memo

To: Energy Efficiency Forecast Working Group

From: Jon Black, Chair

Date: March 8, 2019

Subject: Response to Comments on the Draft 2019 Energy Efficiency Forecast

Response to Comments Developed by: The Connecticut Department of Energy and Environmental Protection *(excerpts of comment in Italics)*

> ***"Connecticut recognizes ISO's concern about escalating risks in the future for the EE programs as the EE programs and measures evolve. However, history has shown that the programs generally outperform, rather than underperform, the ISO's conservative estimates of EE. … the ISO has repeatedly underestimated energy savings, demand reductions…"***

Recent updates to the ISO's EE forecast methodology have resulted in a substantial increase to the level of the EE forecast. In the 2017 forecast, a graduated production cost escalator was introduced to allow for greater near term savings, and more consistency with recent historical production costs. In 2018, when ISO chose to use ARA 3 (Third Annual Reconfiguration Auction) qualification values in the forecast in place of existing qualified plus new cleared, the entire level of the EE forecast was shifted upward to align it with qualification values seen at ARA 3. This change also resulted in an EE forecast that began in year two rather than year five. Combined, these changes have resulted in significant increases to the EE forecast above 2016 levels, ranging from 500 MW in the near term to 1000 MW in later years (see Figure 1).

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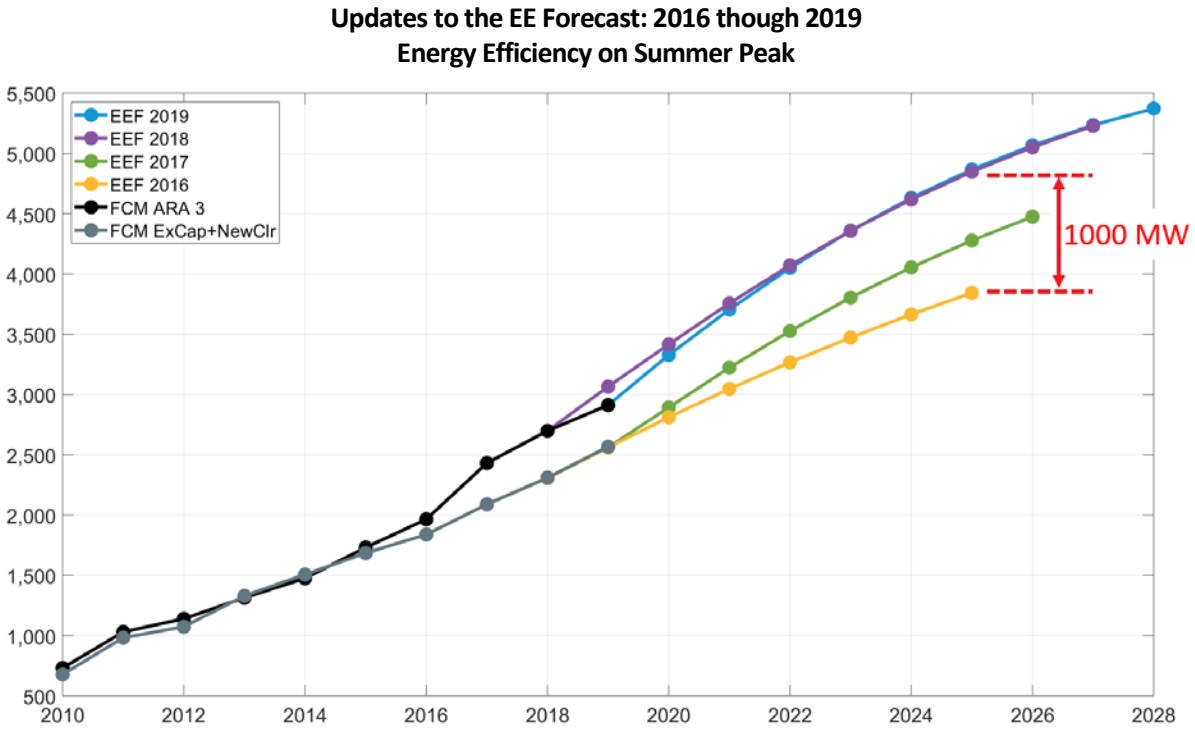

Figure 1: The 2016 EE forecast utilized a baseline formed by the sum of FCM Exising Qualified Capacity and FCM Newly Cleared Capacity. The 2016 EE forecast also employed a static escalation of production costs. Subsequent forecasts incorportated a graduated escalation of production costs and a shift to utilizing a baseline formed by qualification at ARA 3.

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In addition, recent benchmarking has revealed that the current EE forecast has a tendency to overestimate relative to observed ARA 3 values. The draft 2018 EE forecast overestimated the observed New England ARA 3 qualification value for 2018 by approximately 140 MW (see Figure 2).

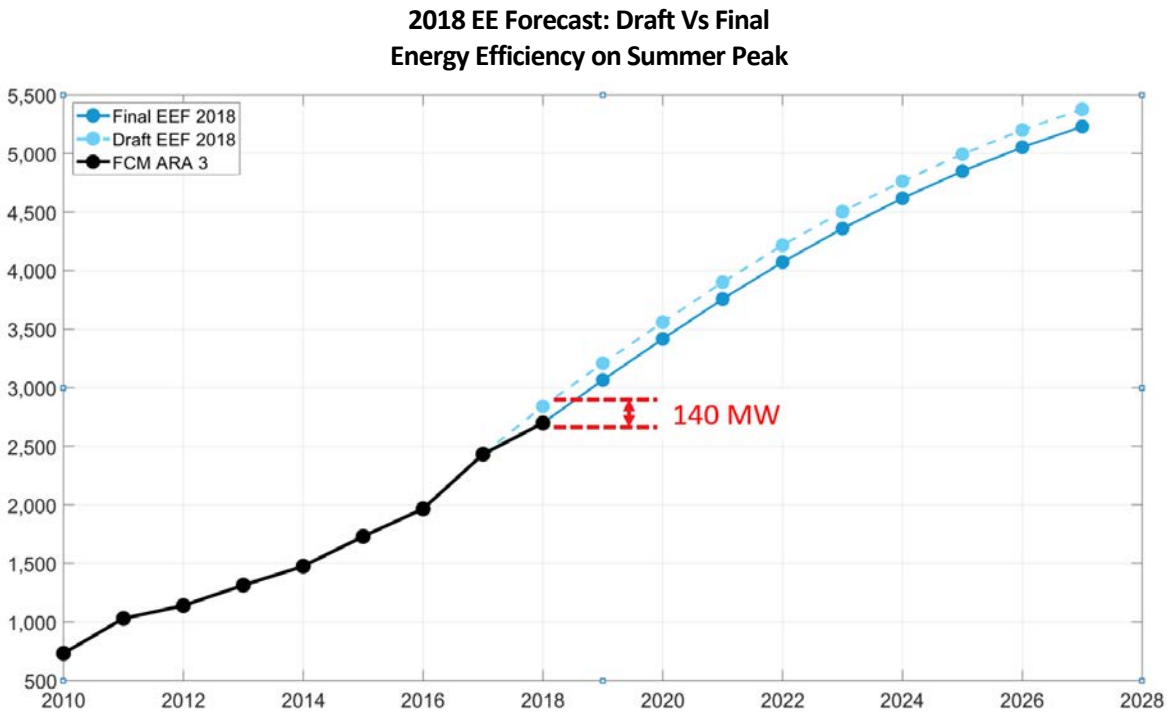

Figure2: The draft 2018 EE forecast overestimated qualificiation at ARA 3 for 2018 by approximately 140 MW for the New England region.

Furthermore, the draft 2019 EE forecast, which incorporated an increased graduated production cost escalator of 2.75%, was also found to overestimate savings for New England relative to ARA 3 qualification for 2019 (see Figure 3).

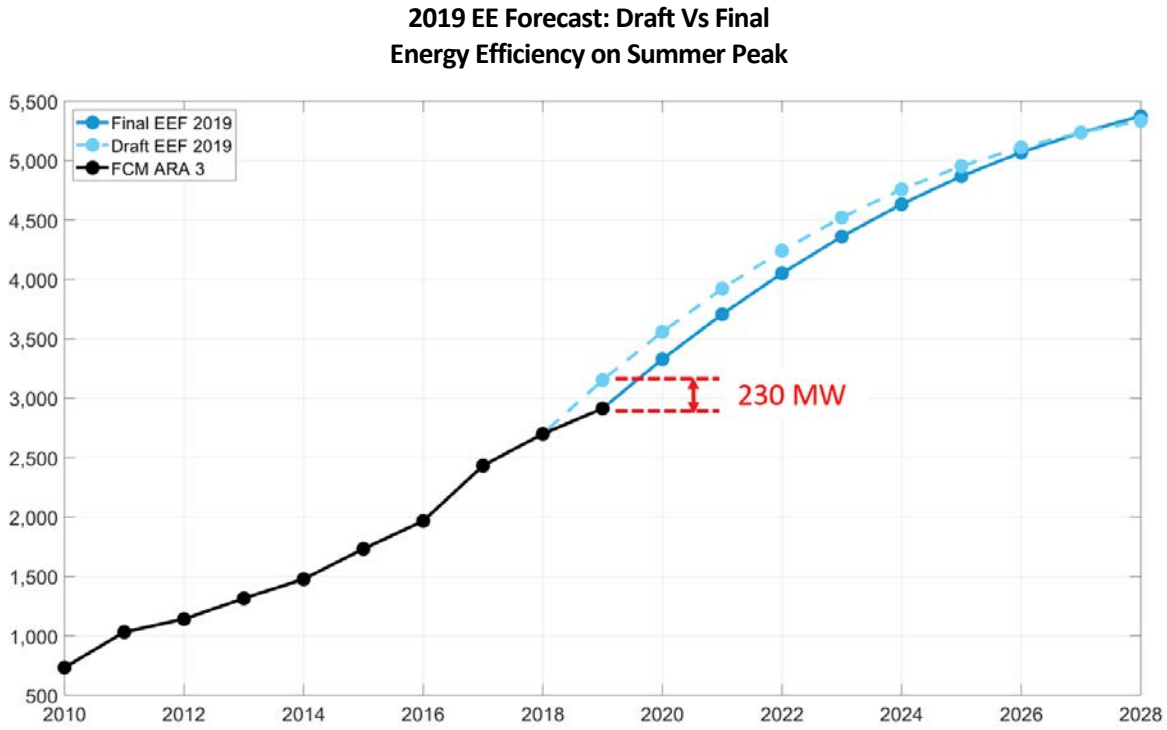

Figure 3: The draft 2019 EE forecast over estimated qualificiation at ARA 3 for 2019 by approximately 230 MW for the New England region.

"…the ISO has repeatedly …overestimated production costs in the region."

The ISO's EE forecast is designed to estimate future energy and demand savings. Although forward looking production costs are computed within the EE forecast framework, the ISO's EE forecast is not intended to be a forecast of production costs. Within the EE forecast model, production costs are a construct that allow for the inclusion of a variety of factors that could influence the realization of future energy and demand savings.

Within the ISO's EE forecast model, the escalation of production costs is designed to capture more than just the expectation of increased costs over time. Growing production costs are a mechanism to reflect significant uncertainty due to a variety of factors including, but not limited to:

- The impact of measures expiring out the EE stack
- Uncertainty in future EE budgets
- Limits in the remaining technical potential of various measures
- Limits to operationalizing existing technical potential
- Rising baselines due to market transformation and standards
- Increased cost to develop savings
- Uncertainty in the persistence of active demand savings over the forecast horizon

"An important part of Connecticut's recommendation of maintaining the escalation rate of 1.25% is that in 2019, is that the production costs in New England decreased year over year. …Recent experience points to a negative escalation rate."

The ISO recognizes that production costs have been declining in recent history and expects that this may likely continue in the near term. This phenomenon results from program administrator success in achieving savings that are highly cost effective. However, the ISO also recognizes that this trend cannot continue indefinitely. By virtue of strong efforts to date in realizing many of the most cost effective savings, the cost of achieving additional incremental savings will increase, as remaining savings become more difficult to achieve.

The starting production costs seen by the EE forecast model are tied directly to those reported in the historical data provided by the program administrators, which reflects information that is already more than a year out of date when the EE forecast is developed. All else unchanged, this relationship dictates that if recent historical production costs drop, the EE forecast will automatically rise. In some cases, this increase can be rather significant, such as that observed during the development of the draft 2019 EE forecast. A preliminary model run revealed that lower starting production costs, due to recently reported data, resulted in an increase of nearly 500 MW in the outermost years of the forecast. However, recent benchmarking has shown that the current EE forecast has a tendency to overestimate EE savings relative to observed ARA 3 values. The draft 2018 EE forecast overestimated the observed ARA 3 qualification value by approximately 140 MW (see Figure 2).

This juxtaposition of an increased forecast against observations that our current model may have a tendency to overestimate savings informed ISO's decision to increase the graduated production cost escalation rate from 1.25% to 2.75% for the draft 2019 EE forecast. However, despite this change, a comparison between the draft 2019 EE forecast and the 2019 ARA 3 qualification value reveals that the EE forecast predicted 230 MW in excess of what was observed at ARA 3 (see Figure 3). For these reasons, the ISO maintains that an increase in the graduated production cost escalator for the 2019 EE forecast is appropriate.

Response to Comments Developed by: Efficiency Vermont, supported by The Vermont Department of Public Service and the Vermont Public Utility Commission *(excerpts of comment in Italics)*

> ***"It appears that the $/MWh cost of efficiency savings, or yield rate, that ISO used to calculate the potential savings for the early years in the model, years 2018 – 2023 are accurate and consistent with the Vermont Demand Resource Plan. … Beginning in 2024, the assumptions used by Efficiency Vermont and ISO NE, in terms of the program dollars needed to achieve first-year MWh savings (or, $/MWh yield), begin to diverge significantly."***

The ISO's EE forecast is not intended to be an explicit forecast of production costs. In the EE forecast, the escalation of production costs is a mechanism to moderate the level of the forecast to reflect a level of uncertainty in the forecast that grows over time. As noted above, uncertainty in the EE forecast stems from a number of factors ranging from uncertainty in costs and budgets to uncertainty in the very nature of what the future of EE savings will look like.

> ***"ISO NE's forecast appears to use an exponential growth rate that would cause the yield rates for first-year efficiency costs to balloon from $600/MWh in 2023 to over $1,700/MWh by 2028. While Efficiency Vermont agrees that higher costs for savings should be expected over time as the measure mix becomes increasingly complex and requires additional resources to achieve the same level of savings, the high rate of increase modeled by ISO NE is inconsistent with Vermont's forecasts and is an unrealistic cost estimate."***

In the final forecast the graduated production cost escalator will be reduced from 2.75% to 2% for all states. This results in a Vermont production cost of approximately $1,200 in year 2028 of the forecast. Because the 2019 ARA 3 value came in lower than expected, the production cost escalator was reduced to maintain a forecast at the regional level that aligns with the 2018 EE forecast in the outermost years.

> ***"The ISO NE forecast projects that savings would dramatically drop from an estimated 140 GWh saved in 2020 to under 40 GWh saved by 2028. This would be inconsistent with Efficiency Vermont's forecast, which expects to be able to maintain relatively consistent savings of between 90 to 100 GWh over that time period…***

Further, the exponential cost escalation rate would not be consistent with historical cost of EE in Vermont, nor by industry projections of portfolio yields that we consider accurate and applicable to Vermont's future efficiency program portfolios."

The ISO has acknowledged the recent trend of falling production costs in the majority of the New England states, along with the historical ability of program administrators to meet or exceed savings targets. We anticipate this trend to continue in the very near term. The graduated escalation of production costs introduced in the 2017 EE forecast was designed to allow for persistence of lower production costs, and hence more savings, in the near term consistent with recent historical trends. At the same time, this mechanism still allows for a forecast that reflects significant uncertainty in the level of achievable and persisting savings in the outermost years of the forecast. The relaxed graduated production cost escalator of 2% that will be utilized in the final 2019 EE forecast allows for an increase to incremental energy savings in 2028 from 40 MW to 55 MW relative to the draft 2019 EE forecast. This yields an EE forecast for the state of VT that exceeds the 2018 EE forecast in the outermost years (see Figure 4).

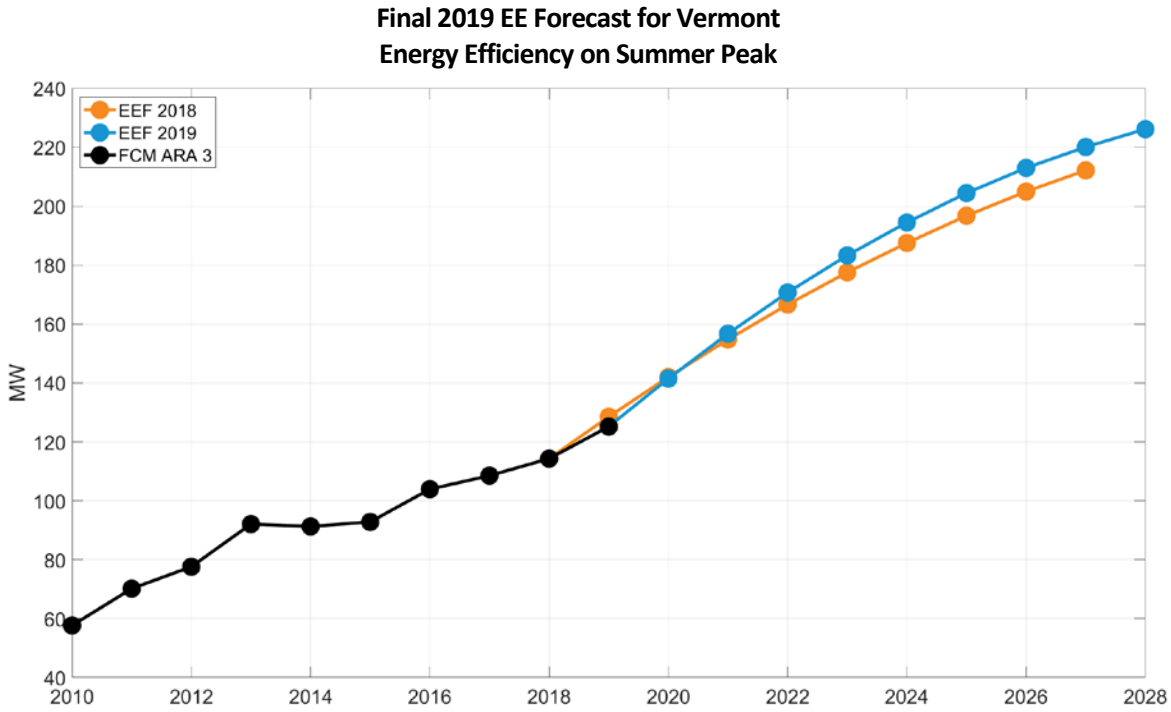

Figure 4: The final 2019 EE forecast for Vermont is at or above the level of the 2018 EE forecast for all years of the forecast horizon.

At this time, it appears that methodological improvements may be warranted to better account for the longer-term sources of uncertainty discussed above. Furthermore, the ISO will continue monitoring the

observed tendency to over-forecast in the near term, as indicated by recent benchmarking results, and discuss related results with the EEFWG. The ISO looks forward to continuing its work with regional stakeholders to gain further insights about the evolving EE landscape.

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