An Energy-Efficiency Workshop and Exposition
Orlando, Florida

Good M&V Planning

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Program Outline:

John Cowan:

- List the current Industry M&V Standards
- The Contents of an M&V Plan
- The process of developing an M&V Plan
- The M&V cost trade-off

The Rest of the Panel:

- Views on M&V Planning from the Navy, Air Force & an ESCO
- Directions From the "M&V Summit"

John Cowan & M&V

Professional Engineer - Energy Management

ESCO co-founder

Consulting Owner's Rep in ESCO procurement and negotiation matters & savings verification

IPMVP Technical Committee, co-chair

AEE/IPMVP Certification Board (CMVP)

Author and Instructor of the M&V course co-sponsored in US/Canada by AEE/IPMVP

Consultant/Verifier for emission trades

Industry Standards

IPMVP - Volumes 1 & 2(2001) and Vol 3(2003)

Defines many terms and the structure used in:

- **FEMP M&V Guideline v2.2:**
  - some details on methods for federal projects.
  - mostly consistent with IPMVP 2001, except Stipulation can remove IPMVP's need for on-site energy measurement.
  - FEMP discussion document on the pitfalls of Stipulation.
- **ASHRAE Guideline 14:**
  - details on methods, metering and uncertainty.
  - mostly consistent with IPMVP except no Stipulation.

M&V Plan Contents (A)

- **Select Option**: 1) Retrofit Isolation (with or without partial or full stipulation), 2) Whole Building, or 3) Calibrated Simulation. Consider:
  - Measurement boundary and related metering points as determined by responsibilities for: a) energy performance, and b) gathering of energy and other data for baseline and life of M&V
  - Methods of dealing with interactive effects outside the boundary
  - Analysis/justification of stipulation

M&V Plan Contents (B)

- **Meter system design:** meter range accuracy & reliability, data capture & management, synchronization with utility demand readings.
- **Baseline data** within the measurement boundary:
  - Energy, weather (and/or other variables for routine adjustments)
  - operational and "static" factors – the basis for future non-routine baseline adjustments.

M&V Plan Contents (C)

- **Responsibilities** for ongoing data gathering within the measurement boundary:
  - routine items of energy, weather/other variables
  - static factors to define 'material change' for non-routine "baseline adjustments."
- **Maintenance of meter system:** procedures.
- **Data analysis** procedures – mathematical formulae and justification.
- **Quality control** procedures.

M&V Planning Process

Progressively develop the M&V Plan, during retrofit design, to ensure:

- intended results are measurable
- M&V cost is included in retrofit economics
- plan is agreed before "money is on the table"

M&V Planning is as iterative as the retrofit design process.

M&V Costs (A)

How Much is Too Much?

- Are you comfortable with:
  - the amount of information you will have for **operational control**, from M&V or other information sources?
  - the level of **uncertainty** in reported savings, arising from: meter accuracy, sampling variance, modelling variance?
- If NOT, spend more on M&V:
  - up to 10% of the savings, hopefully far less

M&V Costs (B)

How Little is Too Little?

- What else will you do with the avoided M&V cost:
  - Install more retrofits? (= more savings)
  - Reduce project payback?
  - Install more equipment for operational feedback?
  - Skip the country?
- K.I.S.S.

M&V Costs (C)

Every Owner, Project and Contract situation is different.

You must establish your own comfort level for the cost/uncertainty tradeoff.

M&V Plan Summary

Sorry! ☹

There are no cookbook answers!

So…….

Get good M&V skills on your team!