



Efficiency
Valuation
Organization



ENERGY SAVINGS MEASUREMENT & VERIFICATION MANAGING THE RISKS

20 1997-2017
years
M&V Protocol Development

EVO is a non-profit organization whose products and services help people engineer and invest in energy efficiency projects worldwide.



VISION

EVO's vision is to create a world that has confidence in energy efficiency as a reliable and sustainable energy resource.



MISSION

EVO's mission is to ensure that the savings and impact of energy efficiency and sustainability projects are accurately measured and verified.



CORE VALUES

Not a consulting or implementation organization.

Not-for-profit and virtual to the extent possible.

Politically, geographically, commercially and technologically neutral.

Centered in an ever expanding global community of volunteers and practitioners.

Encourages and recognizes the value of contributions made by EVO volunteers.

Governed by an international Board of Directors supported by a small core staff.

Maintains fiscal responsibility.

OUR HISTORY

1994

U.S. Department of Energy began **working with industry** to develop a consensus approach to measuring and verifying efficiency investments in order to overcome existing barriers to efficiency.

1996

The **North American Measurement and Verification Protocol (NEMVP)** is published.

1997

The **International Performance Measurement and Verification Protocol (IPMVP) – Concepts and Options for Determining Energy and Water Savings** is published, as a result of strong and widespread interest outside of North America.

This **second edition** involve the participation of national organizations from a dozen countries and individual experts from more than 20 nations. This revised guide includes efficiency opportunities for new construction projects and to cover water efficiency.

Response to the IPMVP document is tremendous and the protocol is quickly adopted as the industry standard approach to **measurement and verification (M&V)**.

2001

The Protocol Committee of the IPMVP® formed a non-profit organization **IPMVP Inc.**, deriving its name from the flagship product.

2002

EVO, in conjunction with the Association of Energy Engineers (AEE), announced the launch of the **Certified Measurement & Verification Professional® (CMVP) program**.

2004

To reflect its expanded mission, IPMVP Inc. change his name to the **Efficiency Valuation Organization® (EVO)**.

2007

IPMVP Volume I is updated and released in English and in French.

2009

EVO developed and published the **International Energy Efficiency Financing Protocol (IEEFP)** providing guidance for local financing institutions around the world to evaluate and finance energy efficiency and savings-based renewable projects.

2010

IPMVP is once again updated and EVO made translations to Catalan, Portuguese, French and Spanish. EVO also published the **IEEFP** and release translations in Bulgarian, Czech, Spanish, Croatian, Polish and Romanian. In the same year, EVO updated the **IPMVP Volume I** in English and translated the Protocol to Bulgarian, Croatian, Czech, Polish, Romanian, Russian, Spanish, Brazilian and French.

2011

Dealing with quantifying energy performance improvements and energy savings, EVO is accepted as a liaison organization on two **ISO committees**: TC 242 and TC 257. These two committees were merged together in 2016 and became TC 301.

2013

EVO changed its training policy to allow qualified **third parties** to conduct **IPMVP training events**. Three companies were selected as International Training Partners which support EVO's M&V training in new markets.

2014

EVO publish the **IPMVP Core Concepts** as a new abridged version of the 2012 IPMVP Volume I. Other chapters and sections are split into separate guideline documents. This strategy is meant to make the update of the documents more flexible while allowing for quicker turnaround time for adaptation to different regulatory environment and translation into different languages.

2016

Revised publication of the **IPMVP Core Concepts** is published.

2017

Publication of IPMVP Core Concepts accompanying guides. Update and release of IEEFP along with **thematic seminars** and **specialized training programs**.

OUR COMMITTEES

BOARD OF DIRECTORS

EVO is a nonprofit corporation organized under the laws of the District of Columbia. EVO's Directors are selected to reflect diversity and geographic representation, with the objective of securing Directors representing a geographic and demographic cross-section of users of EVO Protocols. The property, affairs, activities and business of the Corporation are be vested in its Board of Directors and the corporation has no members.

The purpose of the EVO Strategic Advisory Board (SAB) is to provide strategic advice to the Board of Directors of EVO on a full range of EVO activities undertaken to achieve its vision and mission. The EVO SAB is a core component of the EVO governance structure whose purpose is to advise EVO Board of Directors with respect to policy, outreach, market development and strategic direction. The SAB members bring a broad range of expertise and perspective from across the World.

STRATEGIC ADVISORY BOARD

IPMVP COMMITTEE

The IPMVP Committee, a voluntary effort originally formed in 1995, serves to help promote and maintain the IPMVP Core Concepts and supporting reference materials on an ongoing basis. These volunteers from around the world devote their time and exchange ideas to further the development of the IPMVP, and continuously update the library of standardized protocols, references and tools to represent Measurement & Verification best-practices.

The M&V Training Committee (TC) oversees a broad portfolio of responsibilities including development of training strategies for all levels of training as well as instructor recruitment, mentoring and certification. The TC relies heavily on the Extended Training Committee (ETC), a group of instructors from every region of the world, that help to localize our training as needed.

M&V TRAINING COMMITTEE

EXTENDED TRAINING COMMITTEE

The Extended Training Committee is composed of M&V professionals who make recommendations to and assist the Training Committee to improve EVO's training procedures and materials. They are selected based upon their expertise as well as well as from a geographic perspective so that EVO's trainings can be adapted for different local environments.

INTRODUCTION TO M&V

WHY MEASUREMENT & VERIFICATION?

When firms and building owners invest in energy efficiency, their executives naturally want to know how much they have saved and how long their savings will last. If the installation had been made to generate energy, then measurements would be trivial – install a meter on the generation equipment.

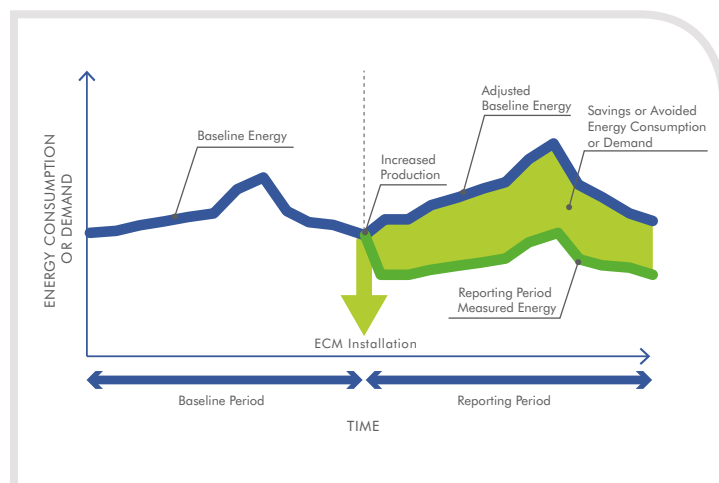
Unlike energy generation, the determination of energy savings is a challenge, and requires both accurate measurement and repeatable methodology, known as a measurement and verification (M&V) protocol. The long-term success of energy and water management projects has been hampered by the inability of project partners to agree on an accurate, successful measurement and verification (M&V) plan.

EVO's International Performance Measurement & Verification Protocol (IPMVP) was developed and maintained over 20 years to address these concerns. The IPMVP discusses procedures that, when implemented, allow buyers, sellers and financiers of energy and water projects to quantify Energy Conservation Measure (ECM) and Water Conservation Measure (WCM) performance and savings.

By using one of the different M&V options discussed in the IPMVP, users can allocate various risks associated with achieving energy or water cost savings to either the buyer or seller of the project, facilitating financing and allowing risk reduction and better risk management.

IPMVP® FRAMEWORK

Energy, water or demand savings cannot be directly measured, because savings represent the absence of energy/water consumption or demand. Instead, savings are determined by comparing measured consumption or demand before and after implementation of a program, making suitable adjustments for changes in conditions as illustrated below.



The comparison of before and after energy consumption or demand should be made on a consistent basis. Good practice requires that M&V is well integrated into the process of identifying, developing, procuring, installing and operating energy conservation measures. IPMVP's framework requires certain activities to occur at key points in this process and describes other important activities that must be included as part of good M&V practice.

IPMVP[®] OPTIONS

IPMVP provides options for developing and implementing a quality M&V process. These options are related to the concept of measurement boundaries. In addition, different methods of calculating savings are available.

Each requires data on energy consumption, demand and other parameters. IPMVP provides four Options for determining savings (A, B, C and D).

Choosing options involves many considerations, including the location of the ECM measurement boundary. The energy quantities in the different savings equations can be measured by one or more of the following techniques.

RETROFIT-ISOLATION: KEY PARAMETER MEASUREMENT

A

- » Savings are determined by field measurement of the key parameter(s), which define the energy consumption and demand of the ECM's affected system(s) or the success of the project.
- » Measurement frequency ranges from short-term to continuous, depending on the expected variations in the measured parameter and the length of the reporting period. Parameters not selected for field measurements are estimated values. Estimates can be based on historical data, manufacturer specifications or engineering judgment.
- » Documentation of the source or justification of the estimated value is required. The plausible saving error arising from estimation rather than measurement is evaluated.

RETROFIT-ISOLATION: ALL PARAMETER MEASUREMENT

B

- » Savings are determined by field measurement of the energy consumption and demand and/or related independent or proxy variables of the ECM affected system.
- » Measurement frequency ranges from short-term to continuous, depending on the expected variations in savings and length of the reporting period.

WHOLE FACILITY

C

- » Savings are determined by measuring energy consumption and demand at the whole facility utility meter level.
- » Continuous measurements of the entire facility's energy consumption and demand are taken throughout the reporting period.

CALIBRATED SIMULATION

D

- » Savings are determined through simulation of the energy consumption and demand of the whole facility, or of a sub-facility.
- » Simulation routines are demonstrated to adequately model actual energy performance in the facility.
- » This option requires considerable skill in calibrated simulation.

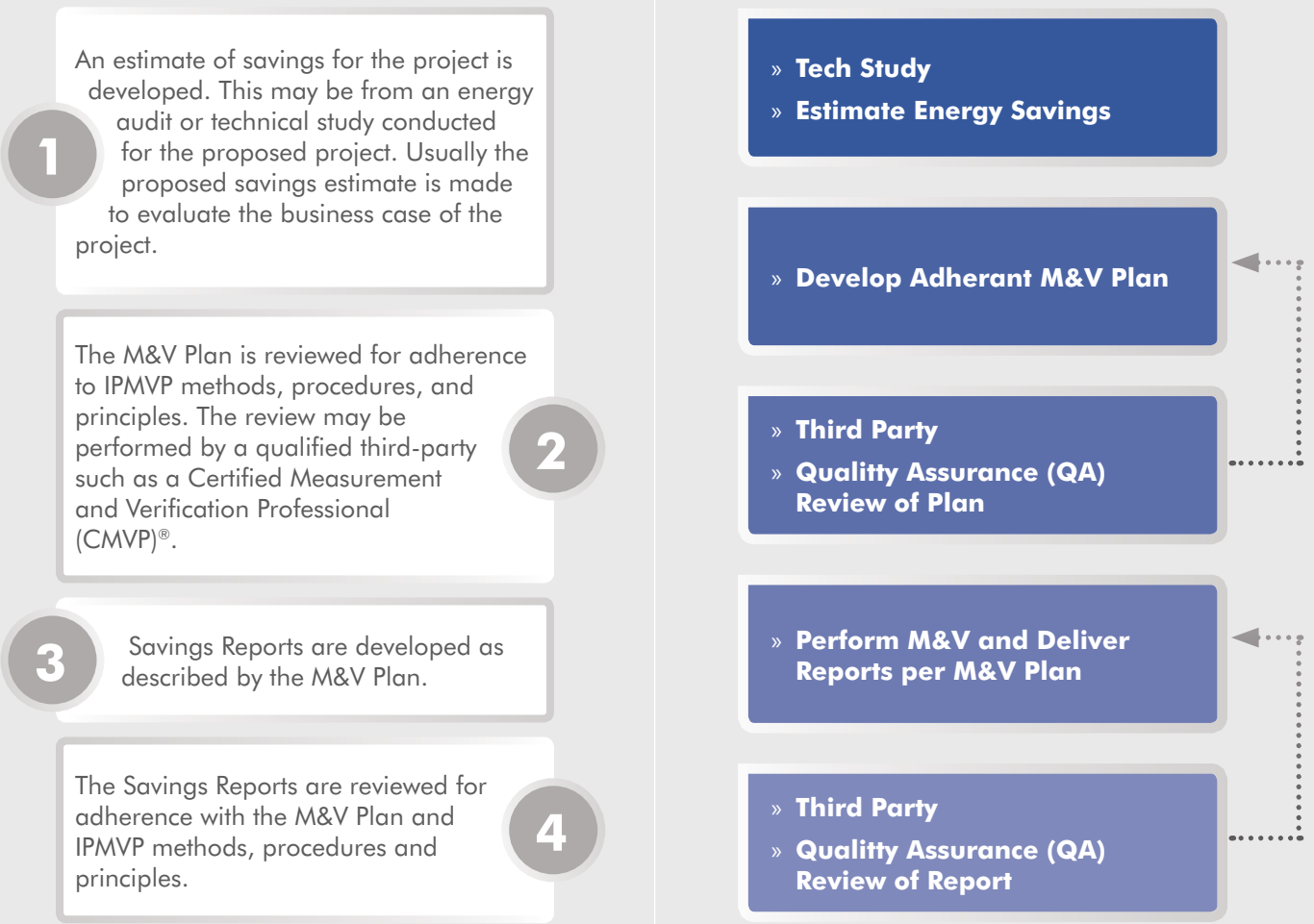
ADHERENCE TO IPMVP®



The IPMVP represents a framework of terminology and methods for properly assessing savings in energy or water consumption and demand. The IPMVP guides users in developing M&V Plans and Reports for specific projects.

The IPMVP is written to allow maximum flexibility in creating and implementing M&V procedures, while adhering to the principles of accuracy, completeness, conservativeness, consistency, relevance and transparency.

M&V represents a process implemented to assure savings are verified according to the application of IPMVP's procedures. A typical M&V process is illustrated below:



TRAINING & CERTIFICATION

M&V / CMVP

TECHNICAL TRAINING FOR THE INTERNATIONAL MARKETPLACE

M&V TRAINING

We draw on EVO's expertise and real world experience to provide M&V training tailored to the needs of an international audience. We offer a variety introductory, intermediate and advanced trainings and workshops to help the M&V professional stay up to date on the latest trends in measurement and verification. Thanks to our various committees, we strive to continuously improving our training programs and materials. We stay current with industry development and expand our training offering accordingly.

Our training mixes fundamental theory with practical applications, giving examples in an interactive environment. Basic workshop topics and target audiences are outlined below, however may be modified to suit attendee needs and interests. Attendees are given a printed copy of the presentation materials and the IPMVP® Core Concepts.

Thanks to a group of over 40 certified instructors and a network of international and national training partners as well as local organizers, EVO can offer M&V training throughout the world. In 2015 and 2016, EVO training sessions were held in 28 countries with more than 2,500 participants. EVO approved instructors customize EVO's training materials to meet local needs.

Over the years, various versions of EVO's protocols were translated in more than 20 languages and training is currently available in 8 languages.

Over
40
certified
instructors

More than
2,500
participants in
2015-16

Training
available in
8
languages



CERTIFIED MEASUREMENT & VERIFICATION PROFESSIONAL (CMVP®)

TRAINING PREPARATION FOR THE CMVP® EXAM & CERTIFICATION

The Association of Energy Engineers (AEE), in cooperation with EVO, has established the Certified Measurement and Verification Professional® program with the dual purpose of recognizing the most qualified professionals in this growing area of the energy industry, and raising the overall professional standards within the measurement and verification field.

This training prepares students for the four hour CMVP® exam taken at the end of the two and one-half day training period. The course covers introductory topics and then tackles more complex subjects such as preparing a M&V Plan and the basic methods of Retrofit Isolation, Whole Facility, and Calibrated Simulation examples.

The training is geared toward the needs of a variety of professionals including performance contractors; energy auditors wanting to expand their expertise into verification roles; large energy users using performance contracting; large energy users interested in getting a better understanding of their energy budgets and being able to explain significant variations and fluctuations in energy use; and energy efficiency program designers, policy makers and managers working for government or utilities.

The CMVP® program has the **dual purpose** of recognizing the most qualified professionals in this growing area of the energy industry, and raising the overall professional standards within the measurement and verification field.



Awarded by

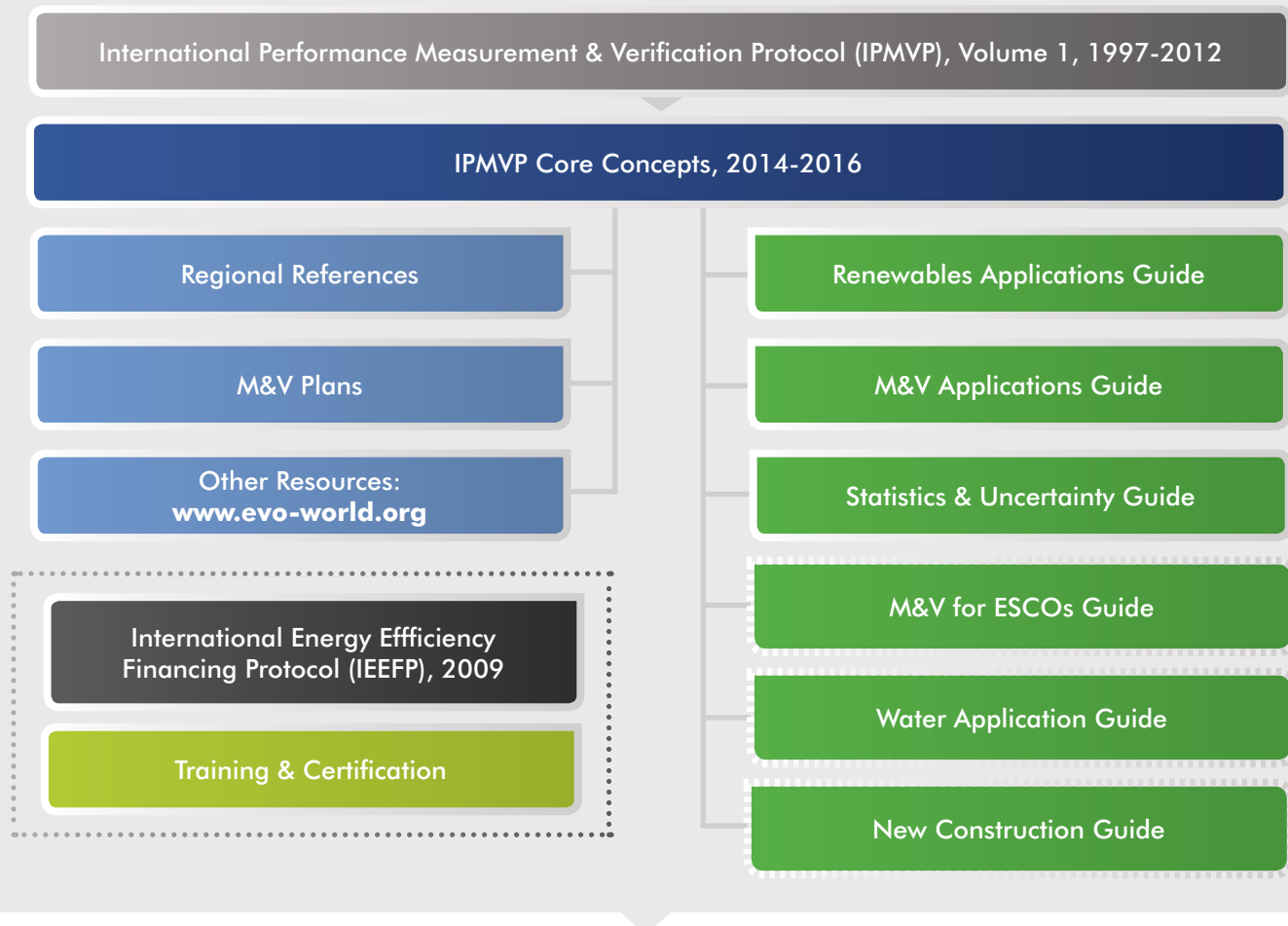


In
conjunction with



EVO RESOURCES

20 1997-2017
years
M&V Protocol Development



SPECIAL THANKS TO OUR CURRENT ORGANIZATIONAL SUPPORTERS





**STAY CURRENT ON THE LATEST
IN M&V POLICY AND PRACTICES**

- » **Protocols (IPMVP, IEEFP)**
- » **Training**
- » **Certification**
- » **Web Resources**
- » **Industry Events**

JOIN EVO TODAY!



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