



Efficiency  
Valuation  
Organization

# MEASUREMENT AND VERIFICATION IN PERFORMANCE CONTRACTS

Mark Lister

Chairman of the Board

Efficiency Valuation Organization

Denis Tanguay

Executive Director

Efficiency Valuation Organization

GLOBAL ESCO NETWORK SYMPOSIUM

Paris – May 29, 2024

# EVO – WHO WE ARE



The home of the **IPMVP**®



A 23-year-old **non-profit** corporation



Led by **volunteers** around the world

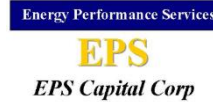
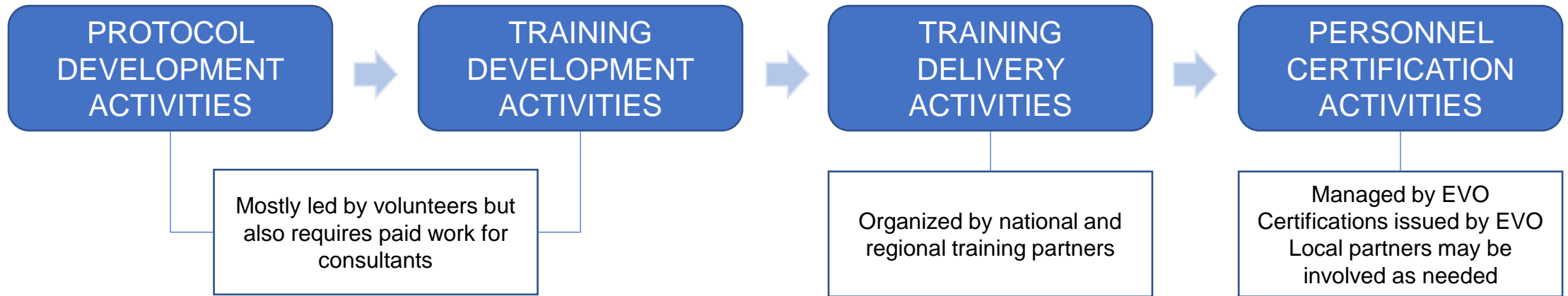
## VISION

Create a world that has confidence in energy efficiency as a reliable and sustainable energy resource.

## MISSION

Ensure that the savings and impact of energy efficiency and sustainability projects are determined through appropriate measurement and verification.

# EVO – WHAT WE DO



# THE NEED FOR AN M&V PROTOCOL -1996/97

## ISSUE

Existing protocols created a patchwork of **inconsistent** and sometimes **unreliable** efficiency installation and **measurement practices**.

- ▶ Reduced reliability and performance of efficiency investments.
- ▶ Increased project transaction costs.
- ▶ Prevented the development of new forms of lower-cost financing.
- ▶ Inability of project partners to agree on an M&V Plan.

## GOAL

A consensus approach to measuring and verifying efficiency investments to overcome barriers to efficiency.

## SCOPE

Create a document for use in the energy performance contracting industry.

# THE IPMVP IS THE RESULT OF A GLOBAL EFFORT

## **BRAZIL**

Institute Nacional De Eficiencia  
Energetica

Programa De Combate Ao Desperdicio  
De Energia Electrica  
Ministry of Mines and Energy

## **BULGARIA**

Bulgarian Foundation for Energy  
Efficiency (EnEffect)

## **CANADA**

Canadian Association of Energy Service  
Companies (CAESCO)  
Natural Resources Canada

## **CHINA**

State Economic and Trade Commission  
Beijing Energy Efficiency Center (BECON)  
Electric Power Research Institute (EPRI)

## **THE CZECH REPUBLIC**

Stredisko pro Efektivni Vyuzivani Energie  
(SEVEN7)

## **INDIA**

Tata Energy Research Institute

## **JAPAN**

Ministry of International Trade and Industry  
(MITI)

## **KOREA**

Korea Energy Management Corporation  
(KEMCO)

## **MEXICO**

Comision Nacional Para El Ahorro De  
Energia (CONAE)  
Fideicomiso De Apoyo Al Programa De  
Ahorro De Energia Del Sector Electrico  
(FIDE)

## **POLAND**

The Polish Foundation for Energy Efficiency  
(FEWE)

## **RUSSIA**

Center for Energy Efficiency (CENef)

## **SWEDEN**

Swedish National Board for Technical and Urban Development

## **UKRAINE**

Agency for Rational Energy Use and Ecology (ARENA – ECO)

## **UNITED KINGDOM**

Association for the Conservation of Energy

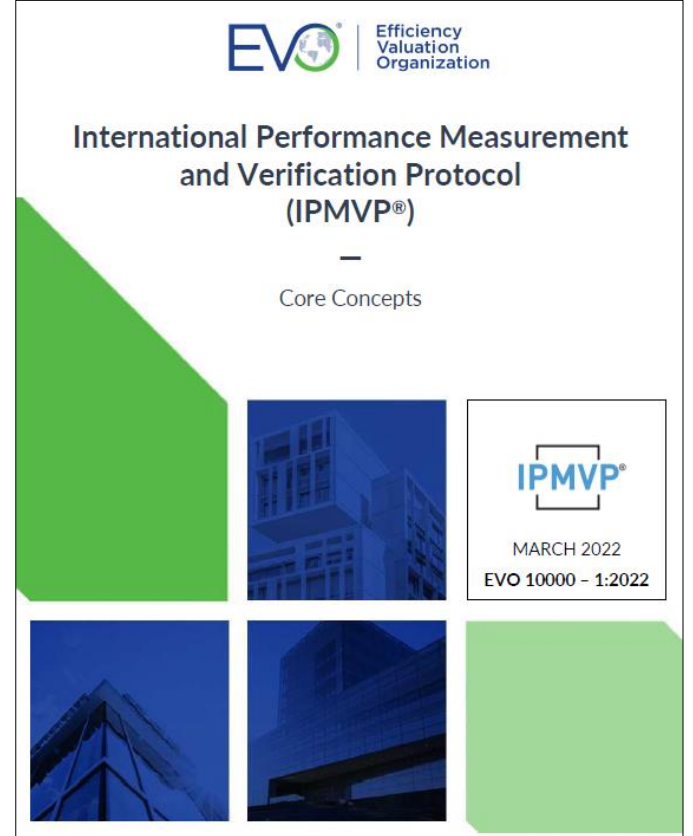
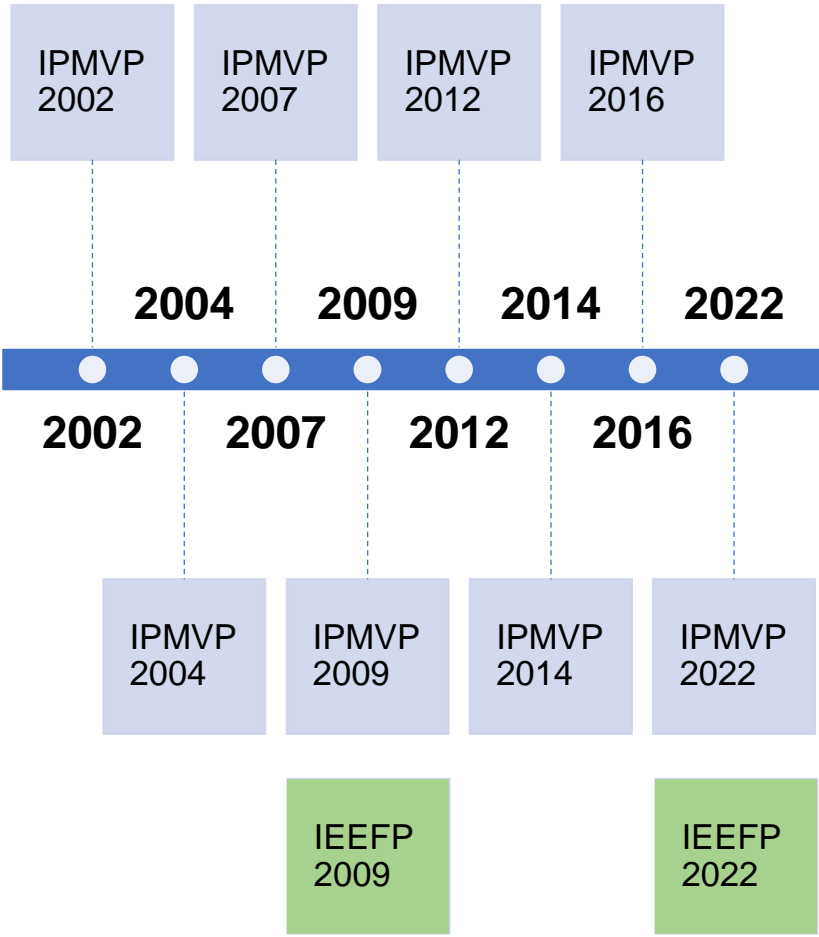
## **UNITED STATES**

American Society of Heating, Refrigerating, and Air-Conditioning  
Engineers (ASHRAE)  
American Water Works Association (AWWA)  
Building Owners and Managers Association (BOMA)  
National Association of Energy Service Companies (NAESCO)  
National Association of Regulatory Utility Commissioners (NARUC)  
National Association of State Energy Officials (NASEO)  
U.S. Department of Energy (DOE)  
U.S. Environmental Protection Agency (EPA)

# IPMVP IN TIME

**1996**  
North American  
Energy  
Measurement and  
Verification Protocol  
(NEMVP)

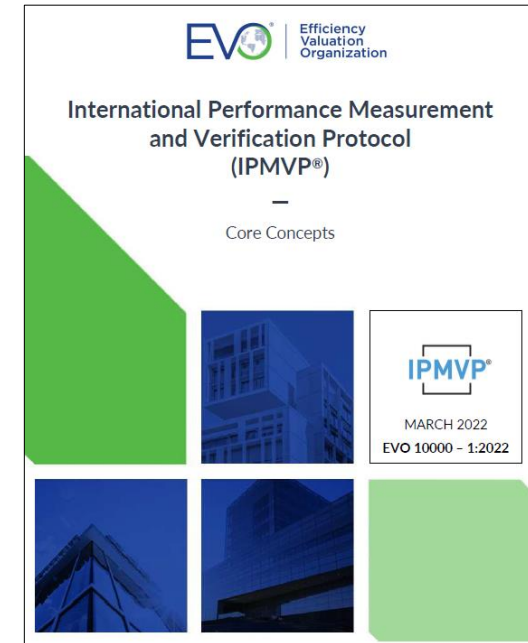
**1997**  
International  
Performance  
Measurement and  
Verification Protocol  
(IPMVP)



# IPMVP AND APPLICATION GUIDES

## THE IPMVP

- ▶ **Maintained and updated** regularly by Efficiency Valuation Organization since 1997
- ▶ Globally recognized as the “**mother of all M&V protocols**” with different versions translated in about 10 languages
- ▶ **Available for free** from EVO’s website with over **20,000 downloads** since 2016
- ▶ Used by **ESCOs** all over the world since the 1990s
- ▶ The corner stone of **utility energy efficiency programmatic efforts** in all continents
- ▶ Required by various levels of **government** to validate energy savings
- ▶ Normative reference in many other codes and **standards** including **ISO 50015**
- ▶ Training reference for EVO’s Performance Measurement and Verification Analyst (PMVA) and Performance Measurement and Verification Expert (PMVE) **professional certification programs**
- ▶ Reference framework for the **International Energy Efficiency Financing Protocol** (IEEFP) and its related training program
- ▶ Methodology behind nearly all energy consumption **analysis software**



# IPMVP AND EVO / GLOBAL PRESENCE



**Canada  
United States  
Mexico**



**France  
Belgium  
Switzerland  
England/Ireland  
Spain  
Portugal  
Italy**



**Turkey**

**South Korea  
Taiwan  
China  
Thailand  
India  
Indonesia  
Hong Kong**



**Brazil  
Argentina  
Colombia  
Chile**



**Tunisia  
Kenya**



**Australia  
New Zealand**



# WHAT DO WE MEAN BY M&V?

## M&V ≠ M&V

### Monitoring & Verification

Routine activity that proves a project is operating as intended with a process of checking using defined methods, procedures, tests, and other evaluations.

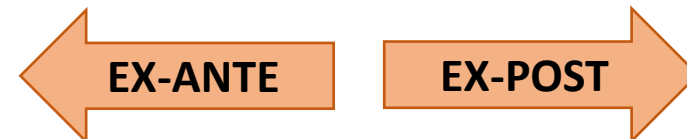
- Mostly applied for the **reporting** of energy efficiency **program** results and outcomes.
- Savings are often **deemed** or **stipulated** – not measured.
- Project **performance** is often **assumed** – too costly to measure all projects.



### Measurement & Verification

Process of planning, measuring, collecting, and analyzing data to verify and report energy savings within a facility resulting from implementing energy efficiency measures.

- Applied for the **contractual reporting** of energy efficiency **project** results.
- Under the IPMVP, **measurement is compulsory**.
- Uncertainty calculations/considerations are **core and central** to the IPMVP.
- Project **performance** is **measured**.



[http://evo-world.org/images/corporate\\_documents/EVO\\_Deemed\\_Savings\\_Position\\_OCTOBER\\_2019.pdf](http://evo-world.org/images/corporate_documents/EVO_Deemed_Savings_Position_OCTOBER_2019.pdf)

<https://evo-world.org/en/news-media/m-v-focus/858-magazine-issue-2/1095-the-exact-science-of-deemed-savings>

# WHY MEASUREMENT AND VERIFICATION?

Two fundamental questions for a facility owner investing in energy efficiency

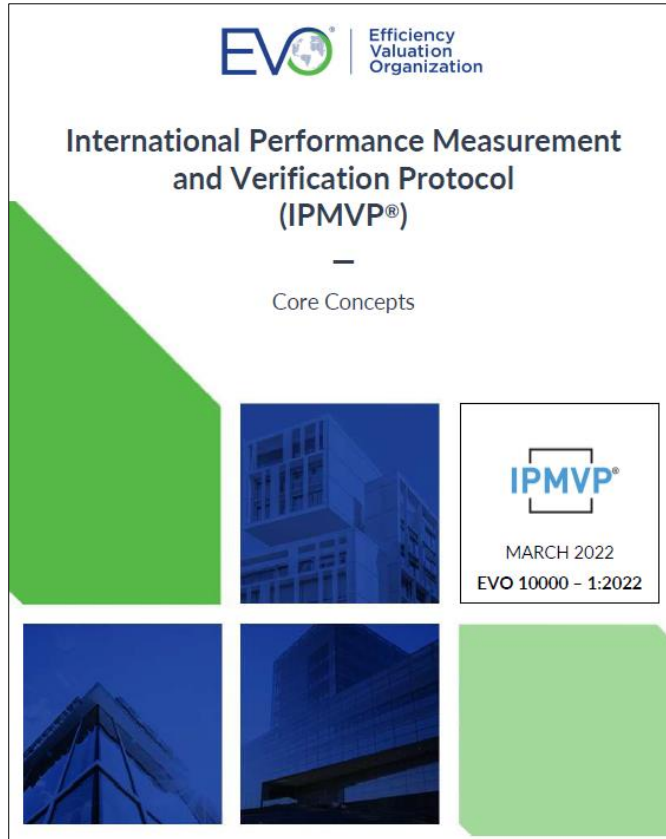
How much will I save?

How long will the savings last?

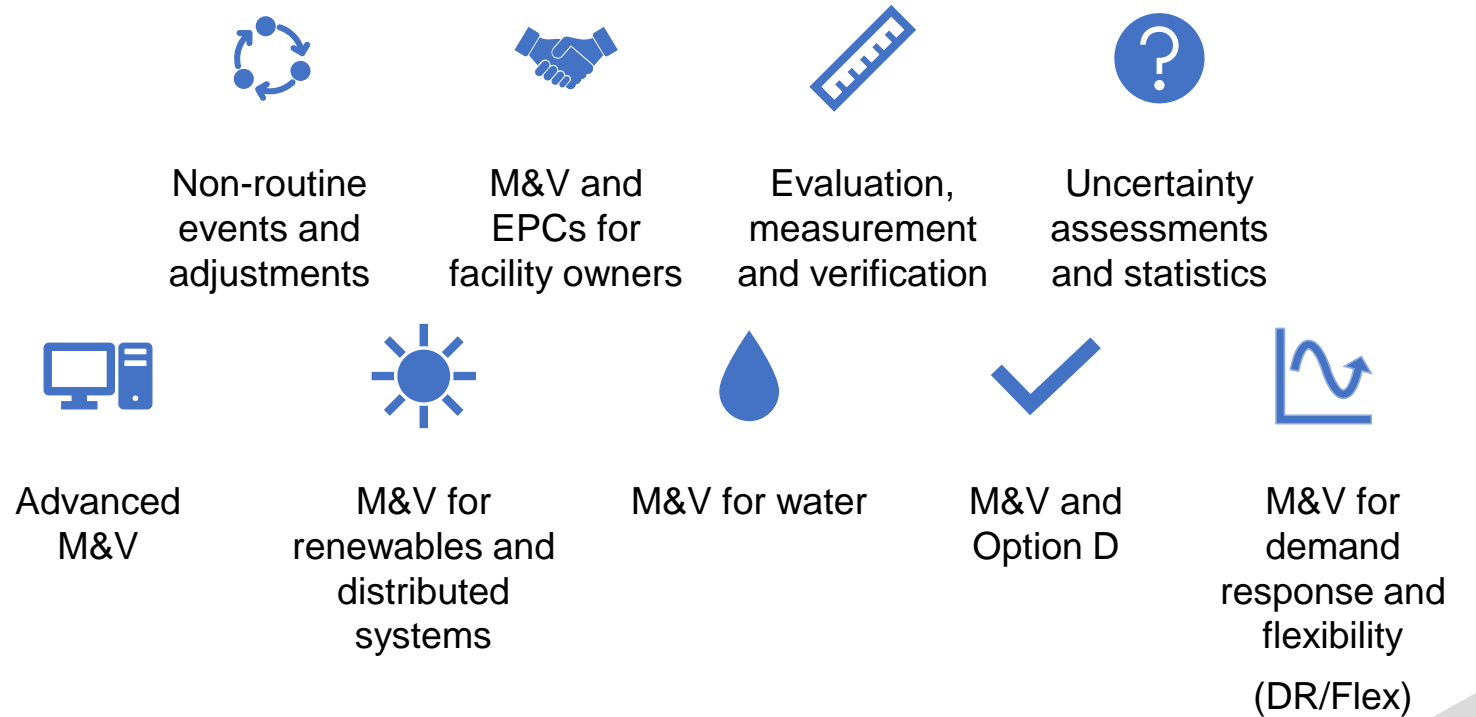
- ▶ M&V is the **meter** of energy efficiency projects.
- ▶ M&V addresses the **accuracy** of energy savings calculation.
- ▶ The measurement of uncertainty is **quantifying doubt** and provides insights into a project.
- ▶ M&V allows project **risk allocations** in a **structured and repeatable manner**.
- ▶ M&V **reduces financing costs** by providing standardization.
- ▶ In EPCs, M&V **reduces transaction costs** through a consensus approach and recognized methodologies.

# IPMVP – CURRENT PROTOCOL DEVELOPMENT WORK

## IPMVP CORE CONCEPTS



## IPMVP APPLICATION GUIDES (REVISIONS AND NEW DOCUMENTS)



# IPMVP APPLICATION GUIDES – PUBLICATION SCHEDULE

Published - 2021



Non-routine events and adjustments

First semester - 2024



M&V and EPCs for facility owners

Second semester - 2024



Uncertainty assessments and statistics

Second semester - 2024



Advanced M&V

Second semester - 2024



Evaluation, measurement and verification

2025



M&V for renewables and distributed systems

2025



M&V and Option D

2025

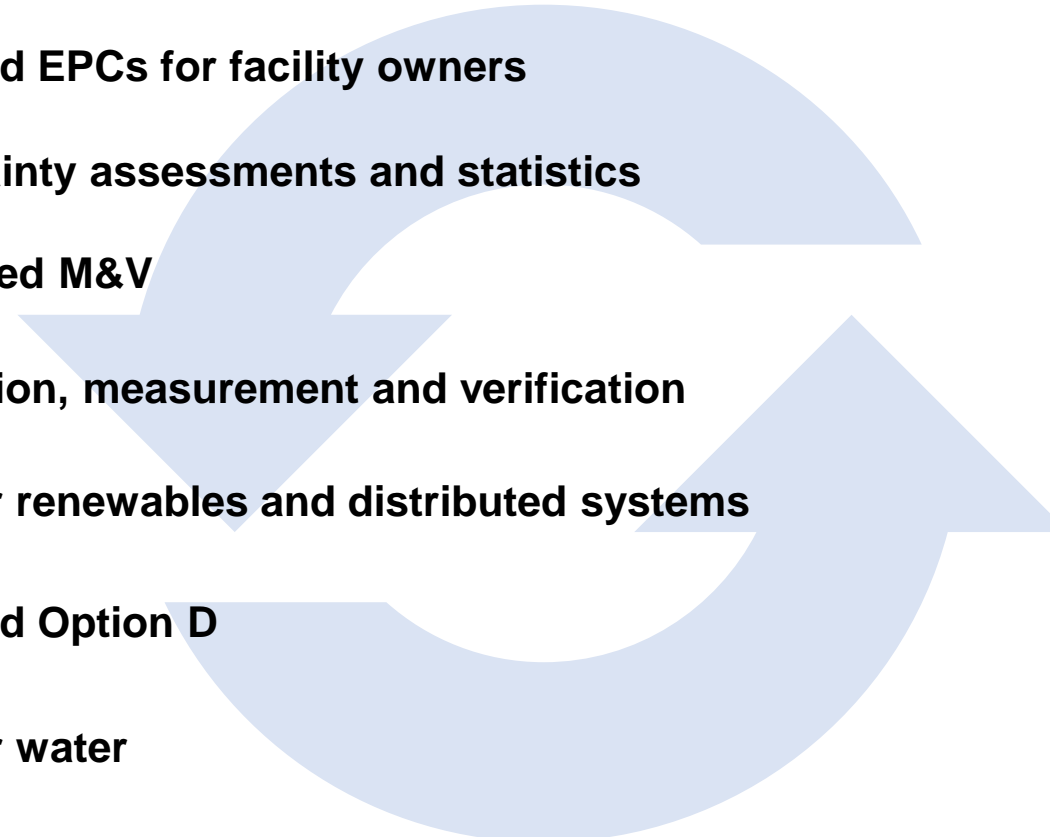


M&V for water

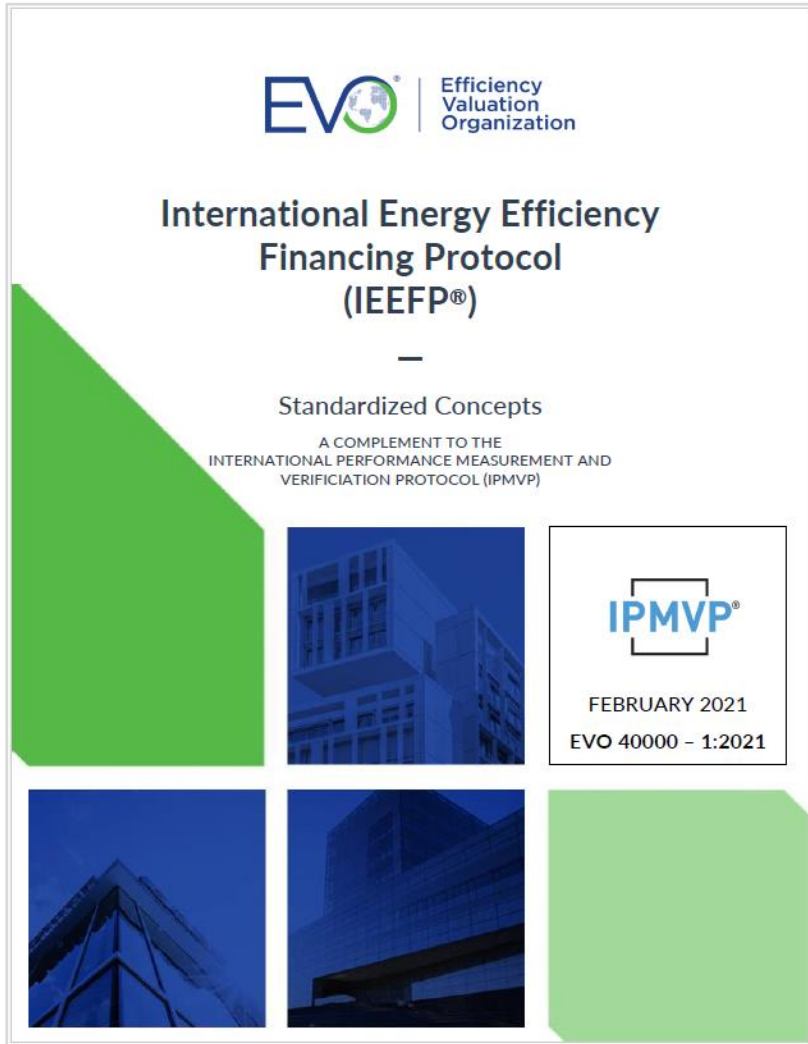
2025



M&V for demand response and flexibility (DR/flex)



# ENERGY EFFICIENCY FINANCING PROTOCOL



The main objective of IEEFP is to create an understanding for **local financial institutions** of how energy efficiency (EE) projects generate reliable cost reductions (savings) in a facility's existing operating expenses.

To accomplish this, IEEFP is designed to enhance the credit officer's knowledge of the following:

- How EE Project savings can be relied upon for loan repayment & increased the facility owner credit capacity;
- How to evaluate and mitigate risks of EE projects delivering estimated savings (ignoring any attempt to educate them on how to evaluate borrower credit risk since they should already possess this core competency);
- How to structure a project-based loan that minimizes risk and provides an attractive internal rate of return (IRR);
- How the measurement and verification (M&V) of energy savings can be reliably performed is critical to documenting and ensuring sustainable EE savings.

# IPMVP DEPLOYMENT – PROGRAM ENHANCEMENT EE SPECIALISTS



Recomendações sobre políticas públicas para incentivar a EE industrial

Novos mecanismos financeiros a fim de alavancar os potenciais de investimentos em EE

Conscientização de PMEs e campanha de marketing

Capacitação de consultores

Subsídios para diagnósticos energéticos e apoio à implementação de projetos

Fundo Garantidor

Catálogo de tecnologias (processo de credenciamento)

Validação de projetos por especialistas independentes

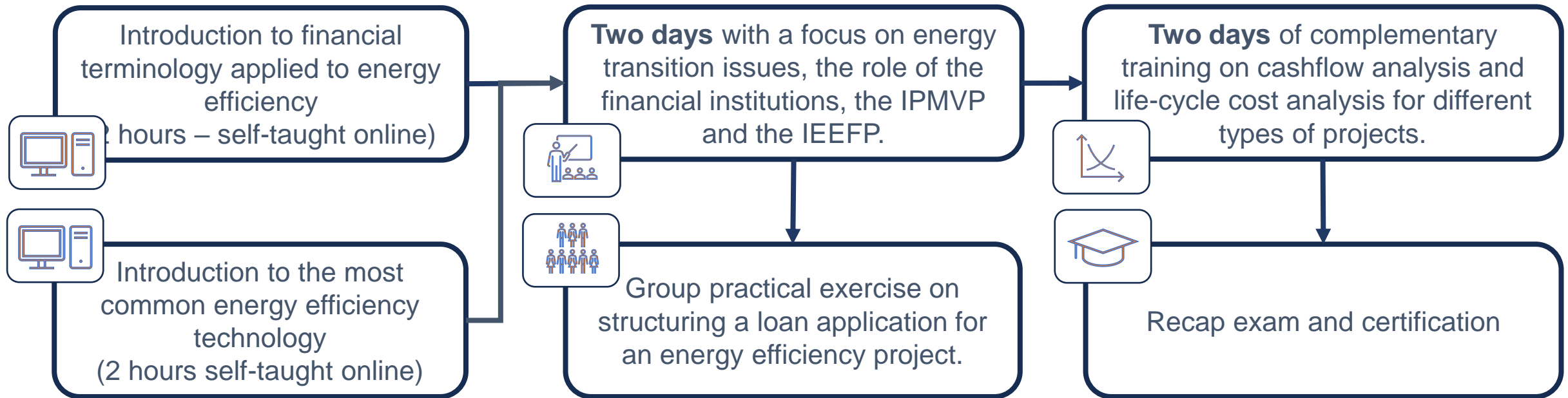
Pré-financiamento

Capacitação de bancos

Processo de refinanciamento junto a investidores privados



# IEEFP DEPLOYMENT – PROGRAM ENHANCEMENT FOR BANKS



- ▶ **IPMVP** forms a solid basis for contractual agreement about risk sharing in ESCO projects – underpinning confidence in performance contracting
- ▶ As the developer and owner of IPMVP, EVO provides a **consistent, internationally agreed, objective protocol** on which contract agreements can be based
- ▶ **Capacity** of M&V professionals is a key constraint to ESCO sector growth in many markets – EVO's training offering can help to meet this need
- ▶ EVO is a **natural partner** for ESCO Associations looking to accelerate uptake in national ESCO markets and grow industry knowledge





Efficiency  
Valuation  
Organization

**THANK YOU!**