	70,268	0	2,426	0	14,084	6,573	47,185	
2024	84,148	0	2,909	0	16,863	7,882	56,494	
2025	96,519	0	3,341	0	19,339	9,054	64,786	
2026	107,423	0	3,722	0	21,520	10,090	72,092	

# Policy Dollars and Total Budgets

Policy Dollars (\$1000's)*								
	ISONE	ME	NH	VT	CT	RI	MA	
2021	599,657	39,494	0	60,795	87,789	0	411,579	
2022	591,786	39,494	0	62,613	87,789	0	401,890	
2023	584,712	39,494	0	64,510	87,789	0	392,919	
2024	578,359	39,494	0	66,346	87,789	0	384,730	
2025	574,376	39,494	0	69,785	87,789	0	377,308	
2026	569,692	39,494	0	71,814	87,789	0	370,595	
Total Budget Dollars (\$1000's)								
	ISONE	ME	NH	VT	CT	RI	MA	
2021	1,182,486	39,494	33,736	60,795	239,399	92,261	716,801	
2022	1,187,183	39,494	34,393	62,613	242,193	91,690	716,801	
2023	1,191,841	39,494	35,011	64,510	244,773	91,253	716,801	
2024	1,196,288	39,494	35,582	66,346	247,112	90,952	716,801	
2025	1,202,167	39,494	36,107	69,785	249,223	90,758	716,801	
2026	1,206,497	39,494	36,591	71,814	251,141	90,657	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

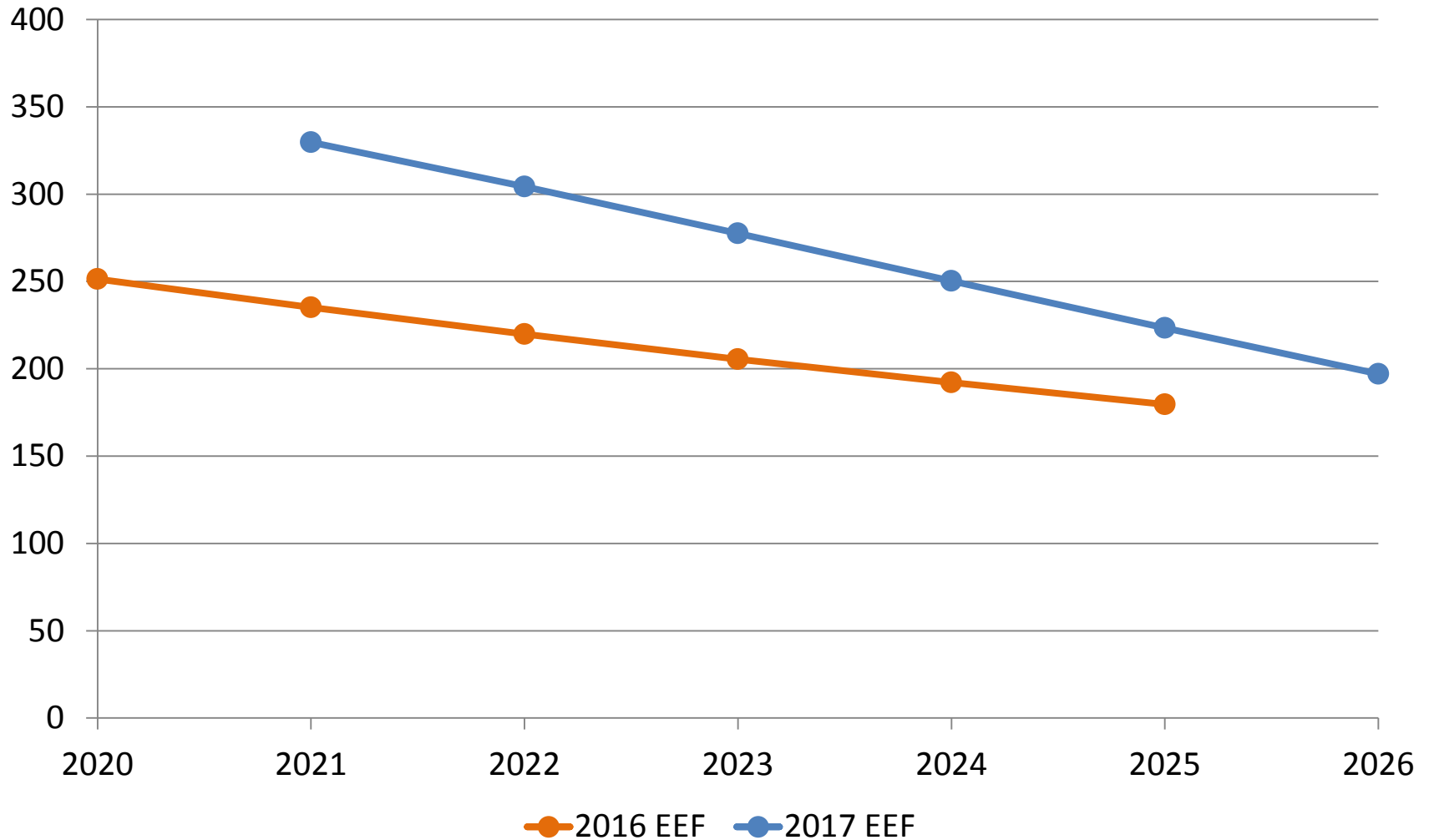
<b>Production Cost Multiplier (includes inflation)</b>							
	ME	NH	VT	CT	RI	MA	
2016	1.0250	1.0250	1.0250	1.0250	1.0250	1.0250	1.0250
2017	1.0250	1.0250	1.0250	1.0250	1.0250	1.0250	1.0250
2018	1.0375	1.0375	1.0375	1.0375	1.0375	1.0375	1.0375
2019	1.0500	1.0500	1.0500	1.0500	1.0500	1.0500	1.0500
2020	1.0625	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	1.0750
2022	1.0875	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	1.1000
2024	1.1125	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	1.1250
2026	1.1375	1.1375	1.1375	1.1375	1.1375	1.1375	1.1375
<b>Production Cost \$/MWh</b>							
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	
<b>Peak-to-Energy Ratio (MW/GWh)</b>							
	ME	NH	VT	CT	RI	MA	
	0.1174	0.1493	0.1194	0.137	0.1394	0.1399	

# FINAL 2017 ENERGY-EFFICIENCY FORECAST

*New England*

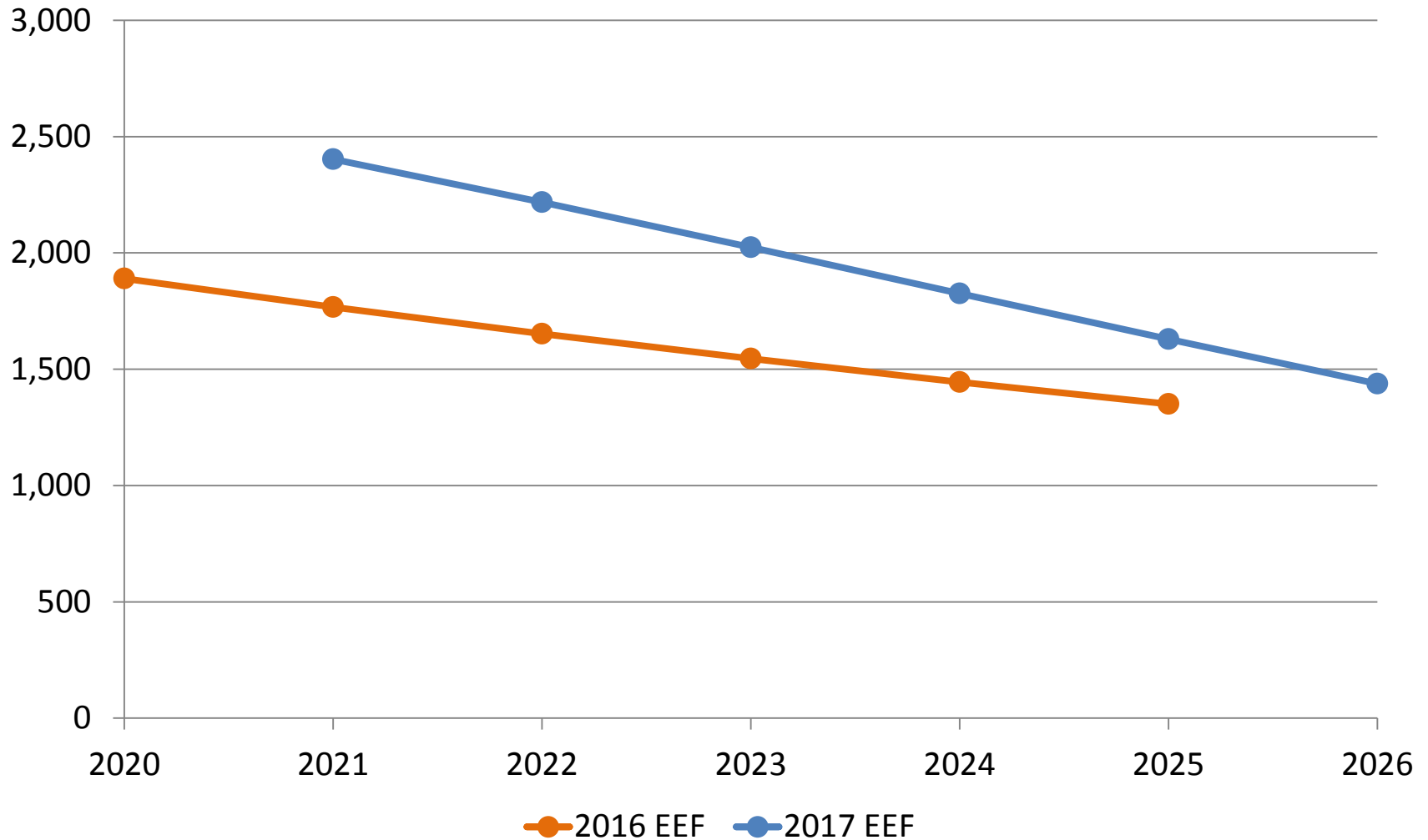
# New England

## *Efficiency on Summer Peak (MW)*



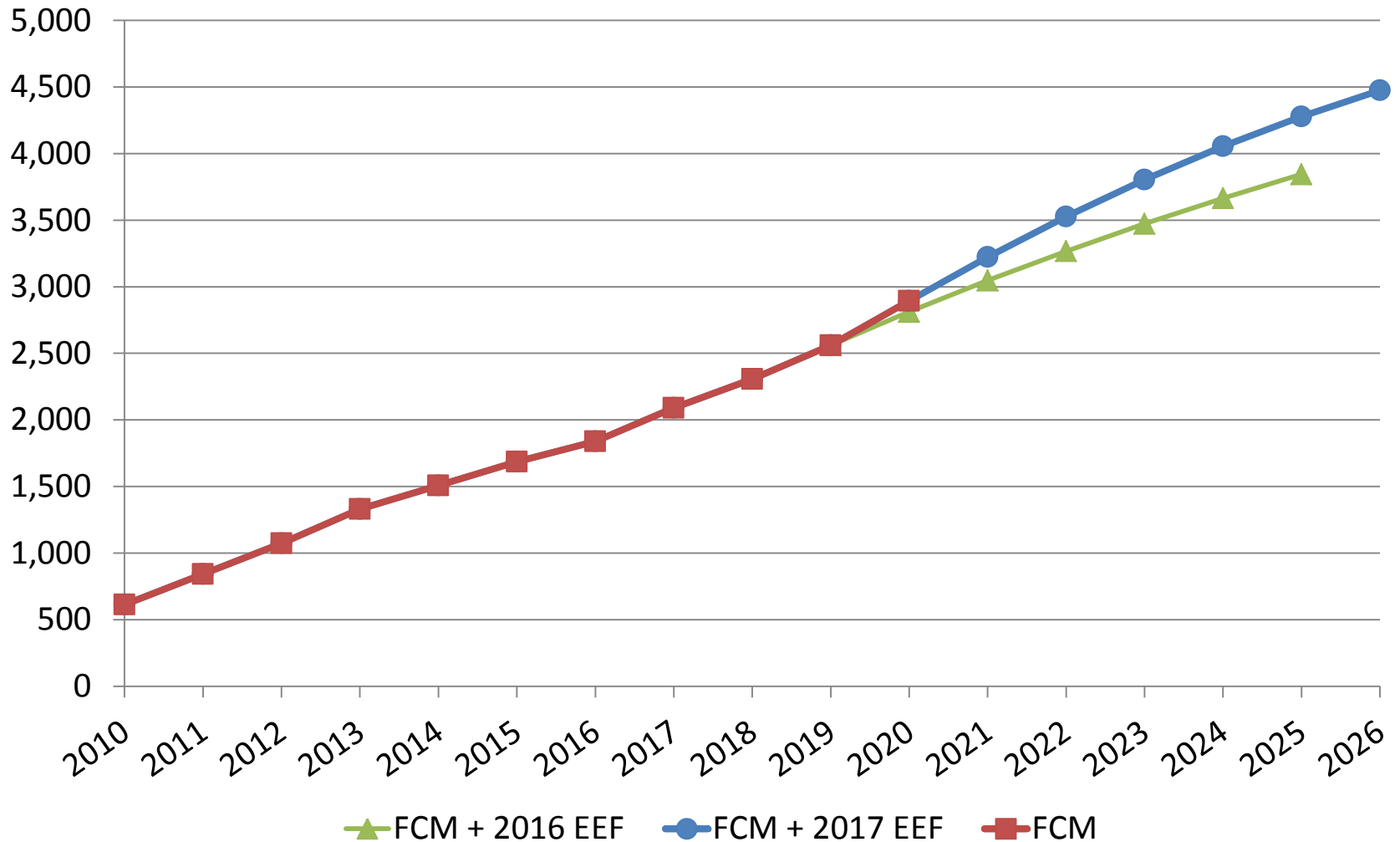
# New England

## *Efficiency on Annual Energy (GWh)*



# New England

## *Efficiency on Summer Peak (MW)*



# Energy and Summer Peak EE Forecast Data

GWh Savings								
	ISONE	ME	NH	VT	CT	RI	MA	
2021	2,403	152	69	117	431	188	1,447	
2022	2,218	140	64	111	401	172	1,330	
2023	2,023	127	60	104	368	156	1,209	
2024	1,825	114	54	96	334	139	1,087	
2025	1,630	101	49	90	299	124	966	
2026	1,438	89	44	81	265	109	849	
Total 2021-2026	11,537	723	340	600	2,098	887	6,888	
Average	1,923	120	57	100	350	148	1,148	
MW Savings								
	ISONE	ME	NH	VT	CT	RI	MA	
2021	330	18	10	14	59	26	202	
2022	304	16	10	13	55	24	186	
2023	278	15	9	12	50	22	169	
2024	250	13	8	11	46	19	152	
2025	223	12	7	11	41	17	135	
2026	197	10	7	10	36	15	119	
Total 2021-2026	1,582	84	51	71	287	123	963	
Average	264	14	9	12	48	21	161	





# Forecast Comparison

<b>PA Average PRODUCTION COST (\$/MWh)</b>							
	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
<b>PA Average PEAK-ENERGY RATIO (MW/GWh)</b>							
	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
<b>Total EE Dollars (1000s)</b>							
	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	7,166,462	236,964	211,420	395,863	1,473,841	547,571	4,300,806
Average	1,194,410	39,494	35,237	65,977	245,640	91,262	716,801
<b>ANNUAL EE ENERGY IMPACTS (GWh)</b>							
	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	11,537	723	340	600	2,098	887	6,888
Average	1,923	120	57	100	350	148	1,148
<b>SUMMER EE PEAK IMPACTS (MW)</b>							
	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	1,582	84	51	71	287	123	963
Average	264	14	9	12	48	21	161

# FINAL 2017 ENERGY-EFFICIENCY FORECAST

*States*

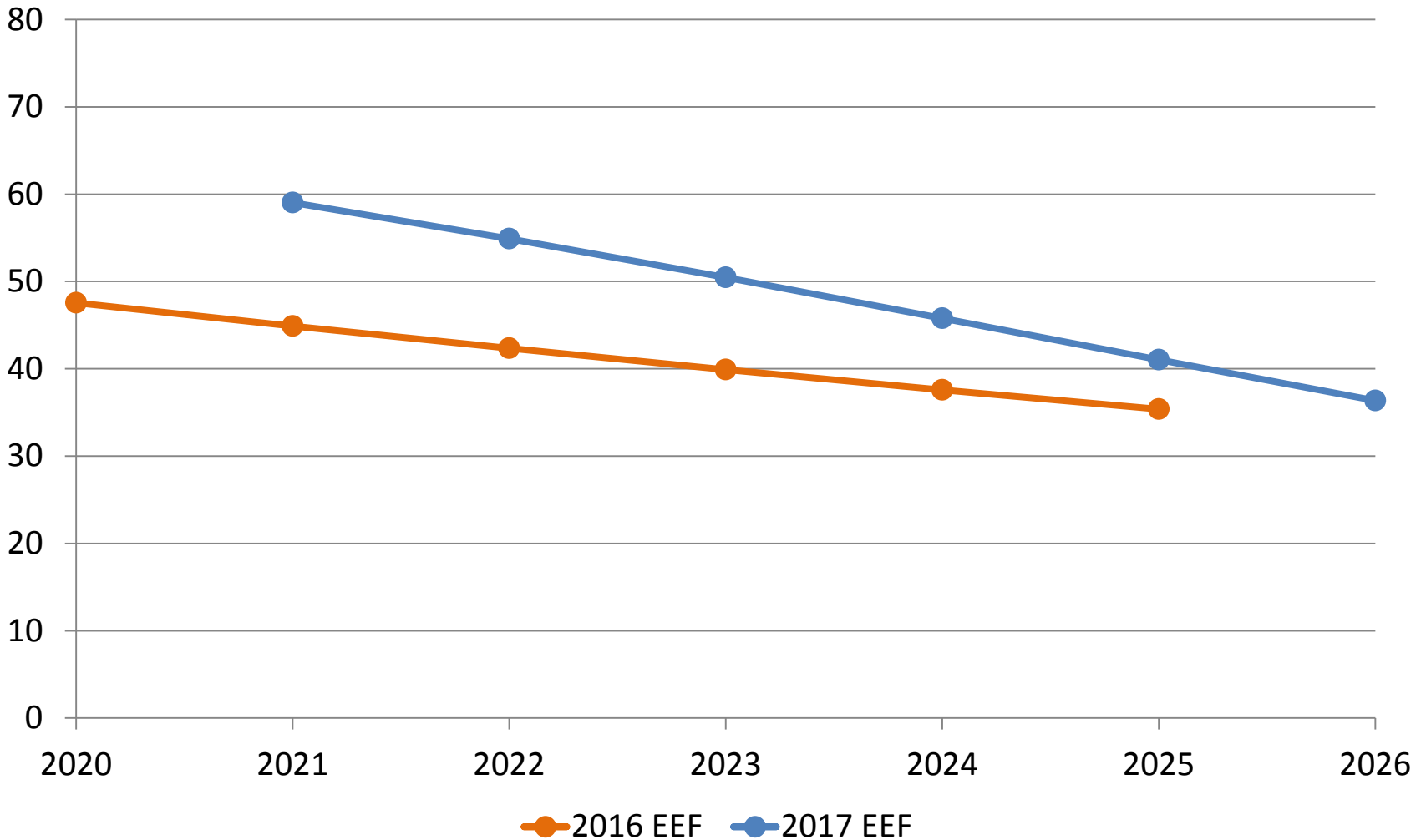
# Explanation of State Forecast Graphs

- 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 (GWh)
- A graphic representation of the EE capacity reductions qualified in the Forward Capacity Market (2010-2020) and the extended 2017 EE forecast



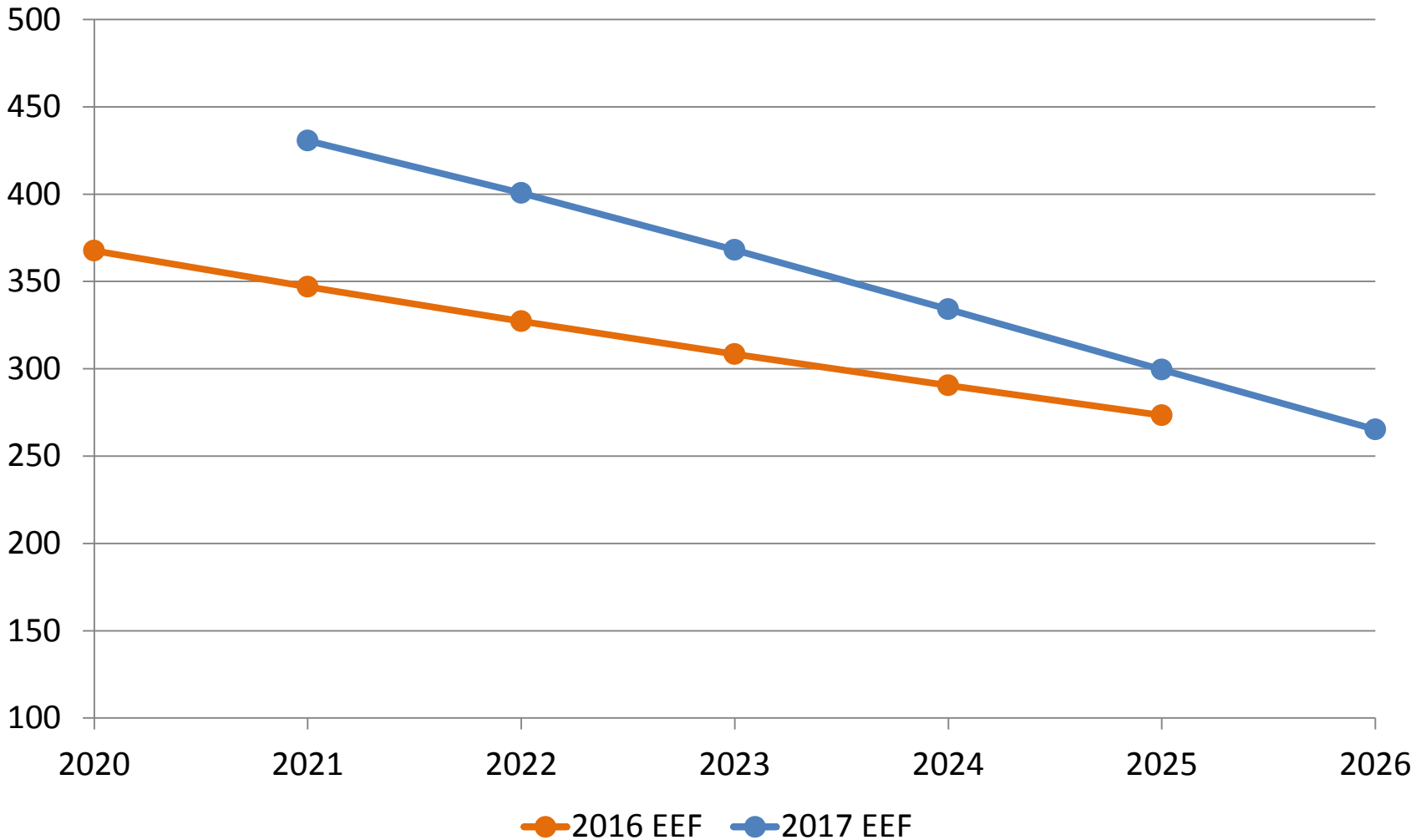
# Connecticut

## *Energy Efficiency on Summer Peak (MW)*



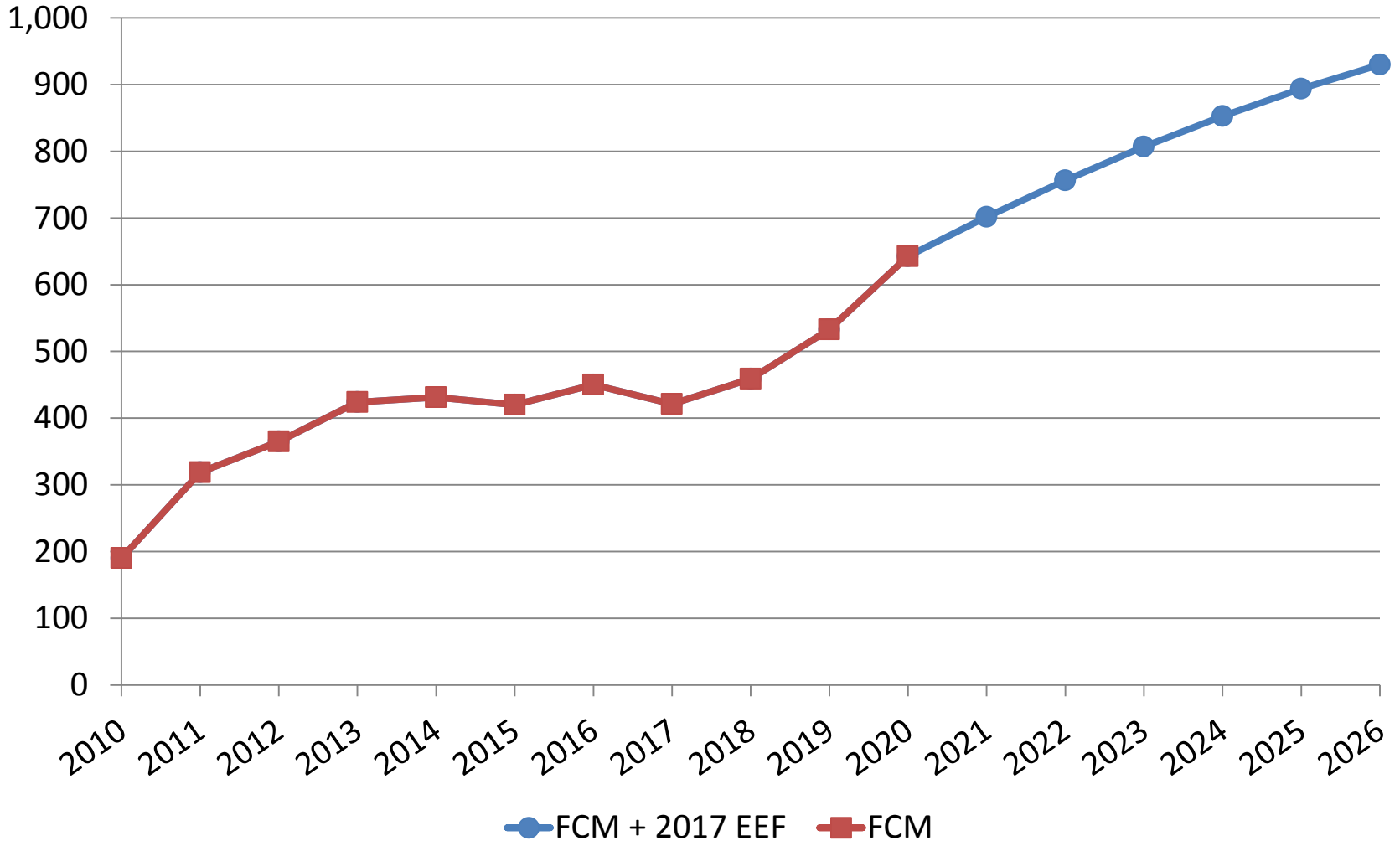
# Connecticut

## *Efficiency on Annual Energy (GWh)*



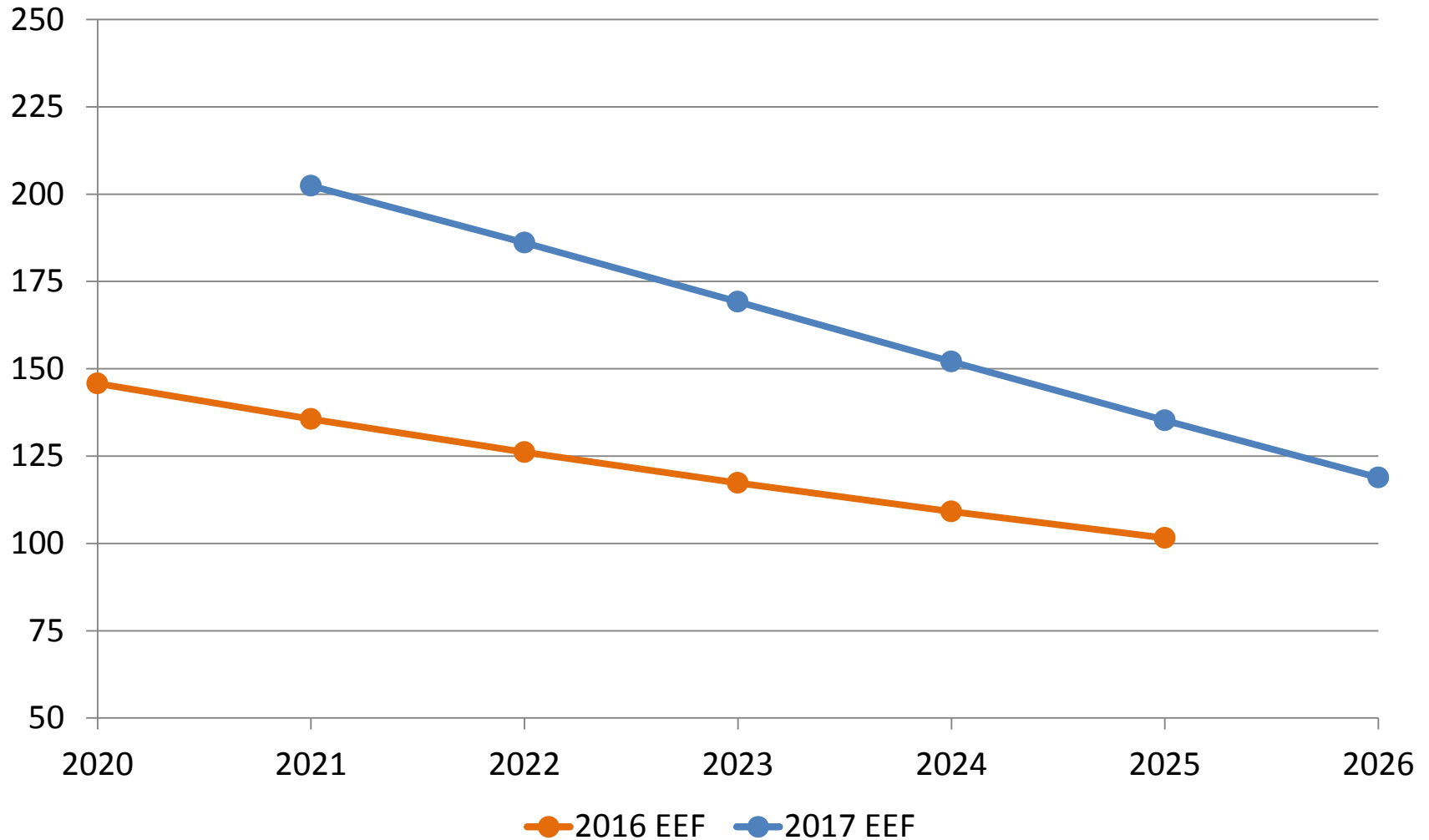
# Connecticut

## *Energy Efficiency on Summer Peak (MW)*



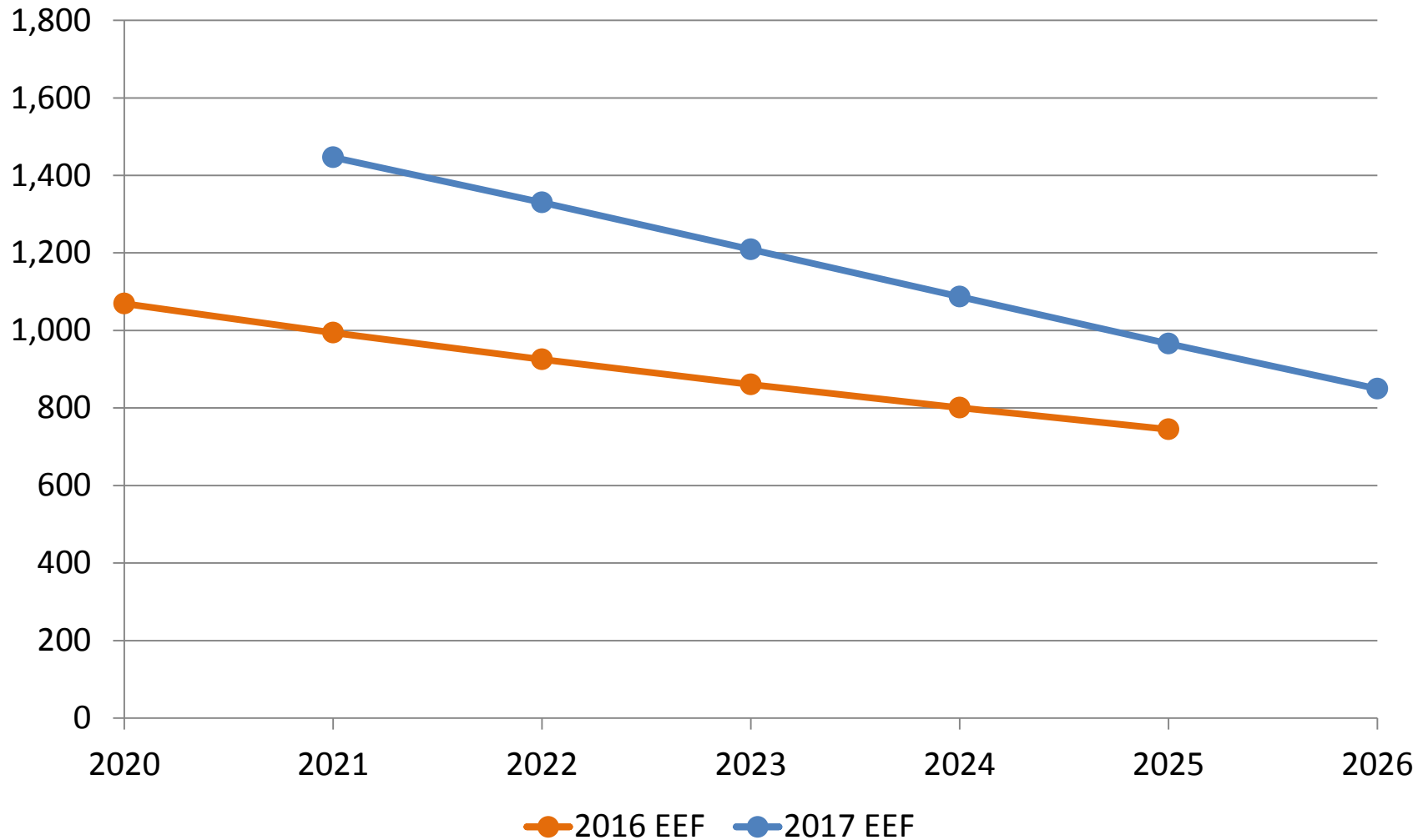
# Massachusetts

## *Energy Efficiency on Summer Peak (MW)*



# Massachusetts

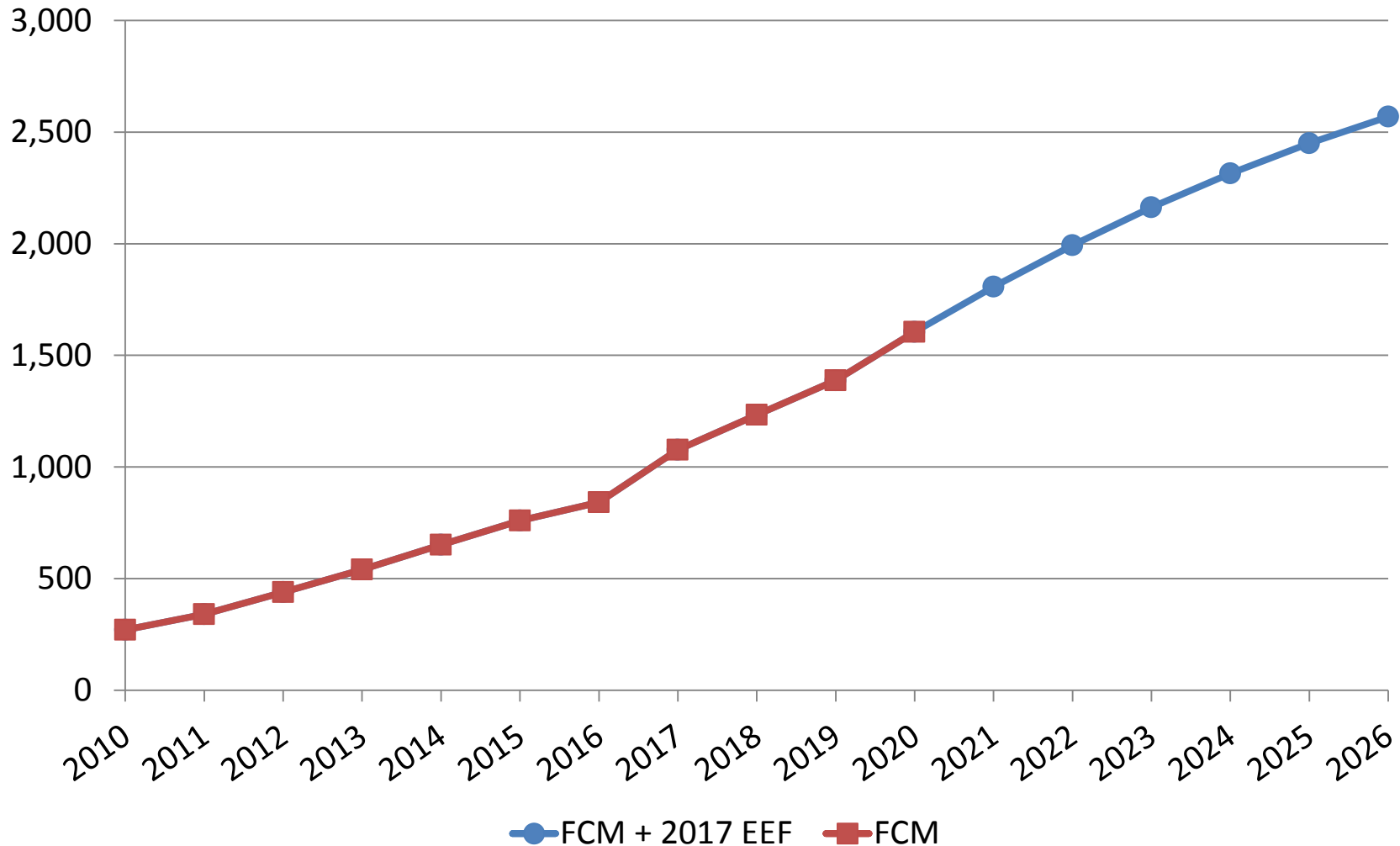
## *Energy Efficiency on Annual Energy (GWh)*





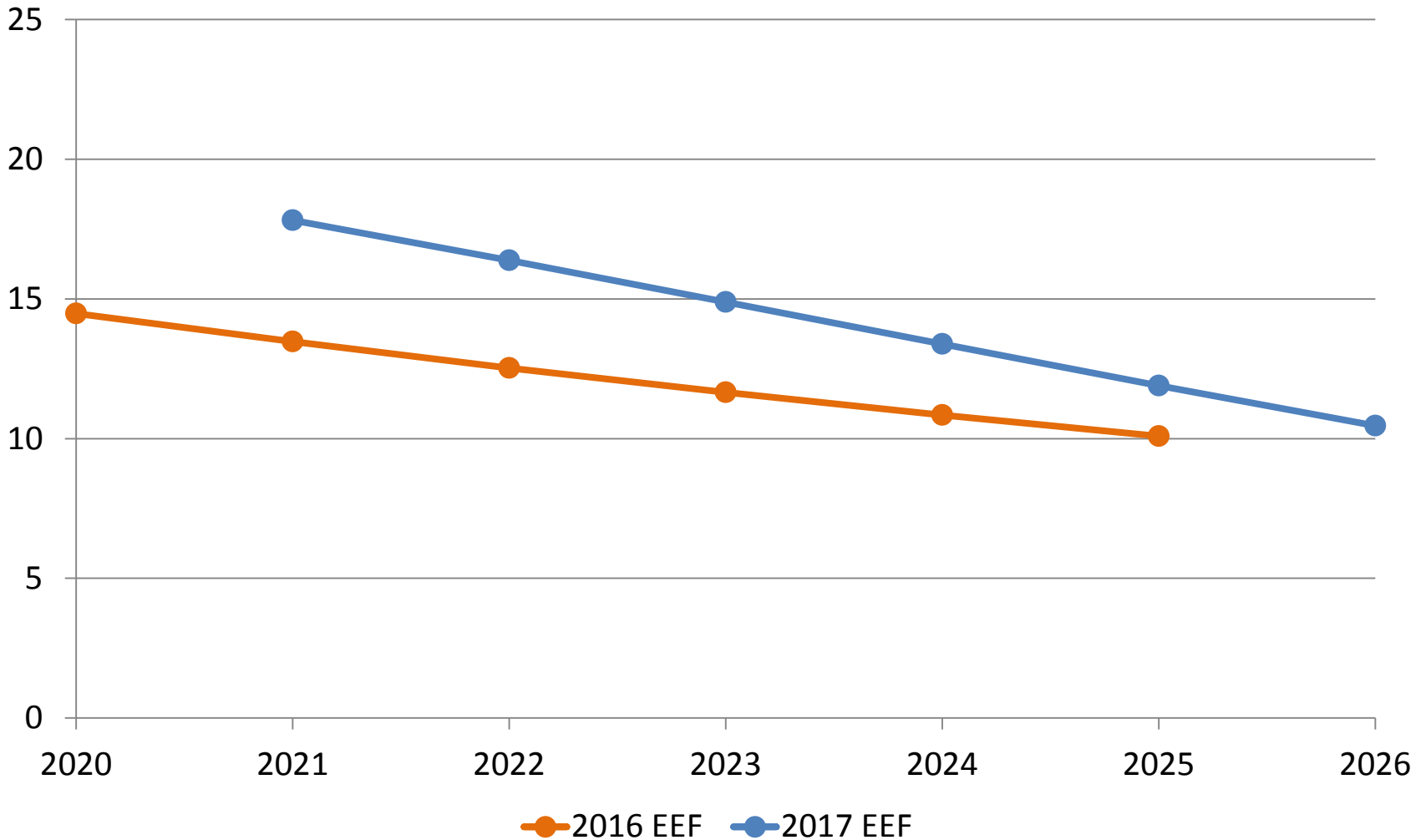
# Massachusetts

## *Energy Efficiency on Summer Peak (MW)*



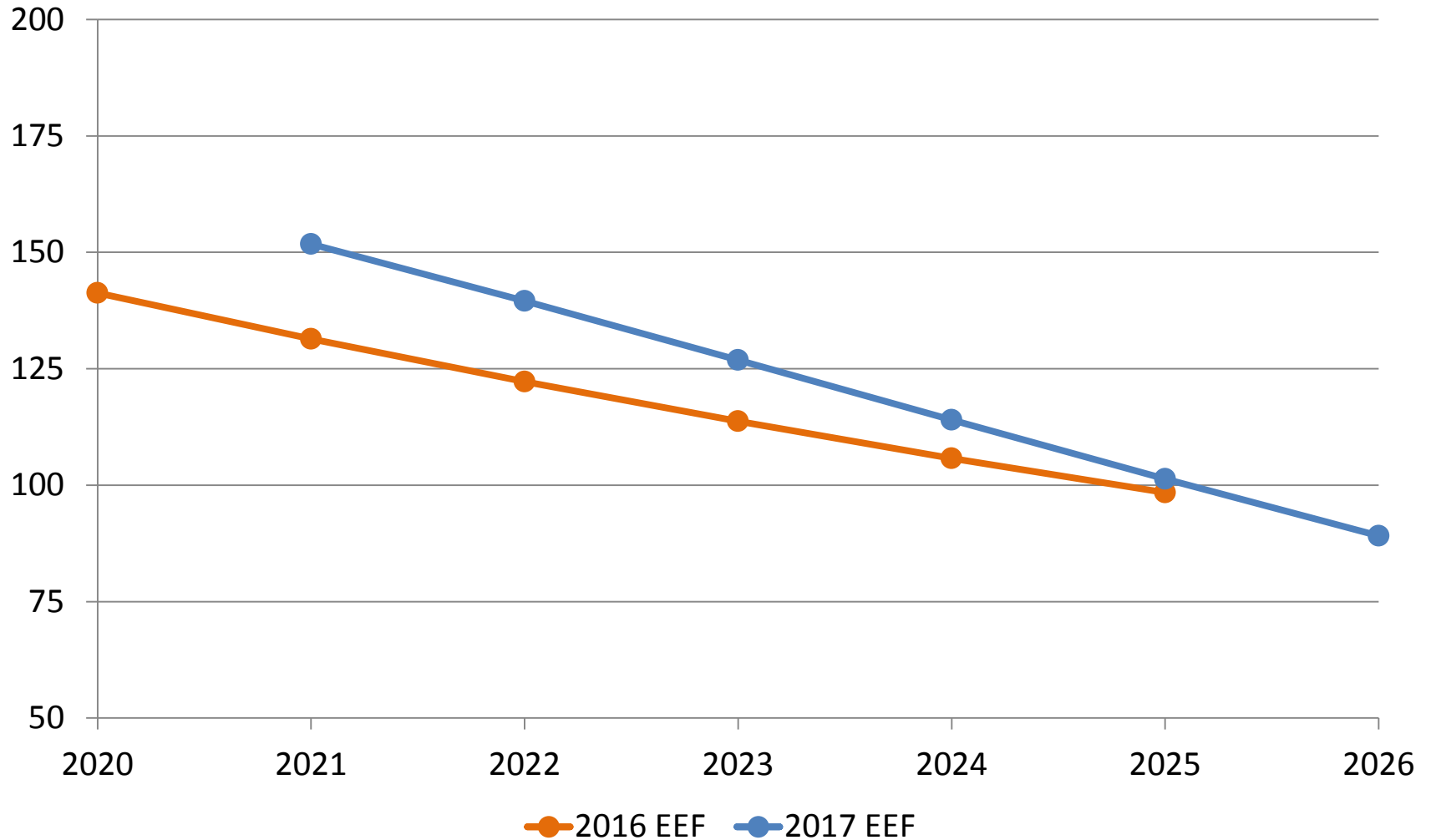
# Maine

## *Energy Efficiency on Summer Peak (MW)*



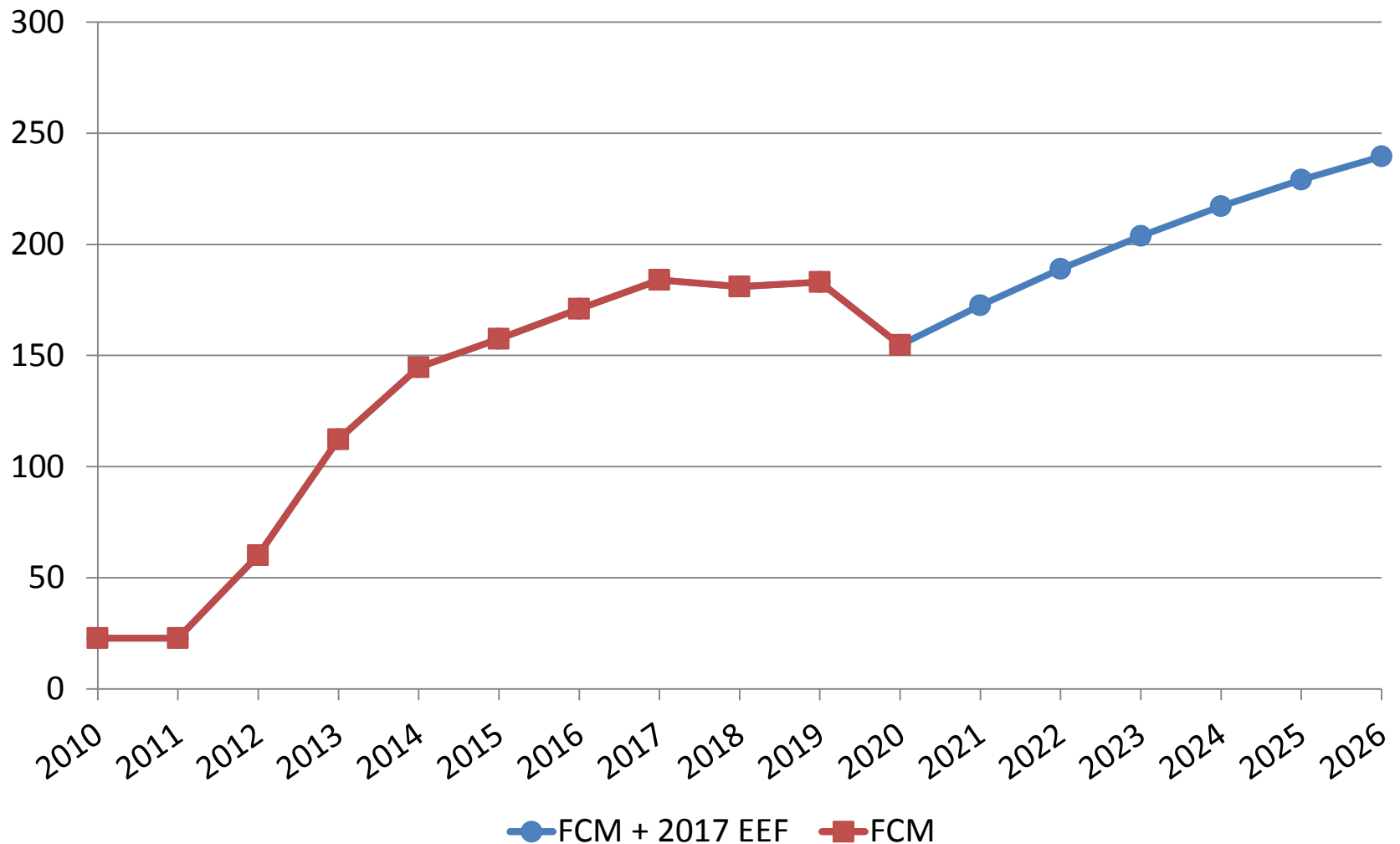
# Maine

## *Energy Efficiency on Annual Energy (GWh)*



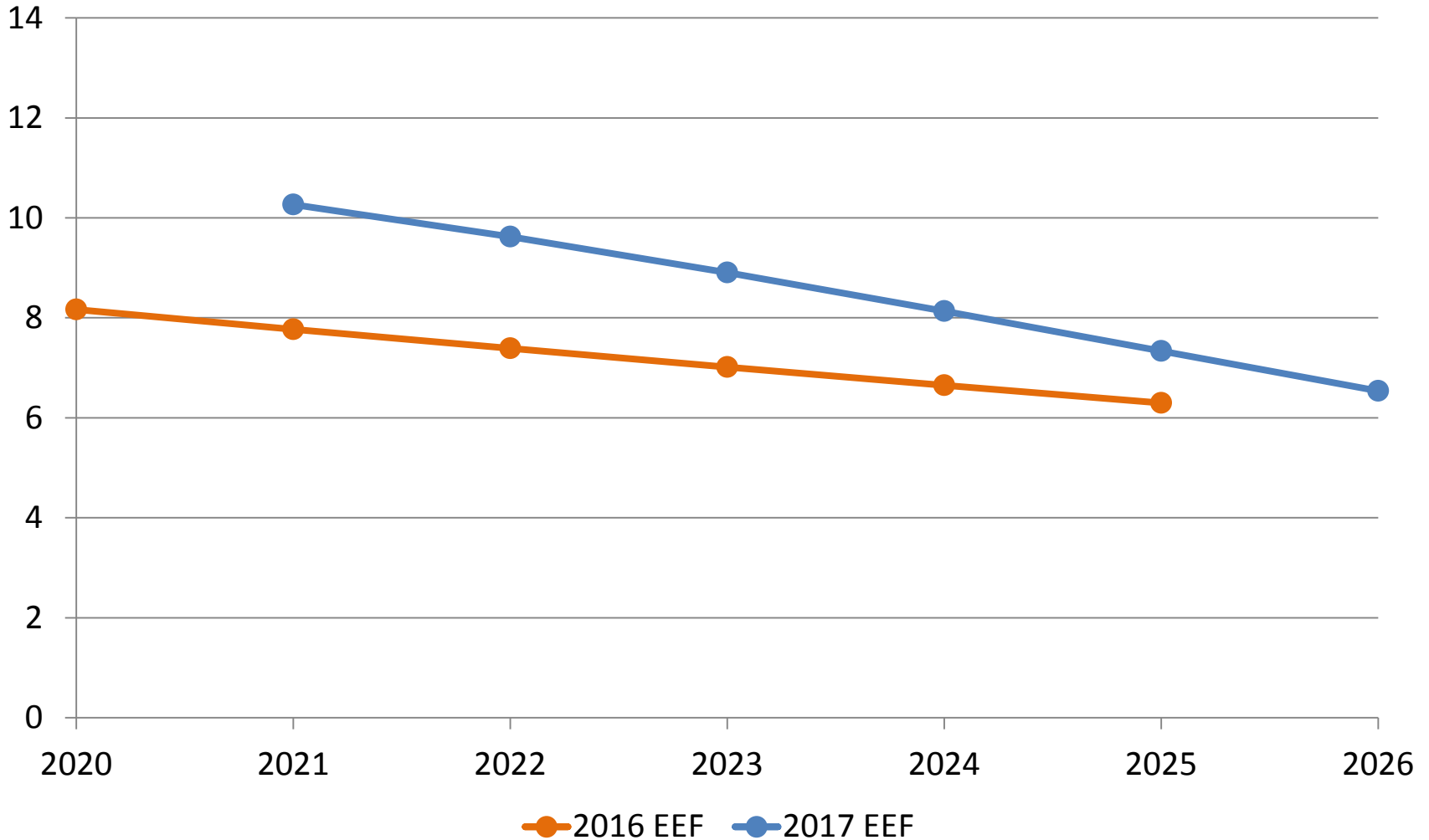
# Maine

## *Energy Efficiency on Summer Peak (MW)*



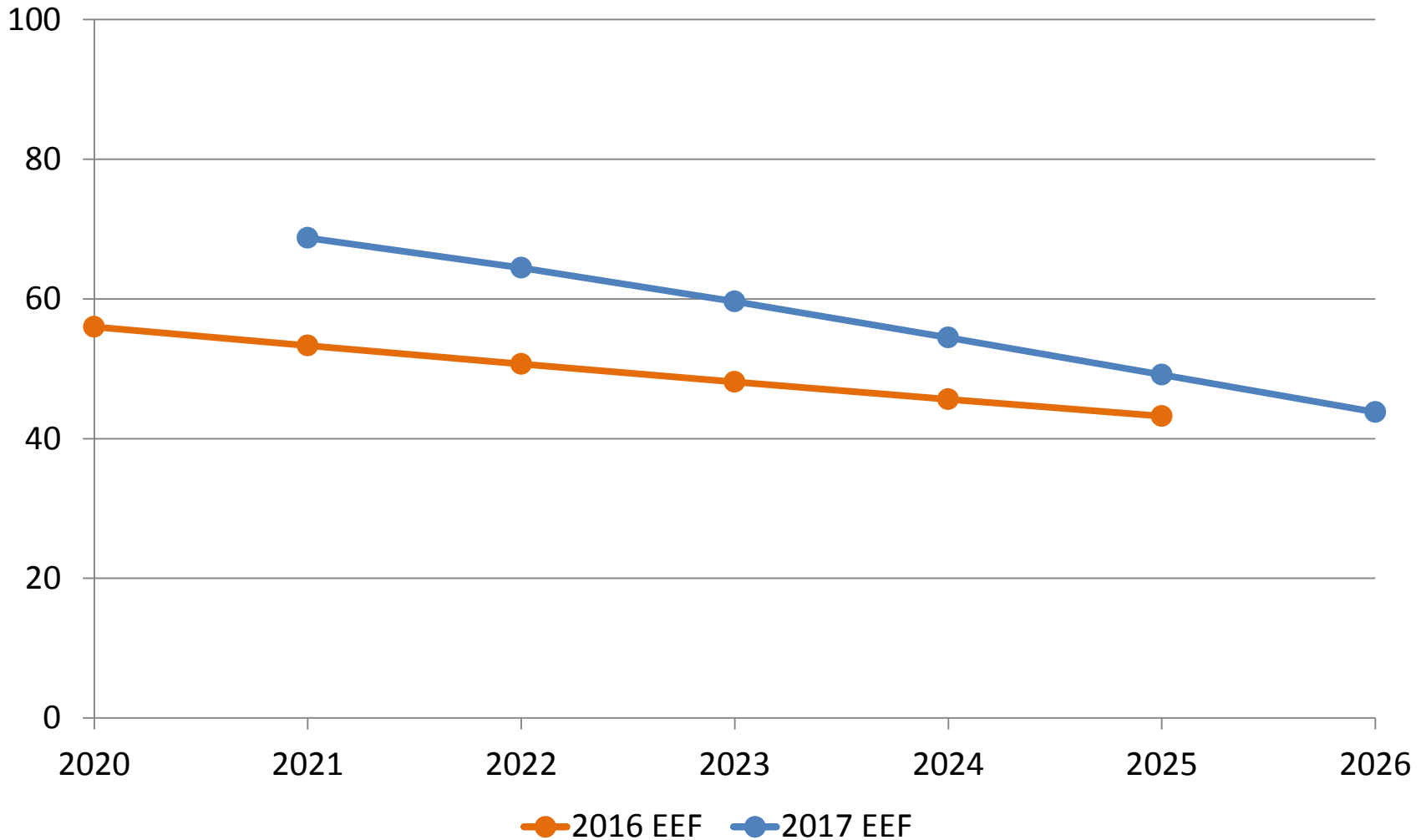
# New Hampshire

## *Energy Efficiency on Summer Peak (MW)*



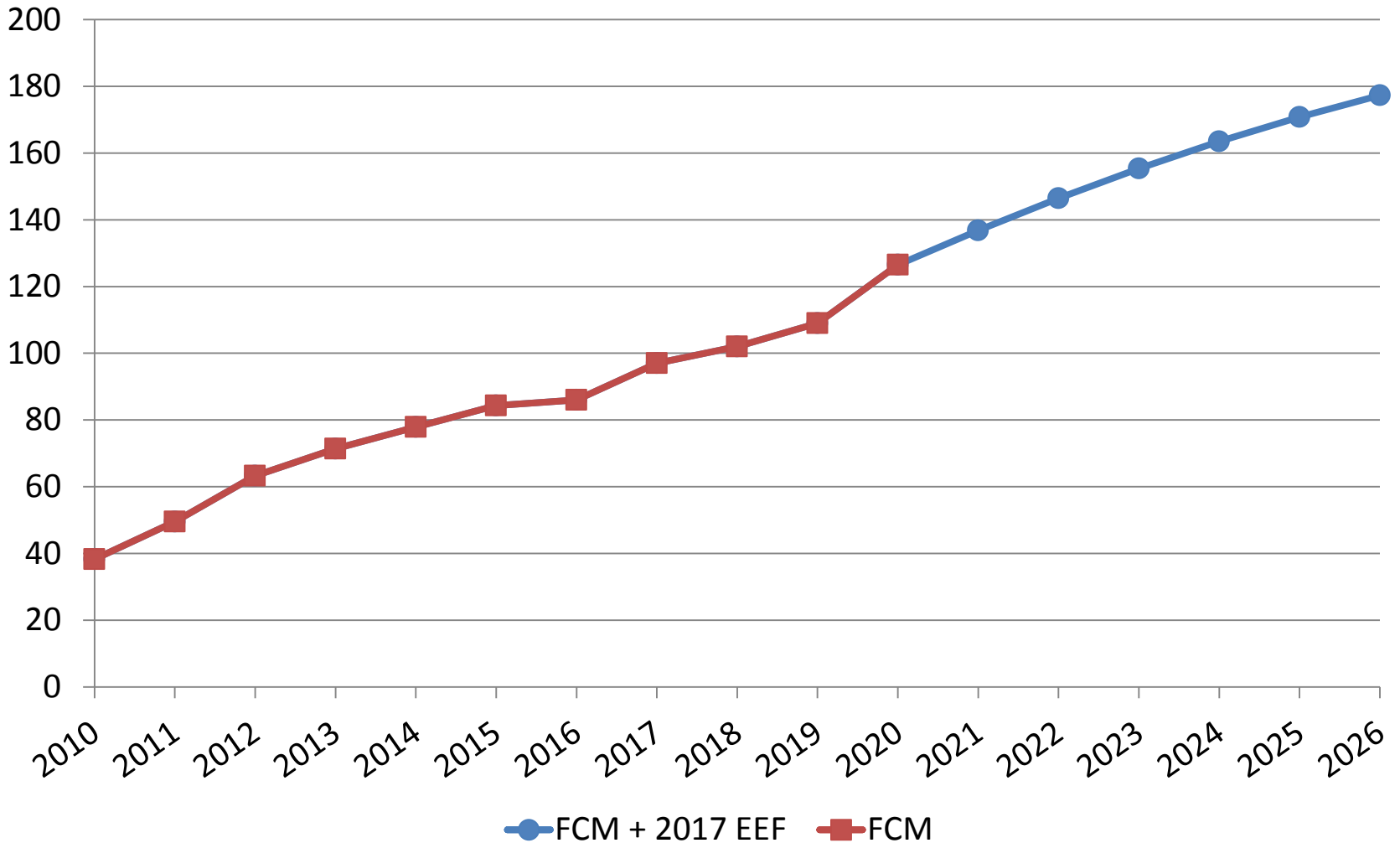
# New Hampshire

## *Energy Efficiency on Annual Energy (GWh)*



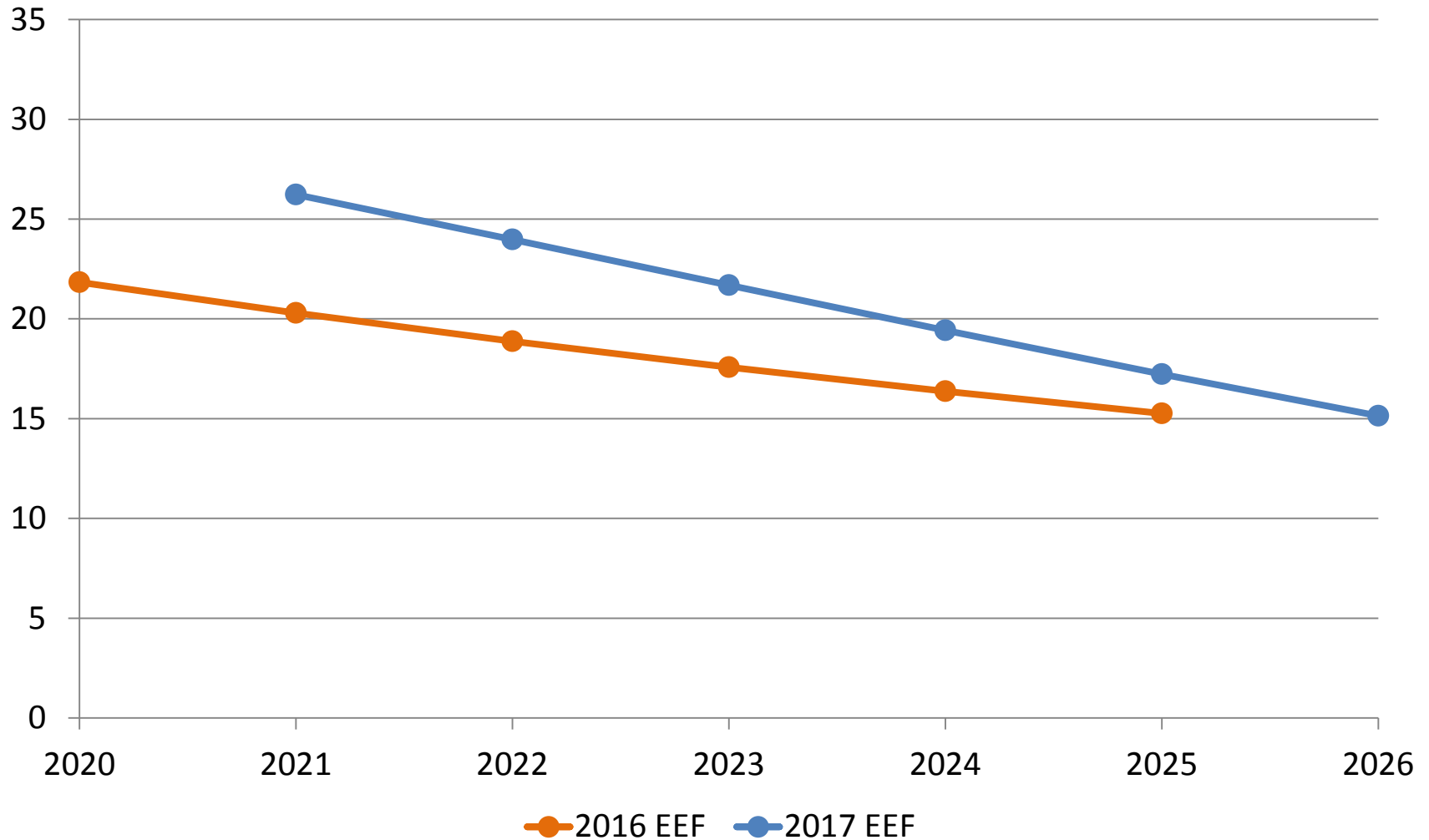
# New Hampshire

## *Energy Efficiency on Summer Peak (MW)*



# Rhode Island

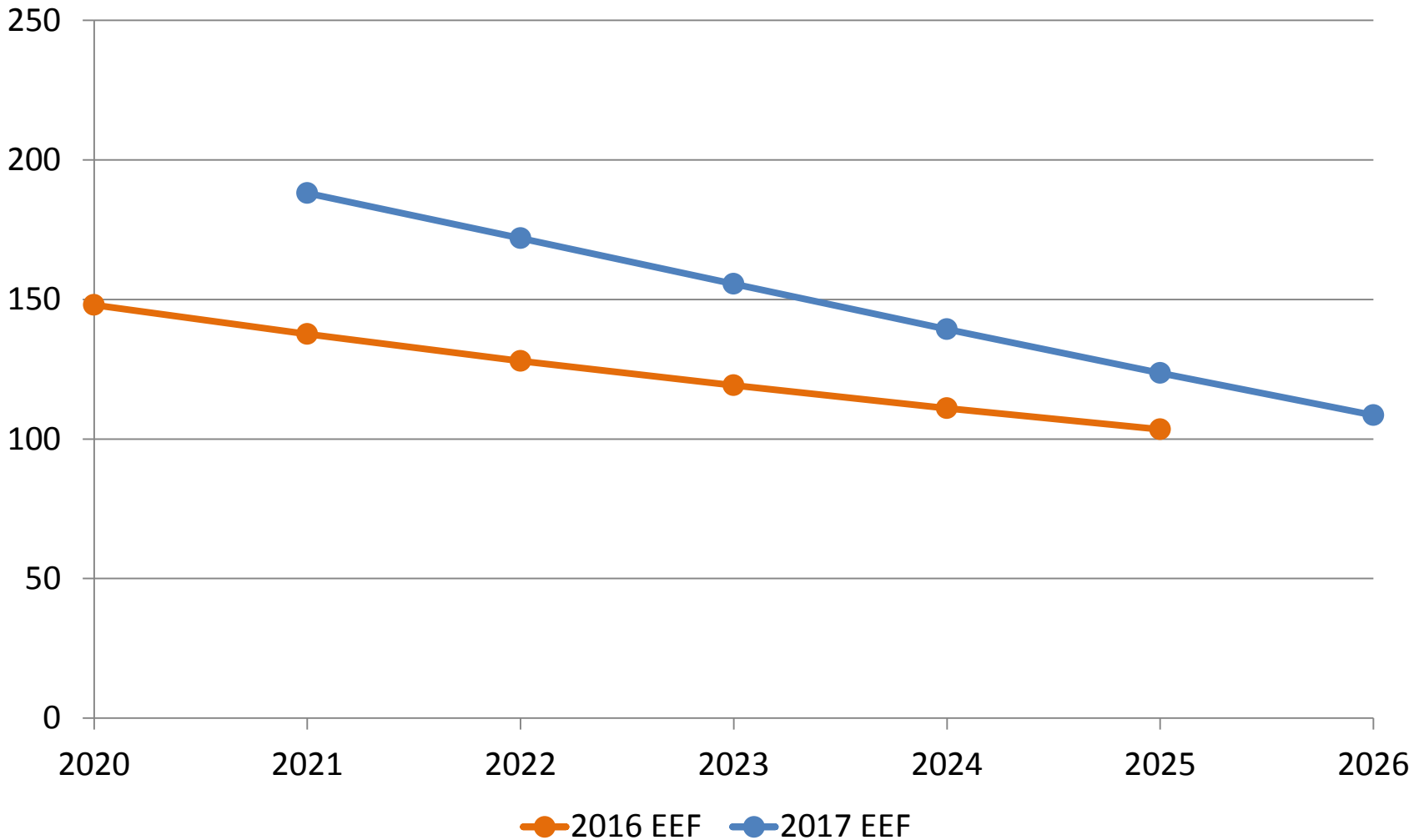
## *Energy Efficiency on Summer Peak (MW)*





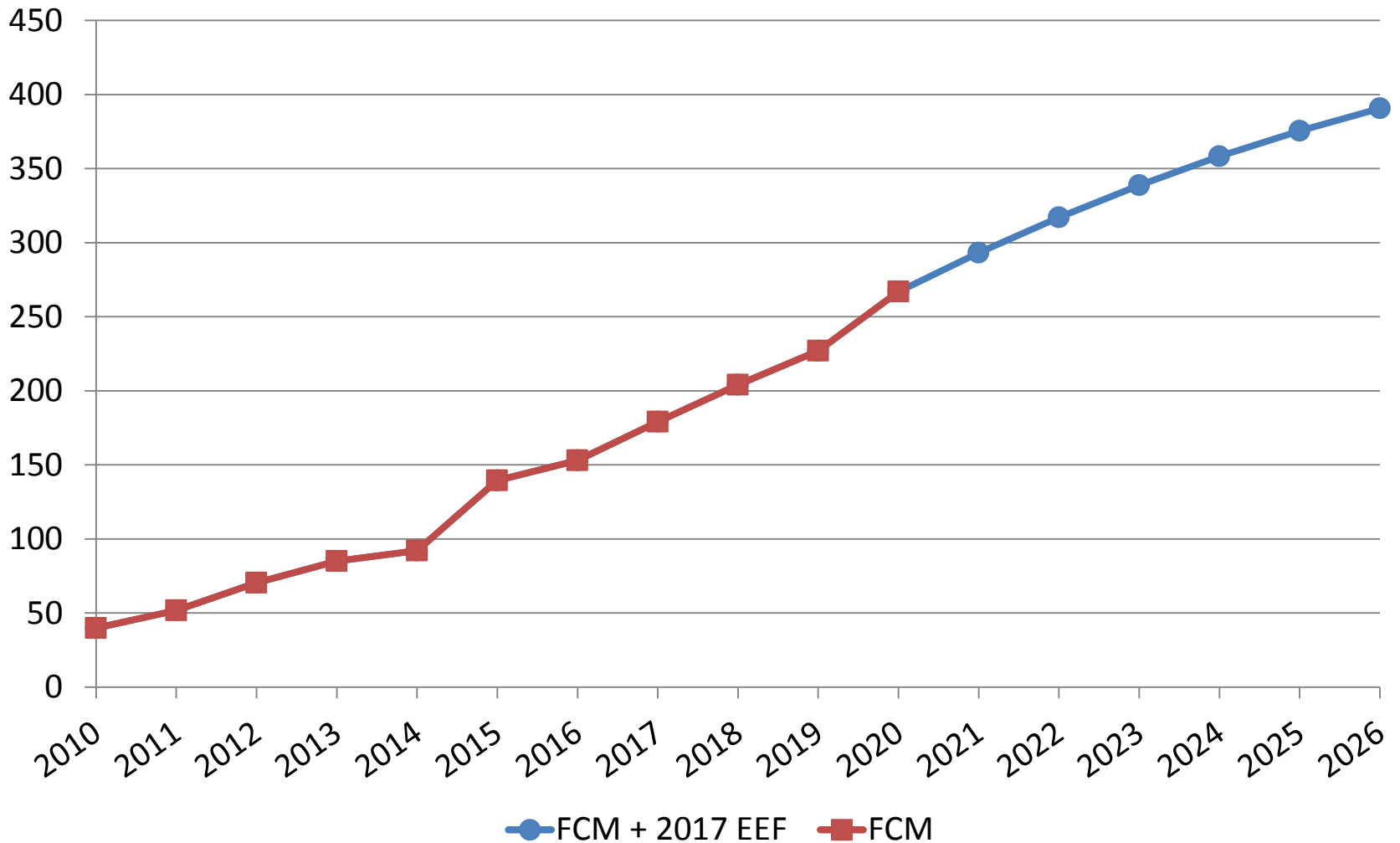
# Rhode Island

## *Energy Efficiency on Annual Energy (GWh)*



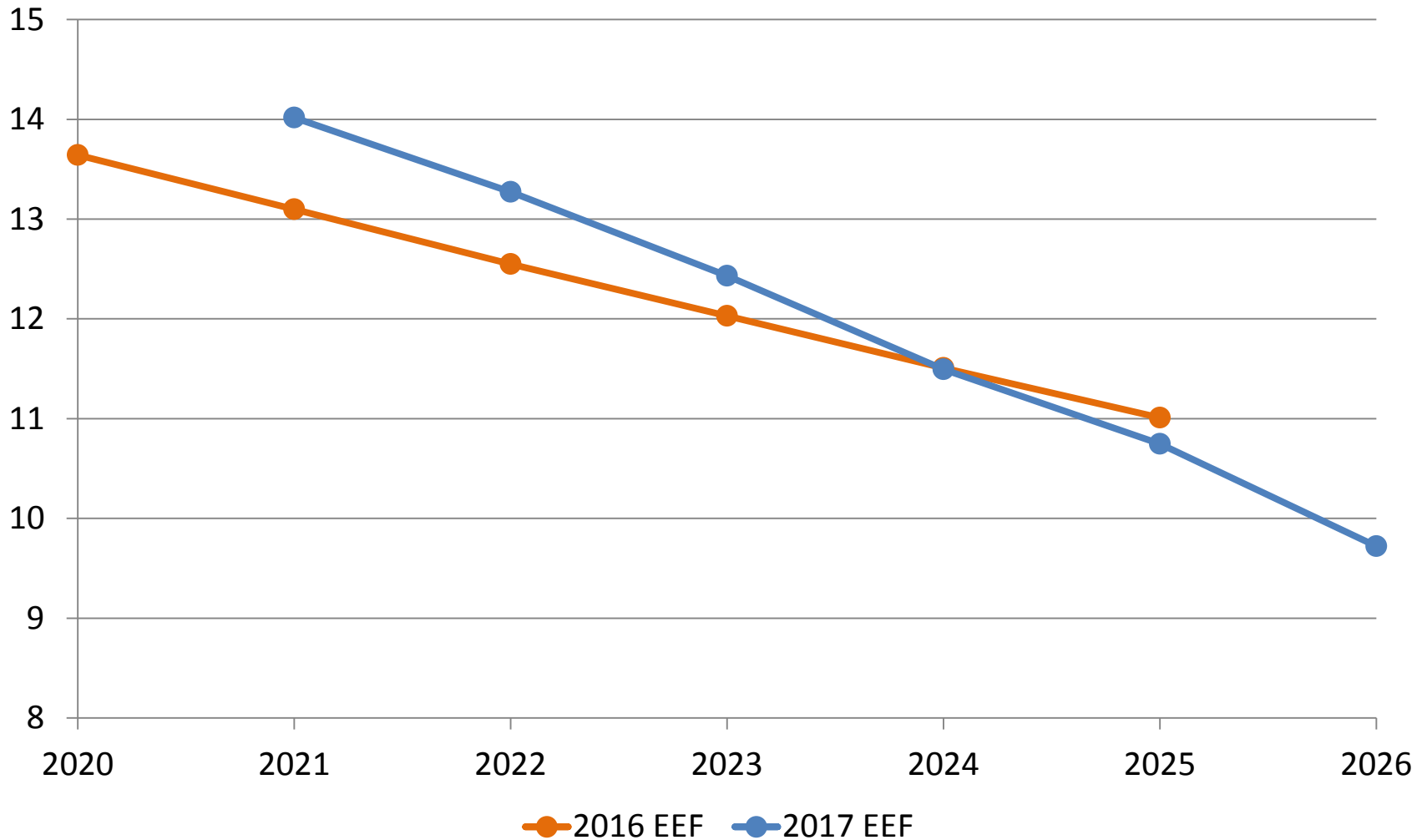
# Rhode Island

## *Energy Efficiency on Summer Peak (MW)*



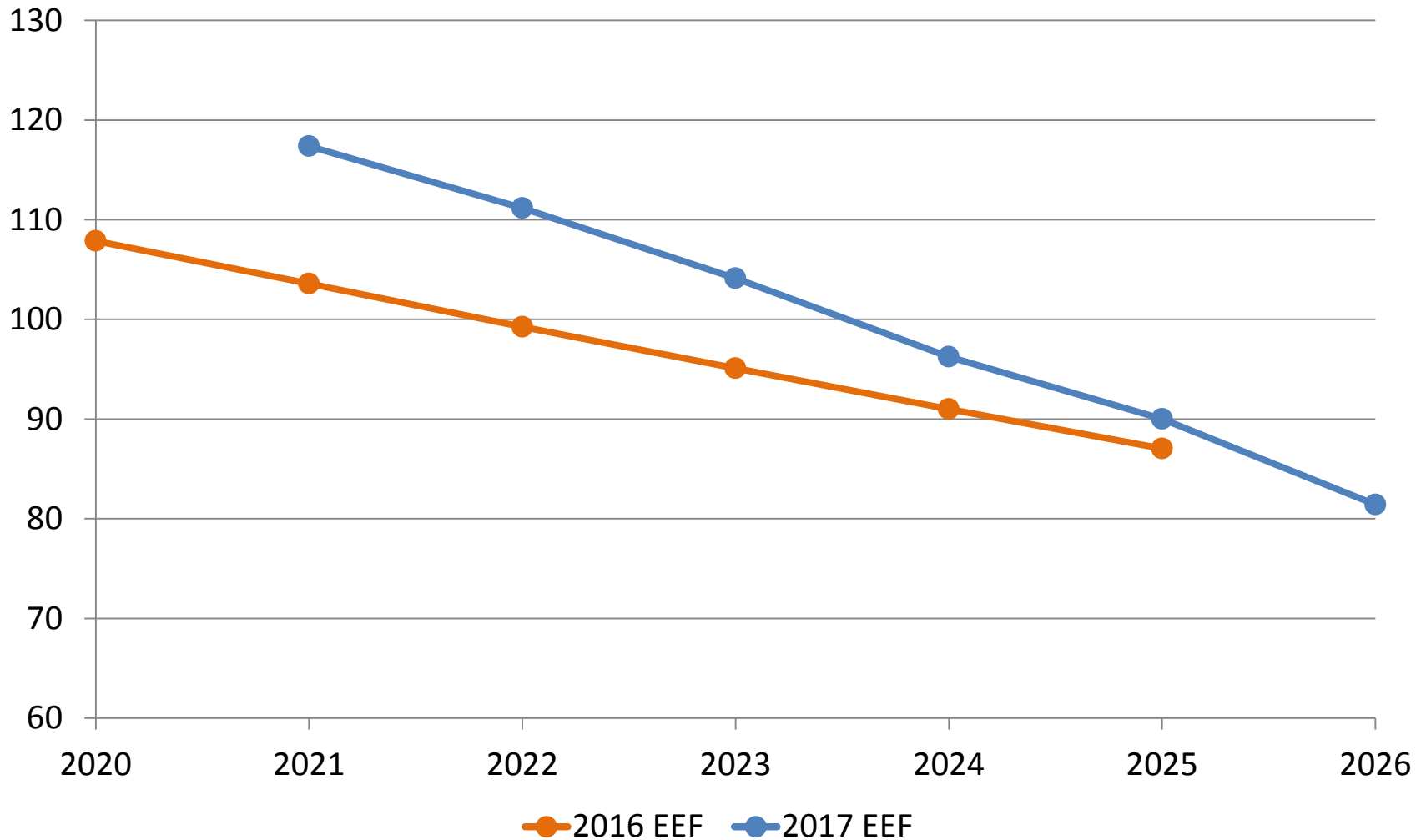
# Vermont

## *Energy Efficiency on Summer Peak (MW)*



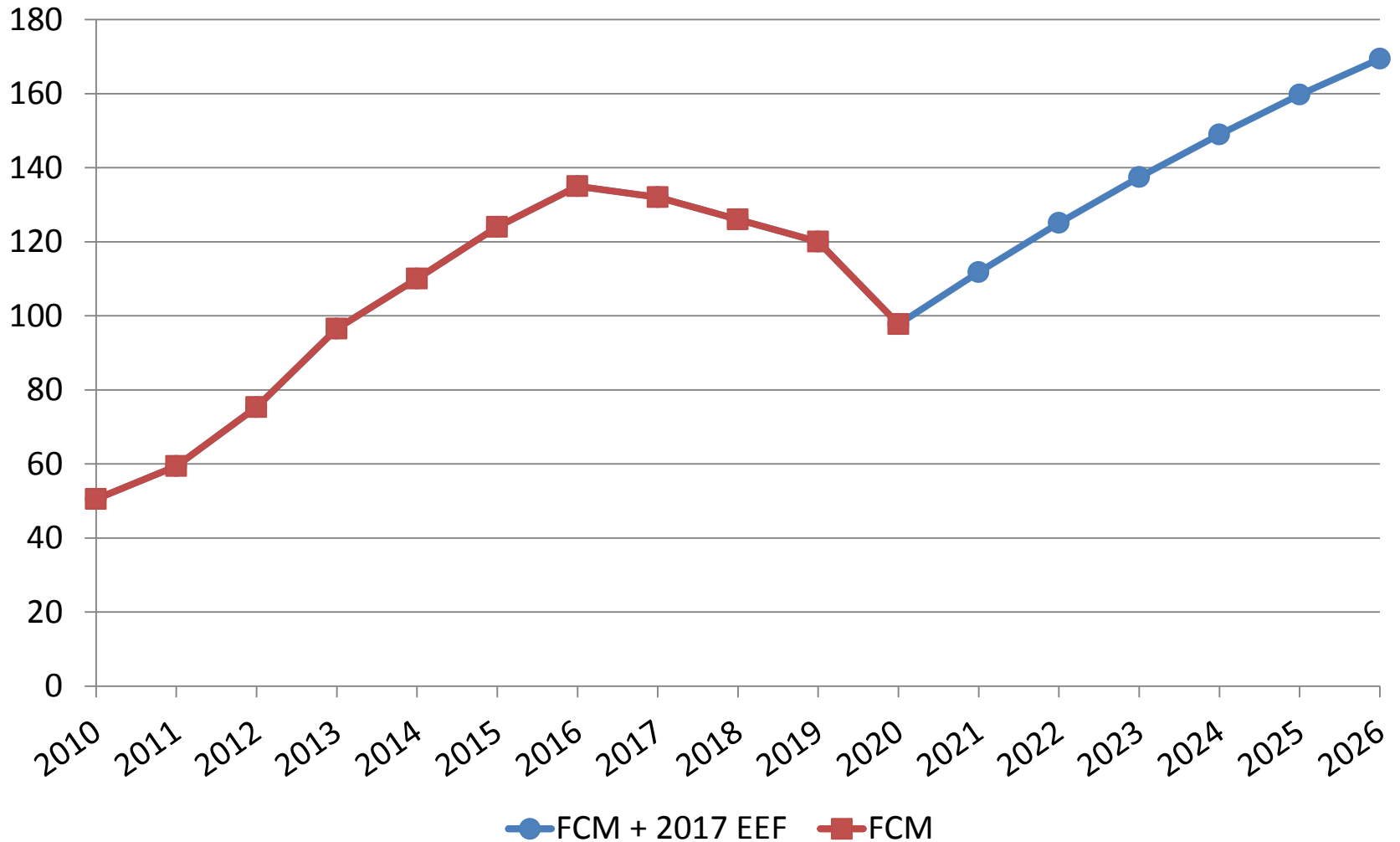
# Vermont

## *Energy Efficiency on Annual Energy (GWh)*



# Vermont

## *Energy Efficiency on Summer Peak (MW)*

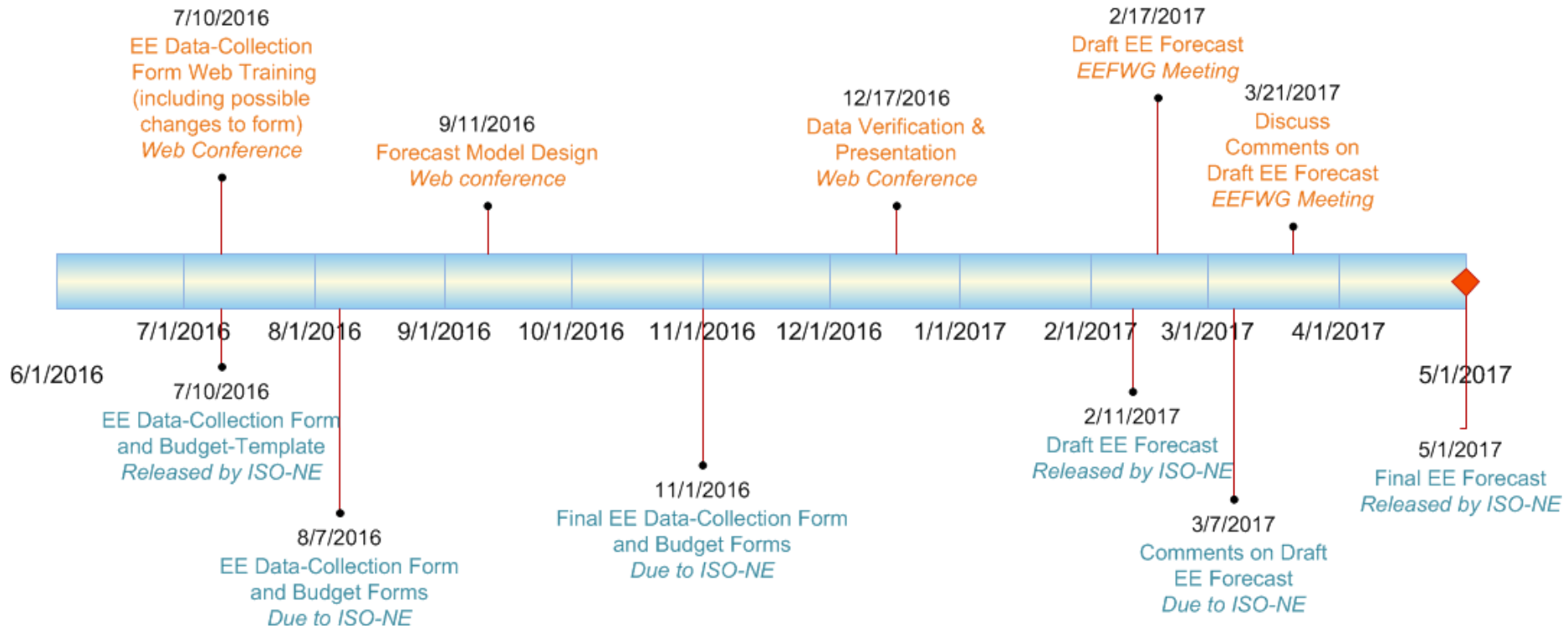


# FORECAST SCHEDULE

# 2017 Schedule

## Energy-Efficiency Forecast for 2021-2026

### Meetings



### Milestones