



THE
CADMUS
GROUP, INC.

EM&V Uniform Methods Project: Commercial Lighting

Dakers Gowans
April 26, 2012

→ *Left Fork Energy, Inc.*

Agenda

- Overview Commercial Lighting Protocol
- Author and Reviewers
- Savings Algorithm and Recommended Approaches
- Comparison to Industry Practices
- Addressing Reviewer Comments
- Questions/Comments

Overview of Commercial Lighting Protocol

- Common measures
 - Linear & compact fluorescents (includes fixtures, ballasts/lamps)
 - High intensity discharge lamps
 - LEDs
 - Delamping
- Common delivery strategies
 - Incentive and rebate
 - Upstream buy-down
 - Direct install

Overview of Commercial Lighting Protocol

What is Covered?

- Common measures and delivery strategies
- Retrofit and new construction programs
- 1st year savings

What is Not Covered?

- Net effects, cost effectiveness
- Sampling
- Controls
- Lifetime savings

Who Wrote Protocol?

- Dakers Gowans
 - 15 years experience designing, managing, evaluating DSM programs
 - Consultant to EM&V for programs in the Northeast

Who Reviewed Protocol?

Comments from:

- Feitau King and colleague(s); NREL
- Mike Rufo, John Cavalli; Itron
- Kevin Cooney, Jes Rivas; Navigant
- Kevin Warren; Warren Energy Engineering

Savings Algorithm

$$\text{kWh/year}_{\text{saved}} =$$
$$(\text{kW}_{\text{baseline}} \times \text{HOU}_{\text{baseline}}) -$$
$$(\text{kW}_{\text{efficient}} \times \text{HOU}_{\text{efficient}})$$

Recommended Approach

- Administrator records each fixture and building type
 - Fixture wattage, HOU are deemed
 - Ex ante estimate for each project
- Evaluator samples projects
 - Meter HOU for sample
 - Develop realization rate and ex post savings

Data for Independent Variables

Activity	kW_{baseline} kW_{efficient}	HOU_{baseline}	HOU_{efficient}
Implementation	Wattage look-up table	Deemed	Deemed
EM&V	Wattage look-up table	Measured, same as efficient case	Measured

Comparison to Industry Practices

- Most impact evaluations use similar methods; may not monitor HOU
- Most programs require contractor to submit information baseline / efficient fixture types, HOU
- Reporting formats usually prescribed

Review Comments / Issues

- Clarification of administrator and evaluator roles; who collects what data
- Reliability of deemed building HOU values
- Guidance for administrators to select fixture wattage, HOU data

Review Comments / Issues

- Need for baseline adjustment, dual baseline
- Balance evaluator's need for implementation data in consistent format, and diverse reporting forms used by lighting contractors

Questions/Comments?

Project Team

- U.S. Department of Energy
 - Michael Li
michael.li@hq.doe.gov
 - Carla Frisch
carla.frisch@ee.doe.gov
- National Renewable Energy Laboratory
 - Dan Beckley
daniel.beckley@nrel.gov
 - Chuck Kurnik
chuck.kurnik@nrel.gov
- The Cadmus Group
 - Hossein Haeri
hossein.haeri@cadmusgroup.com
 - Tina Jayaweera
tina.jayaweera@cadmusgroup.com
- Left Fork Energy, Inc.
 - Dakers Gowans
dgowans@leftfork.com