Measurement & Verification and Energy Performance Contracts

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Stepping Plus project

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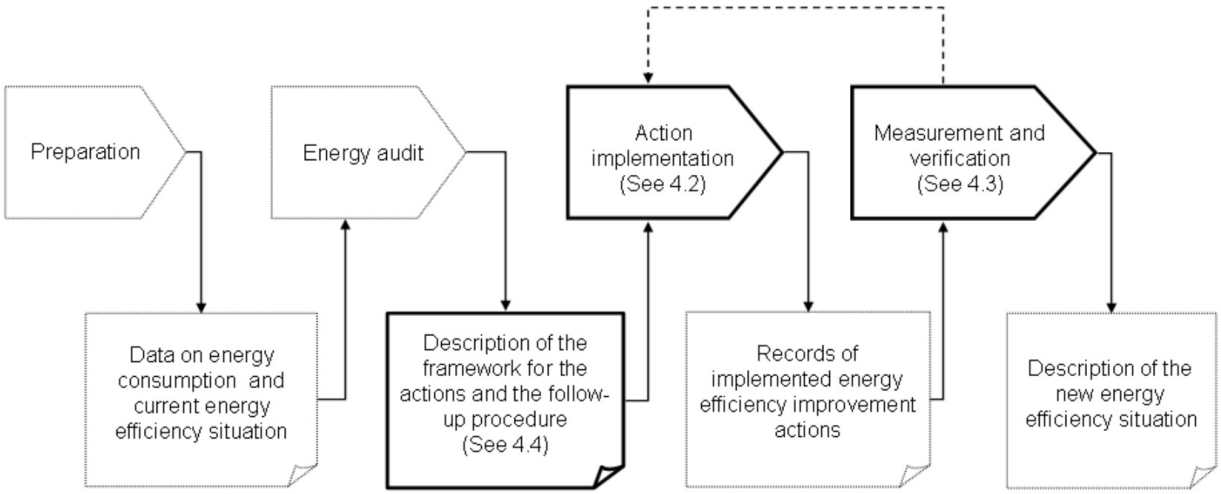
Measurement of consumption and determination of savings

Measurement & Verification (M&V) is the process of planning, measuring, collecting, and analyzing data for the purpose of verifying and reporting energy savings resulting from the implementation of an Energy conservation measures (ECMs).
(Definition from IPMVP Core Concepts 2016)

IPMVP compliant M&V is a solid, shared, repeatable and cost effective procedure that not only evaluates the energy, financial (and carbon) “savings”, but also includes quality assurance and other good practices that enhance the savings and the financing of the project.

Energy performance contract

‘energy performance contracting’ means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings; (Directive 2012/27/EU article 2.27)



EN 15900 on Energy efficiency services

It is a good practice to have the M&V plan as annex to the contract.
It is way more complicated to discuss about M&V after the contract is signed.

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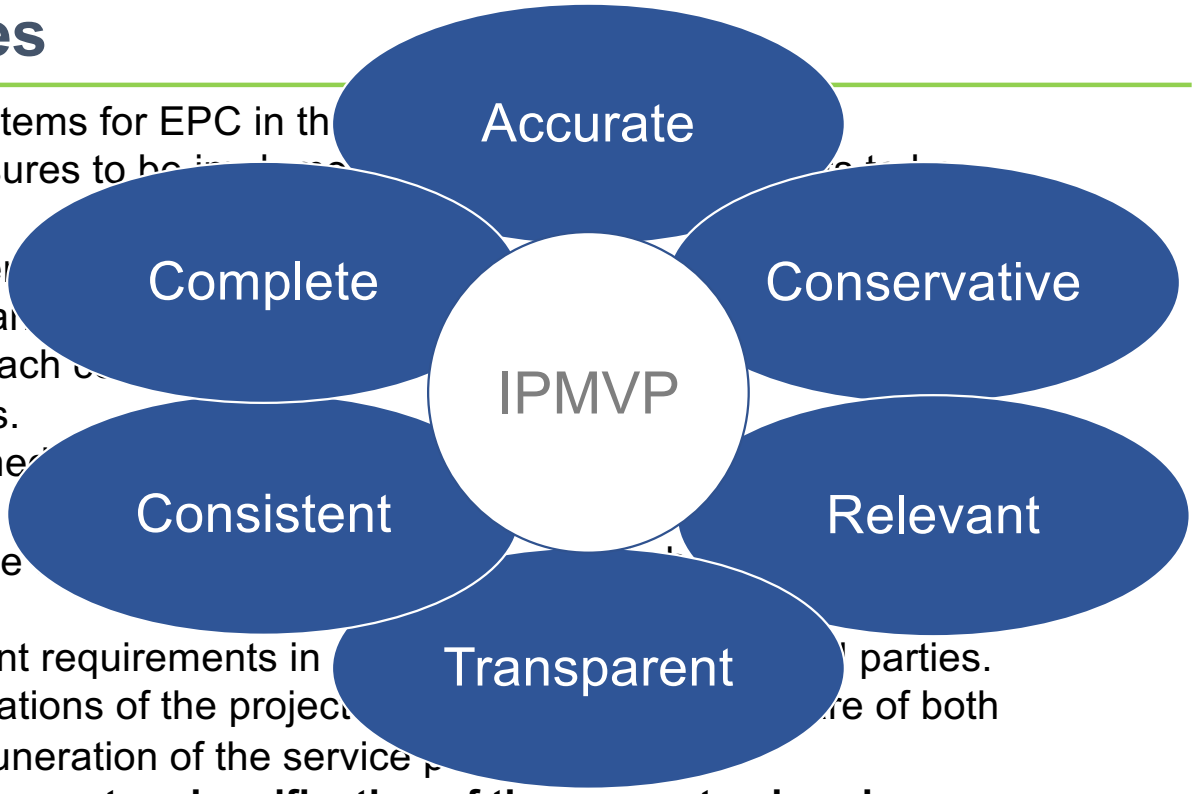
Building trust among the parties



DIRECTIVE 2012/27/EU . ANNEX XIII - Minimum items for EPC in th

— Clear and transparent list of the efficiency measures to be

obtained.

— Guaranteed savings to be achieved by impleme

— Duration and milestones of the contract, terms a

— Clear and transparent list of the obligations of each

— Reference date(s) to establish achieved savings.

— Clear and transparent list of steps to be performe

where relevant, associated costs.

— Obligation to fully implement the measures in the

project.

— Regulations specifying the inclusion of equivalent requirements in parties.

— Clear and transparent display of financial implications of the projec re of both parties in the monetary savings achieved (i.e. remuneration of the service p

— **Clear and transparent provisions on measurement and verification of the guaranteed savings achieved, quality checks** and guarantees.

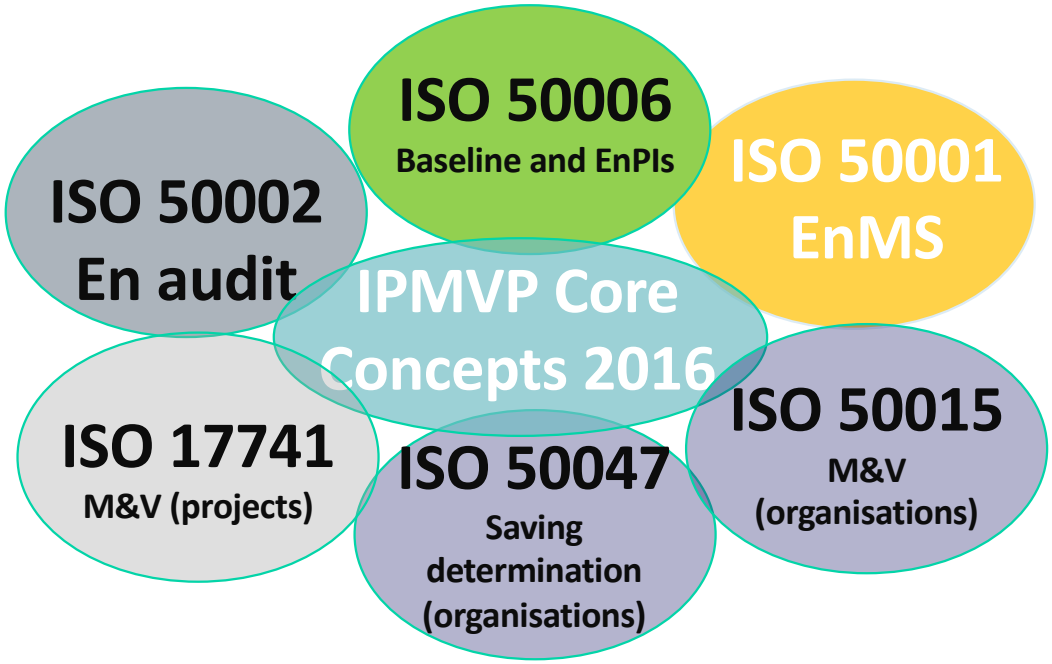
— Provisions clarifying the procedure to deal with changing framework conditions that affect the content and the outcome of the contract (i.e. changing energy prices, use intensity of an installation).

— Detailed information on the obligations of each of the contracting party and of the penalties for their breach.

IPMVP and M&V related Standards

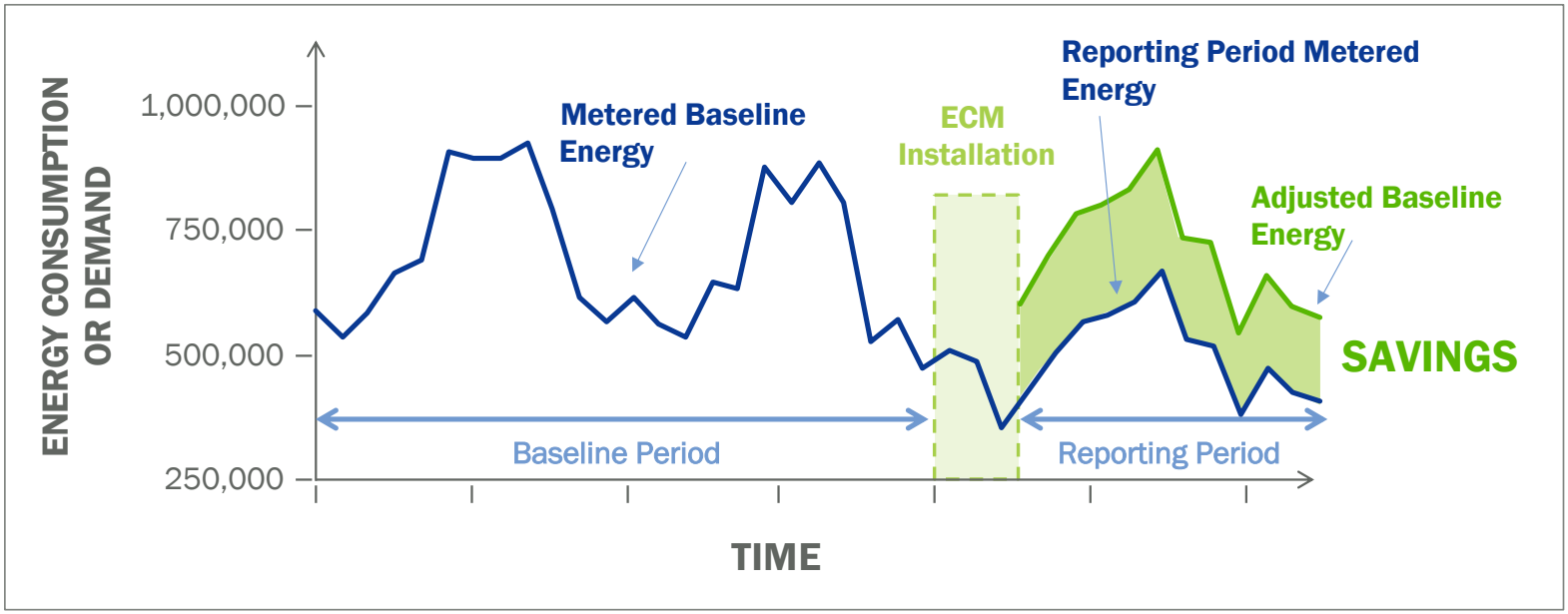
The production of technical standards and protocols in last few years supports energy efficiency and renewables projects, but also witnesses a broader and growing interest in M&V.

Most of those Standards can be used with and/or are inspired to IPMVP.

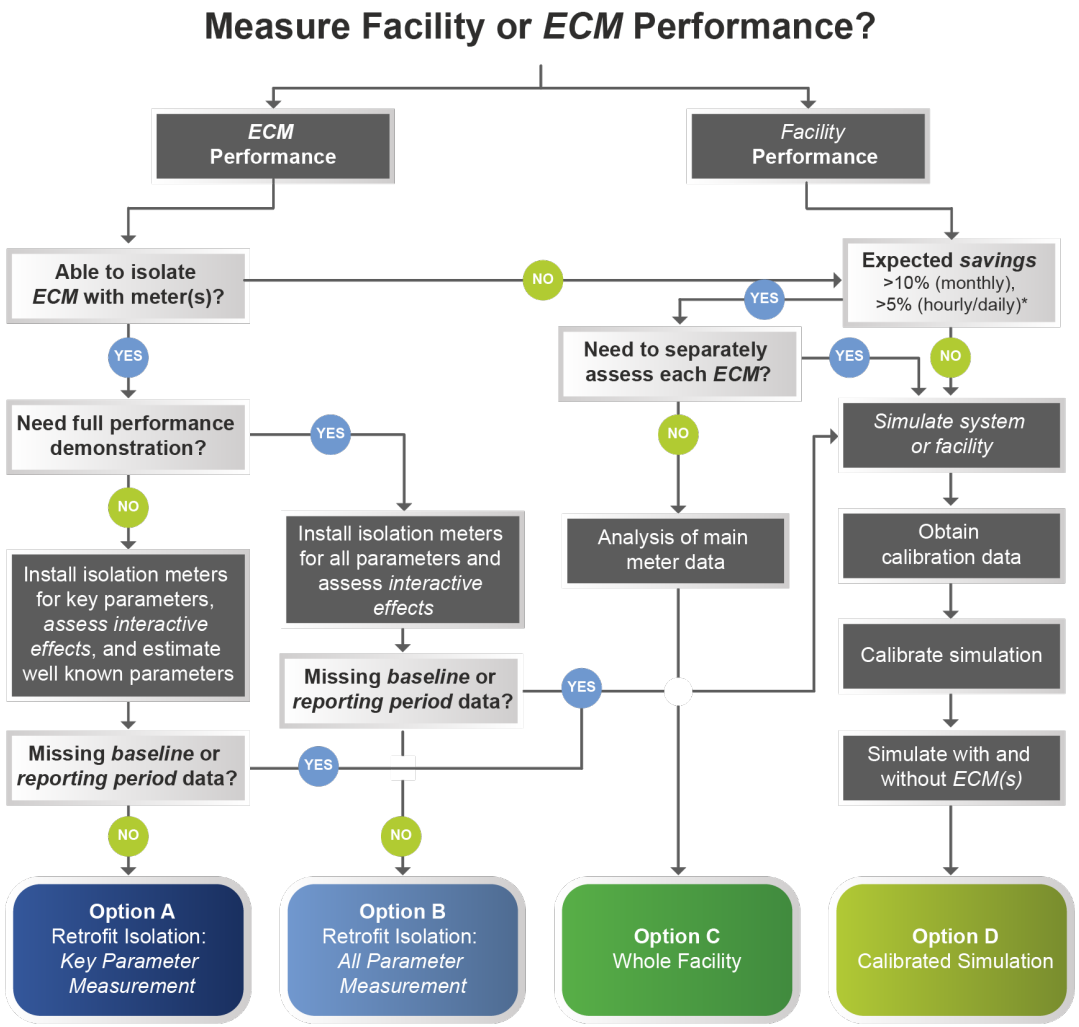


Measurement of consumption and determination of savings

Savings are the absence of energy consumption.
We can measure the consumption, not its absence.
We determine the savings by measuring and analysing energy consumption and other variables.



The four options



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Saving options

		PRE ECM(s)		POST ECM(s)		
Avoided Energy Use (in Reporting Period Conditions)	=	**Adjusted Baseline Consumption**	–	**Reporting Period Consumption**	+/-	**Non Routine Adjustment**
Adjust the Baseline						
Normalized Savings (in Normalized Conditions)	=	**Normalized Baseline Consumption**	–	**Normalized Reporting Period Consumption**	+/-	**Non Routine Adjustment**
Backcasting: Avoided Energy Use (in Baseline Conditions)	=	**Baseline Consumption**	–	**Adjusted Reporting Period Consumption**	+/-	**Non Routine Adjustment**
				Backcast the reporting		

LEGEND
Measured Consumption Without Any Adjustments

Backcasting is a novelty of 2016 IPMVP, it allows reducing savings uncertainty using weekly and daily consumption data from new smart meters also if installed after the baseline period.

M&V plan(ning) should always come before the implementation of ECMs, otherwise costs, complexity and uncertainty could rise to unacceptable levels.

Uncertainty

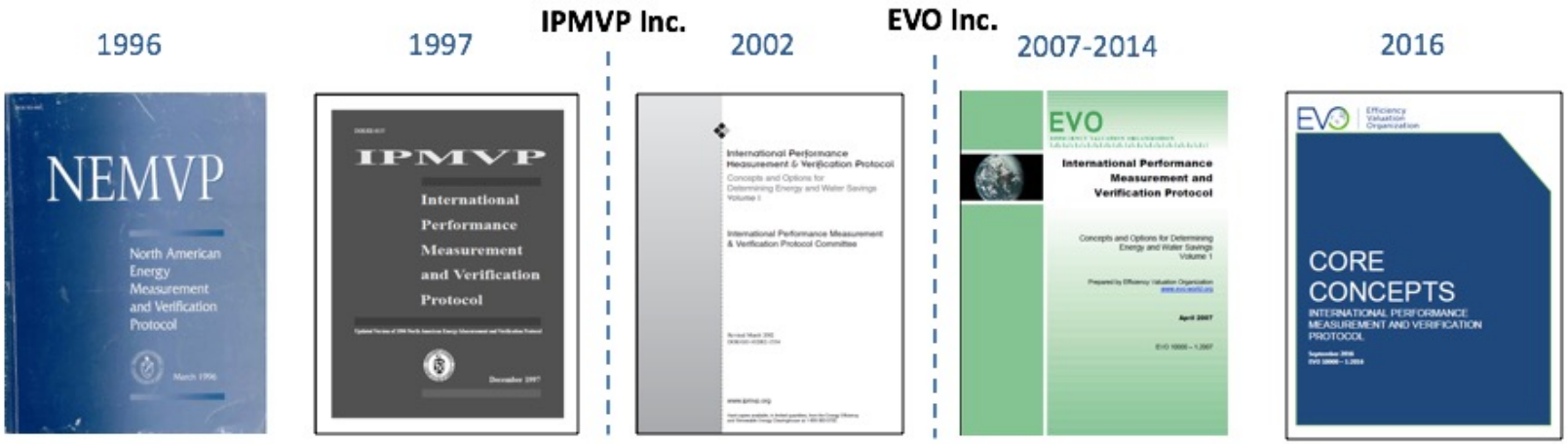
There is no absolutely correct savings value, there is always some uncertainty associated to it.
Uncertainty derives from:

- measurements,
- modelling,
- eventually from sampling and
- assumptions.

You have to determine how much uncertainty you can accept - or afford.
For each project, the correct balance must be found between the uncertainty of results and M&V costs.

IPMVP history …

In 1994, the US Department of Energy began working with industry and financial institutions to develop a shared approach to measuring and verifying energy efficiency - The North American Measurement and Verification Protocol was published in 1996.



… and future

IPMVP – Core Concepts	2021
IPMVP – Generally Accepted Principles of M&V	2021
IPMVP – Non-Routine Events and Adjustments	2021
IPMVP – Uncertainty Assessment	2022
IPMVP – Energy Performance Contract	2022
IPMVP – Evaluation Measurement & Verification	2022
IPMVP – Advanced M&V	2022
IPMVP – Renewables	2022/23
IPMVP – Water Applications	2022/23

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EVO

The home of the **IPMVP®**

A 20-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.

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Concluding remarks

- M&V provides confidence, trust and credibility that energy savings are real.
- Measured savings can be more easily financed by third parties, backed by energy savings insurance schemes.
- Measured savings can be valued and potentially traded.
- Measured savings are the backbone of GHG emissions calculations and support the implementation of energy transition policies and programs.

See you on December 16th

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