

# Evaluation of Energy Efficiency: The Resource is Real

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# Overview

- The role of evaluation, measurement and verification (EM&V) in resource planning
- The drivers for robust EM&V in CA
- The history of EM&V:
  - Protocols: past and present
- Applying EM&V results at PG&E
- Final thoughts

# Role of EM&V in Resource Planning

- EM&V plays a crucial role informing Procurement on EE program accomplishments
- EM&V can reduce the uncertainty around EE program results and save dollars in procurement costs
- EM&V, however, will better serve Procurement needs if it could accurately address all savings including spillover

# Drivers for EM&V in Procurement

- CA goal is an 80% reduction in GHG's by 2050
- Energy Efficiency is the first resource per Energy Action Plan
- Energy Efficiency is expected to provide 6 GW of the 11 GW of expected demand growth for CA in 2003-2012.
- See very large increase in EE effort in CA
  - 1996-2003:
    - EE spending was ~ 273 M\$
    - Annual Peak EE savings ~ 250 MW
  - 2006-2008:
    - EE spending ~ 2.1 B\$
    - Cumulative EE Savings ~ 6500 GWh
    - Save 400-500 MW annually to cut the 2% peak demand growth in half

# What's Needed?

- Cost-effective EM&V to provide robust estimates of energy and demand savings
  - 2006-08 EM&V budget is \$165 Million versus the estimated \$22 Million for 2004-05
- Societal EE Program Savings = Gross EE savings + spillover – free riders

# History of EM&V

- Nearly 15 years of EM&V providing measure, site and program-level measurement has provided California with a robust record of energy usage and savings.
- This record includes development of two sets of Protocols that established standards for EM&V that ensure reliability and consistency in measurement results

# Protocols 1994-1997

- Past Protocols focused on establishing minimum standards for field data collection and quantification methods.
  - The goal was to produce technical standards demonstrating measurability and persistence of energy efficiency
  - Protocols were prescriptive to ensure consistency in approach
  - [www.calmac.org/cadmac/protocols](http://www.calmac.org/cadmac/protocols)

# Protocols 2006-08

- The current Protocols continue to build on the technical measurement standards but also add flexibility to address a maturing energy efficiency market.
- Includes Protocols:
  - that allow for varying levels of rigor
  - require identification of International Performance Measurement Verification Protocols (IPMVP) for site-level measurement
  - measuring indirect energy savings
  - measuring participant spillover
  - measuring market effects

# Types of Studies

- 1994 - 2003 under past Protocols:
  - Impact, Net-To-Gross, Persistence and Retention studies
  - Onsite audits, end-use metering, engineering modeling, billing analysis, statistical modeling, mortality curves
- 2000 – 2005 governed by Policy Manual:
  - Process evaluations, market assessment and characterization, potential studies, milestone verification, and limited impact analysis
- 2006 – 2008 under current Protocols:
  - TBD, will include impact evaluations for current portfolios

# Applying EM&V Results in Resource Planning

- Requiring energy efficiency to be first in the loading order requires resource planning to rely on results of past evaluation studies
- Resource planners rely on ex ante savings targets to set long-term needs
  - EM&V is used to update the validity of ex ante forecasts
- System planners use technology and climate zone specific ex ante estimates to determine short-term procurement and system reliability
  - Again, EM&V provides the technology specific data.

# Conclusion

- With nearly 15 years of rigorous program evaluation, resource and system planners can confidently rely on net energy and peak demand savings from energy efficiency.
- With energy efficiency first in the loading order for resources in CA, resource planners need to fully account for the savings from energy efficiency (net program savings + spillover)
- CA evaluators need to bring more rigor into evaluating spillover effects of energy efficiency to help minimize procurement costs.