



U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program

M&V Approaches to Operations & Maintenance (O&M) in Federal ESPCs

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NAESCO Conference
Pasadena, CA
October 24, 2007



Topics will include:

- FEMP's Super ESPC program
- Federal-ESCO M&V Team
- FEMP's approach to operations and maintenance (O&M) related issues:
 - Planning and reporting for O&M
 - Determining O&M savings



“Super ESPC” is DOE’s energy savings performance contract (ESPC)

Used by Federal facilities to implement:

- Fixed price projects
- Pay from savings
- Long-term performance guarantee
 - Up to 25 year contracts



M&V Team Objectives

- Improve ESPCs across the Federal sector
- Aid government and industry
- Protect integrity of ESPC programs
- Build consensus
- Improve and standardize M&V



FEMP's Quality Assurance and Improvement (QA&I) Team:

- Federal ESPC Steering Committee
 - Provides oversight
- Federal – ESCO M&V Team
 - Identifies and addresses technical issues
 - Working groups use consensus to solve specific issues



- Audits conducted on Federal ESPCs:
 - GAO, OMB, Army
- Key issues identified:
 - Energy Baseline Development
 - **Project Planning**
 - **O&M Baseline Development**
 - **Validation of Costs & Savings**
 - Contracting Procedures
 - Investment Strategies
- QA&I Working Groups were formed
- Additional issues identified by M&V team
 - Summits



Issues:

- Ensuring proper O&M for life of contract
 - Prevent repair & replacement issues
 - Ensure long-term savings
- Proper allocation of O&M responsibilities
 - Ideally operations and maintenance handled by ESCO but often unpractical

Action:

- Formed working group: *Planning and Reporting for O&M in Federal ESPCs*



Results:

- Modified Super ESPC contract to include:
 - O&M responsibility allocation
 - O&M reporting requirements
 - M&V Plan
 - Annual Report
- WG Produced Guidance:
 - ***Planning and Reporting for O&M in ESPCs***

http://www1.eere.energy.gov/femp/financing/superespccs_mvresources.html



Steps outlined in *Planning and Reporting for O&M in Federal ESPCs*:

1. *Allocate overall responsibility for O&M and R&R*
2. *Detail responsibilities and reporting requirements by ECM*
3. *Develop O&M checklists*
4. *Provide O&M manuals and training*
5. *Site &/or ESCO report on O&M performed*
6. *ESCO reports project's performance, O&M*



Issues:

- Inflated O&M baselines and overstated cost avoidances
- O&M baselines not diligently reviewed
- O&M savings not sufficiently verified
 - 21% of program savings from O&M

Actions:

- Enhance existing FEMP guidance
- Formed WG: *How to Determine and Verify O&M Savings in Federal ESPCs*



Results:

- WG produced guidance:
 - *How To Determine and Verify O&M Savings in Federal ESPCs (Draft)*
 - *Available upon request*

Topics covered:

- *General M&V Approach*
- *Details needed in M&V Plan*
- *Annual reporting requirements*
- *Example scenarios*



M&V Approach

- $\text{O\&M Savings} = \{\text{Adjusted Baseline O\&M Costs}\} - \{\text{Actual O\&M Costs}\}$
- Graded approach on M&V of savings, according to:
 - Value of savings
 - Risk of not achieving benefits
- Baseline costs established from actual budgets and expenditures wherever possible
- Cost savings from in-house labor cannot be claimed unless labor budget decreases



- Developing the O&M baseline
 - Adequate documentation
 - Time frame for analysis
 - Lack of detailed O&M records
 - Substandard O&M procedures
- Calculating savings
 - Define criteria to adjust baselines
 - Accounting for actual costs
- Defining ongoing verification activities
 - Meeting performance standards
 - Length of O&M savings



- Adequate documentation includes:
 - Review source of savings
 - Dates of on-site activities
 - Review of key variables affecting savings
 - Verify standards of performance have been met



Examples:

1. Elimination of a maintenance contract
2. Reduction in government staff
3. Decrease need for replacement equipment

Example scenarios include:

- Situation
- Baseline development
- Savings calculations
- Verification procedures



- O&M savings requires commitment from Owner
- O&M baselines must be based on actual expenditures, not on what a site *should* be spending
- Maintaining O&M records key to proper ESPC documentation
- Source of O&M savings should be documented in each annual report
- A continuous verification approach can be cumbersome to customer



QA&I Working Groups

M&V Training and Curriculum Development	M&V Plan & Reporting Integration
Commissioning	Energy Savings Discrepancy Resolution
M&V Planning Tool	Agency Witnessing and Verification
Including Retro-Commissioning in Federal ESPCs	One-Time Payment and Savings
Annual Report Standardization	Performance Period Administration
Project Documentation Structure	*O&M Savings Determination and Verification
Planning and Reporting for O&M in Federal ESPCs	*Data Collection and Evaluation
Advanced Metering	*M&V Plan Standardization

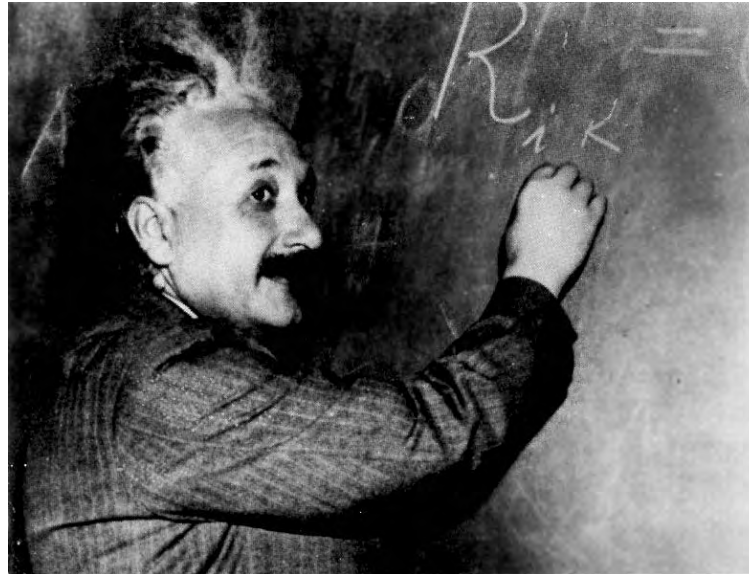
***Current Activity**



- Risk and Responsibility Matrix
- M&V Planning Tool
- Introduction to M&V
- Detailed Guide to Option A
- Case study of quantitative uncertainty analysis
- Retro-Commissioning In Federal Energy Saving Performance Contracts
- Draft Commissioning Guide for DOE Super ESPCs
- One-Time Payment & Saving Guide
- Agency Witnessing and Acceptance Guide
- Standard Lighting M&V Plan Template
- **Planning and Reporting for O&M in ESPCs**
- Standard M&V Plan Outline, and Annual and Post-Installation Report Outlines
- Sample M&V Plan, Post-Installation Report, & Annual Report for a typical ESPC project
- Review guides/checklists for M&V plan and performance reports
- ***How to Determine and Verify O&M Savings in Federal ESPCs (Draft)**



Questions/Discussion



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- http://www1.eere.energy.gov/femp/financing/superespcs_mvresources.html
- <http://ateam.lbl.gov/mv/>