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FUNCTIONALITY OF THE MEASUREMENT AND VERIFICATION SPECIALIST

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MODULE

3

Section 3: Standards of Practice

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FUNCTIONALITY OF THE MEASUREMENT AND VERIFICATION SPECIALIST

Standards of Practice in Measurement and Verification are essential for ensuring the integrity and effectiveness of energy efficiency projects. By adhering to established protocols like the IPMVP and ASHRAE Guideline 14, stakeholders can achieve reliable assessments of energy savings, fostering greater accountability and enhancing the credibility of energy efficiency initiatives.

Learning Objectives

- Introduction and Course Outline
- Contexts and Concepts: The M&V Specialist's Function
- Standards of Practice
- Practical Considerations for M&V
- Physical and statistical models
- System boundary in M&V
- Baseline: Additional Considerations
- Special Baseline Considerations for Utility Programs
- Implementing the baseline model and data from the reporting period
- Granularity and load shapes
- Using Statistics to Communicate Uncertainty



INTRODUCTION

- M&V is crucial for ensuring energy efficiency projects deliver expected savings and performance outcomes.
- The International Performance Measurement and Verification Protocol (IPMVP) provides a systematic approach to M&V for energy efficiency projects.
- ASHRAE Guideline 14 offers a comprehensive framework for evaluating energy savings in buildings, emphasizing transparency and replicability.
- The Federal Energy Management Program (FEMP) provides guidelines tailored for federal agencies.
- Key methodologies within M&V standards include Option A (Measurement of Energy Savings Using the Retrofit Isolation Method), Option B (Measurement of Energy Savings Using Whole-Building Metering), Option C (Savings Estimation Using Engineering Calculations), and Option D (Calibrated Simulation).
- Creating baseline data is a critical component of M&V, serving as a reference point for measuring energy savings.
- Adherence to established protocols like the IPMVP and ASHRAE Guideline 14 fosters accountability and enhances the credibility of energy efficiency initiatives.

HISTORICAL CONTEXT OF "M&V" PROGRAM IN ENERGY EFFICIENCY

- Energy Savings Performance Contracting (ESPC) is a transformative approach to energy efficiency projects.
- Measurement and Verification (M&V) is a core component of ESPC, ensuring predicted energy savings occur as projected.
- Early development of M&V was rudimentary, focusing on simple pre- and post-installation measurements of energy usage.
- Determining energy savings involves measuring post-retrofit energy use and comparing it to pre-retrofit use.
- Demand-side management (DSM) programs emphasized energy efficiency and the adoption of new technologies.
- Major developments in DSM programs during the 1980s included building energy codes, advances in energy efficiency technology, and time-of-use pricing.
- Energy conservation measures, energy baseline, energy savings performance contract, energy unit savings, and energy cost savings are key terms in the energy conservation measures.



EMERGENCE OF FORMAL MEASUREMENT AND VERIFICATION PROTOCOLS

- FEMP, NEMVP/IPMVP, and ASHRAE 14 are foundational documents of "M&V."
- FEMP's guidelines focus on U.S. federal government contracts and procurement, emphasizing compliance with federal procurement rules.
- IPMVP provides general guidance on M&V concepts and best practices, establishing a general framework for users to establish their own applications.
- ASHRAE 14 calls for more scientifically rigorous engineering methods but offers practical guidance on how to comply with the document's specifications.
- The U.S. Department of Energy introduced the "International Performance Measurement and Verification Protocol" (IPMVP) in 1996, providing a structured approach to M&V.
- The IPMVP outlined four options for M&V: Retrofit Isolation (Key Parameter Measurement), Retrofit Isolation (All Parameter Measurement), Whole Facility Measurement, and Calibrated Simulation.
- The IPMVP's development established a common language and framework for stakeholders, promoting transparency and consistency, building trust among participants in ESPC projects.



CURRENT STATUS OF M&V PROGRAMS

- M&V is integral to ESPC and energy efficiency programs across North America and beyond.
- Regulatory frameworks often mandate M&V to ensure accountability and demonstrate the effectiveness of energy-saving initiatives.
- Advances in technology have refined M&V practices, enhancing the accuracy and efficiency of energy consumption measurements.
- The term "options" has transitioned to more strategic language, emphasizing the decision-making aspect of M&V.
- The shift from "options" to "strategies" reflects a broader trend in energy management that prioritizes strategic decision-making.
- Understanding this history and its implications is crucial for professionals engaged in energy management, policy-making, and related fields.



MEASUREMENT AND VERIFICATION (M&V) DOCUMENTS OVERVIEW

- FEMPI: A U.S. government initiative aiming to improve energy efficiency within federal facilities. It provides guidelines for assessing the performance of energy-saving technologies and annual reporting requirements.
- IPMVP: A framework developed by the Efficiency Valuation Organization (EVO) that provides guidelines for quantifying energy savings across various sectors. It outlines four options for measuring energy savings: Retrofit Isolation, Retrofit Isolation with Key Parameter Measurement, Whole Facility, and Calibrated Simulation.
- ASHRAE Guideline 14: A systematic approach to M&V, specifically for building energy performance. It emphasizes consistency in energy savings measurement and statistical analysis.
- ISO 50006 and ISO 50015: Two critical standards related to M&V, focusing on energy performance indicators (EnPIs) and the M&V process.
- Understanding these frameworks is critical for energy professionals to accurately assess and report energy savings, fostering trust and accountability in energy management practices.



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THANK YOU

