



## Certified Measurement & Verification Professional<sup>®</sup> Training Program

*A Certified Measurement & Verification Professional<sup>®</sup> (CMVP<sup>®</sup>) is an individual who manages or performs internationally recognized methods of quantifying the energy usage impacts of energy management activities. They apply the fundamental concepts of performance and savings verification in a wide range of contexts, including energy savings performance contracts and utility/government incentive programs. A CMVP<sup>®</sup> can often help a company confidently and cost-effectively implement cost saving activities through clear communication with project partners.*

### About this Training Program

This training program is designed to provide attendees an understanding of industry best practices for measurement and verification (M&V), including how to evaluate the performance of efficiency projects, and how to best apply International Measurement and Verification Protocol standards.

### What You Will Learn

- Learn about the fundamental method for creating M&V plans or performing M&V as required by others.
- Learn how to apply the core M&V program concepts and framework to a wide variety of facilities, including existing and new buildings and industrial processes.
- Undertake a review of the primary international standards, guidelines and protocols, such as the IPMVP<sup>®</sup>, ASHRAE<sup>®</sup> and ISO with a detailed explanation of how they compare and contrast.
- Learn the importance of establishing clear communication of core concepts with all project partners to avoid misunderstandings.

### At-a-Glance

- » This training program prepares attendees to take the Certified Measurement & Verification Professional<sup>®</sup> (CMVP<sup>®</sup>) exam.
- » This program is held over 3 days.
- » You earn 2.4 CEU | 24 PDH | 4.8 AEE Credits for completing this program.

### Key Takeaways

- » Work through practical examples to demonstrate the topics and procedures covered.
- » Review the various areas of the Body of Knowledge associated with AEE's certification exam.
- » Discuss how to apply what you have learned to your business and applications.
- » Leave with a course workbook and other tools that are invaluable in the field.

### Registration

Candidates should contact their local AEE approved training provider for information about available training programs, the certification application process, exam registration, and associated fees. To find your local training provider visit

[aeecenter.org/training](http://aeecenter.org/training)



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## Who Should Attend

The program is of greatest value to those undertaking, managing, or assessing M&V energy projects. Obtaining AEE's CMVP<sup>®</sup> certification provides international credibility among energy management and M&V communities. Attendees of this program have included existing M&V professionals, Certified Energy Managers, Certified Energy Auditors, energy engineers, energy analysts, financial executives, manufacturing and facilities managers, and energy consultants.

## Course Outline

- Introduction to Energy Management Concepts
- Modeling Concepts and Applications
- Contextual Considerations
- Fundamental Performance Verification Approaches Whole Facility Approach
- Retrofit Isolation Approach
- Basis for Adjustments
- Metering Considerations
- M&V Planning
- M&V Reporting
- Worked Examples and Exam Review

## Our Instructors

Over three days, a professional instructor(s) will guide you through M&V and how to apply M&V Protocols to your energy projects. Their teaching and industry experience allows them to deliver information that is of the most relevance and practical value to attendees.

## Certification Eligibility

The prerequisites to qualify for the certification process take into account the diverse education and experience applicants may have. Each candidate must meet the required criteria at

[aeecenter.org/cmvp](http://aeecenter.org/cmvp)

## Global Training Programs

For a complete list of AEE training programs delivered globally visit

[education.aeecenter.org/global](http://education.aeecenter.org/global)

## Accreditation and Recognition

The Certified Measurement & Verification Professional<sup>®</sup> (CMVP<sup>®</sup>) accreditation is one of the most globally respected in the field of energy management. For a full list of organizations that have recognized or accredited the CMVP<sup>®</sup> program visit

[aeecenter.org/cmvp](http://aeecenter.org/cmvp)

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## Daily Agenda

### Day 1

#### Introduction to M&V

- Definitions
- History of measurement
- Brief history of M&V
- Importance of a standard language

#### Modeling Concepts and Applications

- The Counterfactual Method
- Models - types and uses
- Introduction to adjustments
- Uncertainty for planning and reporting

#### Contextual Considerations

- M&V in contracts
- M&V in programs
- Guiding principles
- Role of judgment

#### Performance Verification Approaches

- Whole facility vs. retrofit isolation
- Four “Options” defined in FEMP, IPMVP®
- Other definitions in ASHRAE, ISO

### Day 2

#### Basis for Adjustments

- Measurement boundary
- Selecting a baseline
- Routine vs non-routine adjustments

#### Whole Facility Approach

- Setting the measurement boundary
- Identifying relevant data

#### Selecting the model type

- Statistical (regression)
- Physical (simulation)
- Advanced modeling concepts
- Uncertainty assessment

#### Retrofit Isolation Approach

- Strengths and weaknesses
- Interactive effects
- Metering/cost issue
- Uncertainty planning and reporting
- Types of models

### Day 3

#### Metering Considerations

- Types and methods
- Planning
- Accuracy vs cost
- Calibration
- Safety

#### M&V Planning

- M&V plan process
- M&V plan contents
- Contextual adherence

#### M&V Reporting

- Assessing value
- Non-energy benefits calculations
- Implementing non-routine adjustments

#### Example Exam Questions

#### Worked examples

IPMVP® is a registered trademark of the Efficiency Value Organization