Title: **The Advanced M&V Proving Ground: It's Working and It's Yielding Great Results**

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Abstract: The steadily increasing granularity of utility meter data is leading to greater adoption of advanced measurement and verification (AM&V, or M&V 2.0) in energy efficiency programs. Despite the easily seen value of AM&V to an efficiency program's annual evaluation process, three barriers to its widespread adoption have recently emerged: (1) an incomplete understanding of the appropriateness of project types for these advanced methods; (2) a program's inability to bring adequate information to correspondingly higher levels of regulatory rigor; and (3) having insufficiently valid and reliable literature available that can mutually support program staff, regulators and evaluators during regular M&V assessments. This paper offers a case study that addressed all three barriers, offering data to support greater adoption of this new, more real-world approach to measuring and verifying the benefits of energy efficiency measures. In 2020, we investigated the feasibility, applicability, and potential for cost and resource savings from replacing custom site-metering evaluations with AM&V, on a wide scale, in the commercial and industrial sector served by statewide efficiency programs. We compared the results from applying AM&V models with results from direct metering across 254 commercial, industrial, and multifamily retrofits. The custom site-metering evaluations follow the regional grid operator's M&V requirements for participation in its forward capacity market. We fit AM&V models — a daily heating and cooling degree regression; an hourly time-of-week and temperature regression; and a gradient-boosting machine model — to assess uncertainty and precision requirements for savings claims within certain portions of the portfolio segmented by measure type, building type, and savings level. Further, we compared the savings claimed through direct metering with the savings computed through AM&V, to analyze the potential benefits and limitations of transitioning portions of the portfolio to AM&V from direct metering practices. Findings: The analysis shows that 45% of our projects can meet uncertainty and precision requirements using time-of-week and temperature regression models. The team also identified savings thresholds and sectors of the project types that warrant use of AM&V. The results of this research can now inform discussions with regulators and evaluators about accepting AM&V methods. This analysis thus helps overcome three critical barriers to broader deployment of these methods. Given these findings, we offer recommendations on how efficiency program administrators can adopt appropriate AM&V methods and achieve scalability across applications.