



M&V FOR EE PROJECT THE ROLE OF IPMVP

Pierre Langlois
Econoler

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Key Concepts

Measure?

- Savings are the absence of energy use.
- We can *not* measure what we does not exist.
- We do *not* ‘measure’ savings!

- We *do* measure energy use.
- We do have to *analyze* measured energy use to **determine** savings.

Introduction

Why Measure and Verify?

- Evaluate the assets created by EE project
- Allocate risks to the appropriate parties

MAKE PROJECTS BANKABLE

Introduction

- M&V is an evolving science, although common practices exist
- These practices are documented in several guidelines, including
 - The International Performance Measurement & Verification Protocol (IPMVP 2001)
 - FEMP M&V Guidelines: Measurement and Verification for Federal Energy Projects Version 2.2 (2000)
 - ASHRAE Guideline 14: Measurement of Energy and Demand Savings (2002)



The International Performance Measurement & Verification Protocol (IPMVP)

Framework of definitions and methods for assessing energy savings.

IPMVP – Added Value

- Verification framework for EE measures
- Standardizes M&V terminology
- Defines various M&V acceptable concepts

IPMVP – Specific Benefits for ESCO projects

- Defines standard approaches to “measuring savings” to reassure clients
 - Leads clients and ESCOs to discuss the trade-off between measurement “accuracy” and measurement cost
 - Legitimized ESCO projects through International recognition
 - Updates M&V state of the art practices through constant evolution
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M&V Basic Concept

- Calculating Energy Savings:
 - Baseline energy use
 - Post-installation energy use
 - = Energy savings
- Baseline represents level of energy that would have been used if new equipment had not been installed - can be affected by a variety of factors:
 - Changes in facility equipment, schedule, occupancy, operations or maintenance procedures, etc.
 - Weather variation, change of functions or production

IPMVP – M&V Options

M&V Option	Performance ¹ and Usage ² Factors	Savings Calculation
Option A – Stipulated and Short-Term Measured Factors	Based on a combination of measured and stipulated factors. Measurements are spot or short-term taken at the component or system level. Stipulated factors are supported by historical or manufacturer's data.	Engineering calculations, component or system models.
Option B – Continuously Measured and Stipulated Factors	Based on continuous measurements taken at the component or system level when variations in factors are expected. Spot or short-term measurements may suffice when variations in factors are not expected.	Engineering calculations, component or system models.
Option C – Utility Billing Data Analysis	Based on long-term whole-building utility meter, facility level, or sub-meter data.	Based on regression analysis of utility billing meter data.
Option D – Calibrated Computer Simulation	Computer simulation inputs may be based on several of the following: reasonable assumptions based on historical data gathered at facilities, performance specifications of equipment or system being installed, engineering estimates, spot-, short-term, or long-term measurements of system components, and long-term whole-building utility meter data.	Based on computer simulation model calibrated with whole-building or end-use metered data or both.

Valuing Savings & Mitigating Related Performance Risks

- The right level of M&V is determined by degree of savings certainty:
 - Projects with high degree of certainty require minimal M&V
 - Projects with low degree of certainty require more M&V
- Factors that affect cost and level of M&V:
 - Value and level of uncertainty of estimated savings
 - Complexity of efficiency equipment installed
 - Amount and value of equipment installed
 - Number of interactive effects
 - Availability and capability of an existing controls system

EVO: 2007 IPMVP

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Conclusions

- Without M&V, energy savings project can not be valorized or made ‘bankable’
- Carefully crafted M&V strategies are a key tool to managing performance risks in projects.
- The final M&V selected should balance need for accuracy with cost to install/perform.

Conclusions

- EVO's IPMVP can play an important role in the development of the energy efficiency projects in Europe, in order to provide expertise and credibility to M&V activities.

EVO

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**Pierre Langlois
President Econoler International
planglois@econolerint.com**