

Program Evaluation: Small/Medium Commercial and Residential Sectors, HVAC, and Lighting

California Public Utilities Commission (Commission)

Challenge: The California Public Utilities Commission (Commission) is committed to ensuring the long-term success of California's dynamic energy efficiency portfolios, consisting of integrated programs with clearly defined *ex ante* energy savings measurements, accompanied by *ex post* evaluated measure energy savings resulting from the various program initiatives undertaken by Energy Efficiency Program Administrators (PAs) in California, including the Investor-Owned Utilities (IOUs). The main drivers of the scope and timing of work required for energy savings Estimation, Measurement and Verification (EM&V) activities include state energy efficiency strategic plans, legislative mandates and Commission decisions and legislative mandates. Moreover, the Commission continues to strive to improve the accuracy, speed and cost-effectiveness of the ratepayer funded program evaluation process. For this contract, Tierra was a core member of the broader / cohesive DNV GL team selected by the Commission to provide savings EM&V, Program Evaluation, Market Assessment, Policy Planning Support, and Financial and Management Audit Support for the Group A Sectors: Small/Medium Commercial and Residential Sectors, HVAC, and Lighting (Group A) consistent with the evaluation principles outlined above.

Project Highlights:

- Led gross-/net-Estimation, Measurement and Verification (EM&V) of HVAC and lighting measures across the small/medium commercial and residential sectors.
- Facilitated the development of statewide Project Coordination Groups (PCG) to ensure applicable insights / recommendations from the Group A evaluation are shared with other, concurrent contract groups (B – E).
- Integrated Group A evaluation findings into California's electronic Technical Reference Manual (eTRM).

Approach: Tierra's unique role on the cross-cutting Group A evaluation contract spanned gross-/net-EM&V of HVAC and lighting measures across the small/medium commercial and residential sectors. The data collection activities were both diverse and uniquely adapted to the breadth of HVAC and lighting measures / programs being evaluated through the Group A contract. Moreover, Tierra has continued to cultivate and refine industry best practice EM&V methodologies, including:

- Collaborating with California's Food Service Technology Center to refine energy saving models for commercial gas fryers that successfully incorporate newly available AMI gas consumption data.
- Deploying high-fidelity energy meters on agricultural Variable Frequency Drives (VFDs) to validate energy savings models developed in compliance with International Performance Measurement and Verification Protocol (IPMVP) Option C.
- Facilitating Net-to-Gross program participant surveys for residential HVAC rebate recipients to quantify free ridership and spillover consistent with California's Evaluation Framework.
- Deploying high-fidelity natural gas and energy meters on incented residential furnaces and blower fan motors to collect performance data inputs used to enhance the program's IPMVP Option C evaluation model.

Outcome: Tierra successfully incorporated accurate, reliable, consistent gross-/net-EM&V data inputs and modeling enhancements into the team's broader Group A evaluation framework. Additionally, the team lent a unique perspective to measure- and program-level evaluation recommendations to further improve future program lifecycles. The Tierra team also facilitated the development of statewide Project Coordination Groups (PCG) to ensure the cross-cutting application and knowledge-sharing of key recommendations across the other Contract Groups (A – E) included within the 2018-2020 evaluation cycle. Finally, Tierra team members integrated Group A evaluation findings into California's electronic Technical Reference Manual (eTRM); an online application that serves as the repository for all statewide deemed measures for California.

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