

PY2022 EM&V Key Findings and Recommendations 2021-2024 CDMF Energy Performance Program

No.	KEY FINDINGS	2022 EM&V RECOMMENDATIONS	IMPACT	IESO RESPONSE
1.	<p>The majority of EPP participants are not submitting their Savings Reports within the contracted 60 days of completing their performance period. An analysis of the EPP tracking system shows that 49 out of 62 facilities that should have their Savings Reports submitted by July 2023 have not done so. Participants’ Savings Reports are overdue an average of 89 days with the longest being overdue 245 days. As such, the technical review, evaluation, and reporting of program impacts has been delayed.</p>	<p>Increase the technical support throughout the first performance period to identify issues with completing Savings Reports early. To ensure program savings impacts, particularly peak demand reductions, are verified and reported efficiently enough so the IESO can leverage them for system planning, grant submission extensions on a limited basis for extreme cases. To identify bottlenecks and recommend solutions to alleviate them, EcoMetric will conduct a participant journey analysis in the PY2023 evaluation to track the timeline of EPP participation from application phase to incentive payout.</p>	High	<p>The IESO has recently brought on a dedicated program delivery partner to manage the program and optimize program participation. The IESO will work with program delivery partner to enable collection of regular, timely, reporting from participants.</p>
2.	<p>Energy savings Performance Plans are often difficult to reconcile with final measured performance savings, especially when savings fail to reach program targets or are lower than expected. Application reviewers typically approve application performance plans based on subjective assessments by technical reviewers, relying on their knowledge and experiences.</p>	<p>Introduce preliminary savings estimates for each performance plan activity or measure. This can be achieved through deemed values, engineering estimates, or by setting savings goals for O&M type activities. Objective savings estimates will expedite the review process of final savings by providing program staff, technical reviewers, and evaluators with an understanding of the expected savings levels. Having expected savings will facilitate quicker troubleshooting when savings goals are not met.</p>	Medium	<p>The IESO acknowledges that this is a reasonable recommendation in general. However, the program design emphasizes the autonomy of the participants and the program never contemplated that the technical reviewer would engage with participants in a detailed analysis of how they planned to improve energy performance, or why they did not achieve early goals. The IESO is not planning to implement this recommendation in the current EPP.</p>

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3.	Participants often delay projects with significant savings until the end of the performance period. In many cases, participants do not complete all planned projects.	Promote better alignment between Performance Plans, measure installations, and the start dates of the performance period with customer Performance Plans. This will help ensure that participants do not postpone significant measures until the last moment and increase the likelihood of completing all planned measures. Focus technical support on the development and commitment to the Performance Plans to ensure success.	Medium	The IESO will provide the recommendation to the EPP delivery partner for consideration and implementation. The IESO is also developing an Advanced Measurement & Verification solution that will help participants analyze and compare savings opportunities to facilitate informed decision-making.
4.	In cases where the measures specified in the Performance Plan application are not installed by participants or there are discrepancies between the planned and final projects, explicit documentation regarding delays or changes in project scope is often lacking.	Establish a direct comparison between the measures approved in Performance Plans' and the final measure checklists during technical reviews. Use this comparison to identify measures that were not completed or experienced changes in scope. Additionally, if unplanned measures were implemented during the performance period and not included in the initial application, document them as additional planned measures.	Medium	The IESO will consider this recommendation.
5.	It is a common occurrence for participants to complete Business Retrofit Program measures during their EPP baseline and/or performance periods. Technical reviewers need to properly account for savings achieved through the Business Retrofit Program, either by adjusting baselines or subtracting savings and demand reductions from the model estimates. However, during evaluation, EcoMetric is often unclear as to what the primary end use is for these Retrofit measures. Understanding the end use of these measures is critical for an evaluator's assessment of the accuracy of the methodology used to net out their savings from EPP baselines and savings calculations.	Clarify the rules regarding cross-program participation for EPP participants. When participants are concurrently involved in multiple programs, technical reviewers should ascertain the primary end use of the installed measures that were incented by a program other than EPP. Technical reviewers can adjust hourly baseline models for EPP participants more precisely, rather than applying a blanket adjustment. This approach will enable a more accurate estimation of peak demand when integrating model-based savings with adjustments for incented measures from other programs with deemed savings.	Medium	The IESO will work with the EPP delivery partner to ensure there is awareness of, and action being taken to, ensure accuracy of the methodology used to net out their savings from EPP baselines and savings calculations should participants also participate in one of the of other Save on Energy programs for the same facility application.

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6.	<p>Customer and technical reviewed baseline models are frequently divided into multiple discrete models. For instance, the baseline year may be split into three separate models: holidays, weekdays, and weekends. This practice is likely employed to isolate similar days or time periods and improve model metrics. However, it often leads to exceedingly small models that may contain fewer than ten data points (e.g., holiday only models). Using multiple models also creates unnecessary model documentation, complexity, and uncertainty in final savings results.</p>	<p>Promote simplicity in application baseline models by using a single model per site. Different time periods or holidays can be incorporated into a single model using appropriately defined indicator (dummy) variables. Adopting one model per participant site will streamline analysis, simplify savings calculations, and eliminate the need for small sample models.</p> <p>Relax the regression coefficient T-Statistic (T-stat) M&V guideline requiring individual coefficient statistical test coefficient be greater than two. Dummy temporal variables may not all be equally important and some variable levels may not meet this requirement. For example, if monthly indicator variables were included in the baseline model, you may see two- or three-month indicators with lower coefficient statistical test values in shoulder energy months where weather is mild. It is unnecessary to remove those individual month levels when the overall model goodness of fit metrics meet program guidelines.</p>	Medium	<p>The IESO will also consider the relaxation of the T-statistics requirement in consultation with the IESO's program delivery partner.</p> <p>In general, multiple discrete models are only employed when a single model does not meet the program's statistical metrics requirements.</p>

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7.	Hourly and daily baseline consumption models in all cases did not include temporal independent variables. Temporal variables can include month, hour of the day, day of week or even hour or hour of week for hourly consumption based models. In all cases, when EcoMetric included temporal variables the goodness of fit model metrics improved. Temporal variables, especially month indicators, produce model residual values (difference between model prediction and actual energy value) that are near zero. This creates more accurate consumption data peak reduction estimates. Temporal variables can also replace production and occupancy variables if they are predictably time-based. One concern with including temporal variables is that not all variable levels may result in statistically significant coefficients when models are built using ordinary least squares regression.	In most cases, baseline models should include temporal variables. If customer application models and/or final technically reviewed models do not include temporal variables, it should be understood why they were excluded, especially for hourly consumption models.	Medium	The IESO will provide recommendation to the EPP delivery partner, to discuss the potential for using temporal independent variables.
8.	Out of the 138 facilities currently participating in EPP, only 53 have elected to participate in the peak demand incentive adder. The incentive adder offers \$50/kW for summer peak demand savings realized with the annual incentive capped at 20% of baseline summer peak demand. To participate in the incentive adder, models must be hourly to calculate peak demand reduction. In process interviews with participants, EcoMetric identified hourly modeling as a pain point.	Consider increasing the incentive adder value to attract more participants. The IESO's plan to leverage centralized M&V software for hourly modeling should eliminate the pain point for participants and increase the uptake of the peak demand incentive adder.	Medium	The IESO is undertaking analysis to assess the impact of changing the peak demand incentive structure. The IESO will work with the EPP delivery partner to ensure marketplace awareness of any resulting program incentive enhancements.
9.	Only about one-third of participants were aware that the EPP program rules allow participants to make a non-routine adjustment to their approved energy models for electrification projects.	EcoMetric will provide the IESO evaluation team with a list of organizations unaware of this opportunity for direct marketing by the IESO Business Advisors. EcoMetric believes the material detailing the electrification adjustment opportunity is robust on the IESO's website, but an additional email blast to participants with a link to this specific information would be beneficial.	Medium	The IESO will provide recommendation to the EPP delivery partner, along with the recommended lists of organizations for follow-up. The IESO will also work with the EPP program delivery partner to identify additional communication channels to advise of program opportunities (such as electrification adjustments).

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10.	<p>Both participants and technical reviewers are substituting Standard Error of Regression (SER) for Root Mean Square Error (RMSE). SER is a standard Microsoft Excel-based regression output metric labeled as Standard Error listed between the Adjusted R Square and number of observations. SER is calculated by dividing the Sum of Squared Residuals (SSR) by the number of input data observations minus the number of independent variables and the degrees of freedom. The last step is to take the square root. RMSE is calculated similarly, but the SSR values are only divided by the number of observations minus degrees of freedom. For small one or two variable models, the SER and RMSE values will be close in value. However, for hourly models with potential dozens if not hundreds of independent variable model inputs, the two calculations will differ. The SER will be smaller than the RMSE and understate the CV(RMSE) goodness of fit metric.</p>	<p>SER should not be used instead of RMSE when calculating baseline model CV(RMSE).</p>	Low	<p>The IESO will provide recommendation to the EPP delivery partner to ensure that the program delivery partner is using the correct standard error going forward and that the incorrect standard error may have been used in existing models and should be adjusted when reporting on existing applications.</p>
11.	<p>Participant and technical review models do not document the method for choosing final heating and cooling degree variables. When evaluated degree day balance points do not align with either participant or technical reviewed model inputs, the reasons for those differences are indeterminable.</p>	<p>EcoMetric recommends that methods for choosing cooling and heating degree day/hour balance points be documented as part of the application and technical review model narratives.</p>	Low	<p>The IESO will provide recommendation to the EPP delivery partner to ensure the method for choosing degree days is documented as part of the technical review process.</p>
12.	<p>Participant and technical reviewer outlier removal often lacks details or context as requested in the current EPP M&V Guidelines Section 6.5. Participants and technical reviewers are not documenting outlier detection methods and/or reasons for removing a data point from baseline models.</p>	<p>Encourage outlier detection screening and documentation for removed data points. Visuals are key for demonstrating outlier decisions.</p>	Low	<p>The IESO will provide recommendation to the EPP delivery partner to enable proper documentation of outlier removal as per the EPP M&V Guidelines Section 6.5.</p>

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13.	<p>The steps participants and technical reviewers use to prepare meter data model input are not clearly documented. Two examples include consistently treating data as hour ending or beginning and adjusting hourly data for daylight savings. Meter data is usually delivered hour ending so that hourly consumption with a timestamp of 0:00 will refer to 11pm to midnight the previous day. Furthermore, typical meter data is output in standard time and not daylight savings adjusted. In many cases, it is unclear if the data is adjusted prior to modeling. This can be detected by checking for an extra hour the first Sunday in November and a missing hour the second Sunday in March. Both hour ending consistency and daylight savings time adjustment inconsistencies will impact final peak demand reduction estimates and incentive calculations.</p>	<p>Require that participants and technical reviewers consistently treat hourly meter data as hour beginning or hour ending. Hourly data standard verses daylight savings status should be verified by technical reviewers and adjusted appropriately prior to modeling and savings calculations.</p>	Low	<p>The IESO will provide recommendation to the EPP program delivery partner to ensure consistent treatment of the hourly data and daylight savings going forward.</p>
14.	<p>The technical review documents display screenshots of load shape tools that calculate peak demand using outdated versions of IESO Cost Effectiveness Tools, rather than utilizing the current versions. (Note that this finding applied to daily model CDM framework models not included in the PY2022 sample frame).</p>	<p>Ensure that the technical review teams assess peak demand accurately, particularly when it is not directly measured using model data. This can be achieved by using the load shapes and coincidence factors from the most up-to-date IESO Cost Effectiveness Tool.</p>	Low	<p>The IESO will provide recommendation to the EPP program delivery partner to enable accurate assessing of peak demand using the correct Cost Effectiveness Tool.</p>
15.	<p>Model based peak demand estimates were not provided for all projects.</p>	<p>We recommend that hourly consumption data based peak demand savings be calculated for all projects regardless of participants' decision to opt into the peak demand incentive adder. Technical reviewers should be directed that per M&V guidelines, baseline model outputs using daily electrical energy can be used to determine energy savings only, but not peak demand savings. (Note that this finding was from CDM Framework 2022 project review that was shifted to the 2023 evaluation)</p>	Low	<p>The IESO will provide the recommendation to the EPP program delivery partner.</p>

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16.	<p>The IESO's CSAT research found that participants were generally satisfied with EPP and that the program met or exceeded their expectations. EcoMetric's interviews found that dissatisfaction was attributed to a lack of technical support and responsiveness. The application process was also identified as an obstacle to program participation. These sentiments were echoed in findings from IESO's CSAT study.</p>	<p>Assign one specific technical reviewer to each facility to ensure the participants and their ESPs communicate with a single point of contact that can improve responsiveness and continuity throughout the application and baseline modeling process.</p>	Low	<p>The IESO will provide recommendation to the EPP program delivery partner. Several actions are being incorporated into EPP to remove barriers identified by participants, including: dedicated program delivery support, the introduction of an online application and AM&V solution.</p>
17.	<p>Based on participant interviews COVID-19 impacted the occupancy and energy consumption of retail, office, and university buildings the most, resulting in lower energy usage. This resulted in the delay or cancellation of planned energy efficiency projects.</p>	<p>Consider adding case studies specific to these building types for handling COVID-related non-routine adjustments in the program's M&V Guidance Documents. Focus technical support on these building types to ensure performance plans and models are adjusted properly.</p>	Low	<p>The IESO will consider the development of case studies to highlight the customer journey and benefits of program participation.</p>