U.S. DEPARTMENT OF ENERGY

Steering Committee Meeting

January 19, 2016

UNIFORM METHODS PROJECT

Managed by the DOE Office of Energy Efficiency and Renewable Energy

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Welcome to the Uniform EM&V Methods Project Steering Committee Meeting January 19, 2016

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Agenda

- Introduction
- Combined Heat and Power Protocol Overview – George Simons, *Itron*
- Strategic Energy Management Protocol Overview – Jim Stewart, *Cadmus*
- Updates to past protocols – Cadmus
- Closing / Next steps

Combined Heat and Power (CHP) Protocol

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Measure Description

- **CHP systems provide both electricity and thermal energy: primarily for onsite use**
  - Involve capture and use of waste heat
- **Combined Heat and Power (CHP) systems include:**
  - IC Engines
  - Gas Turbines
  - Microturbines
  - Fuel Cells
  - Boiler/Steam Turbines
- **Fuels:**
  - Natural gas
  - Biogas
  - Oil
  - Woody biomass

CHP Protocol, cont.

Protocol Approach

- **Comprehensive method for estimating impacts**
  - Estimating CHP electricity and fuel impacts
    - ✓ Metered data as well as algorithms for assessing impacts
  - Provides for CHP performance metrics
  - Offers default values where data is not available
- **Components of M&E plan**
  - Use of on-site inspection data
    - ✓ What on-site data is needed
  - CHP performance data from metering
    - ✓ Meter requirements and frequency of data
  - Dealing with multiple fuels
    - ✓ Natural gas, biogas, directed biogas
  - Interactive effects
    - ✓ Estimating impacts across boilers, generators, chillers

CHP Protocol, cont.

Challenges

- **Early retirement and degradation**
  - Changes in fuel and electricity prices can result in unexpected retirement
  - Without ongoing maintenance programs, aging can reduce CHP performance
- **Normalizing CHP performance**
  - CHP operations are not weather dependent and cannot be easily weather normalized
  - CHP performance can vary significantly due to changes in fuel and electricity prices; changes in process loads; CHP system maintenance, etc.
  - Requires annual estimates and long term metering
- **Net to gross estimation**
  - CHP systems are complex and require significant effort
  - Free ridership and spillover do not occur as frequently as for other EE measures
  - Recommend that evaluators use best practices and close coordination between teams collecting site data and estimating impacts

Measure description

Strategic Energy Management is a set of energy use principles and practices emphasizing continuous improvements in energy management and energy efficiency in industrial facilities or large commercial buildings

- Achieves improvements through systematic and planned changes in facility operations, maintenance, and behaviors
- Typical steps: (1) Establish management support, set goals, and engage employees; (2) Identify opportunities and implement; (3) Track progress; and (4) Update goals and plans.
- Leads to sustained increases in energy efficiency

SEM Protocol, cont.

Protocol Approach

- Measure Definition
- Application Conditions of Protocol
  - Relationship to Existing Evaluation Protocols
- Savings Estimation
  - Facility as analysis unit
  - Collection of facility energy use, output, occupancy, and weather
  - Regression analysis
  - Option C of IPMVP
- M&V Methods
  - Statistical Analysis
  - Onsite Verification
  - Non-routine Adjustments
- Other Evaluation Issues
  - Sampling
- Resources/References

SEM Protocol, cont.

Challenges

- Ability to detect expected savings
  - Recommend conducting statistical power analysis
- Data availability
  - Recommend collecting baseline and engagement period data for relevant variables
- Robustness of regression savings estimates
  - Tests to check robustness of savings estimates
  - Omitted variables
- Changes in production or input characteristics unrelated to SEM that are difficult to model statistically
  - Apply non-routine adjustments – use sparingly
  - Non-routine adjustments should be based on engineering analysis with all assumptions and calculations clearly documented
- Evaluation of SEM program facility savings seeking SEP certification
  - Harmonize evaluation approaches to extent feasible

Past Protocol Updates

- Collection of feedback from authors of past protocols
- Proposed approach for publishing updates to past protocols:

Protocol Status	Author review	TAG Review (incl. SC)	Cadmus Technical Review	NREL copyedit	Publish 2016 version
No updates	X				X
Minor updates	X		X	X	X
Substantive updates	X	X	X	X	X

Schedule and Next Steps

Steering committee review

- CHP, Review by February 2nd
- SEM, February 2016
- Send feedback to Erina.Keefe@cadmusgroup.com and Chuck.Kurnik@nrel.gov

General Schedule

- Mid-February and March 2016 – Stakeholder review
- May and June 2016 – Final reviews and formatting
- July and August 2016 – Publication

Discussion

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Questions?

- UMP management team:
  - Erina.Keefe@cadmusgroup.com
  - Arlis.Reynolds@cadmusgroup.com
  - Chuck.Kurnik@nrel.gov
  - Michael.Li@EE.doe.gov
- CHP protocol author: George.Simons@itron.com
- SEM protocol author: Jim.Stewart@cadmusgroup.com

UMP protocols

- Final: http://energy.gov/eere/about-us/ump-protocols
- Draft: http://www.nrel.gov/extranet/ump/draft_protocols.html

Thank you!