MEMD Calibration Lighting Hours of Use Study

Research Plan

November 19, 2013

EMI
Energy Market Innovations

Source: GE Lighting

Agenda

Introduction

Sampling

Data Collection

Analysis

Schedule

Objective

Calibrate the MEMD assumptions for **lighting hours-of-use** (HOU) and **peak coincidence factors** (CF) for C&I lighting.

Why?

- It's important. Currently, lighting accounts for about 75% of expected electric energy savings
- It's an unknown. Current estimates are based on secondary data from outside of Michigan.

Definitions

Hours-of-use (HOU): The estimated number of hours a fixture is on through-out the year

Coincidence factor (CF): The percentage of time a fixture is on during the peak period

Current MEMD values for most non-high bay lighting:

- HOU: 3,680 hours/year
- CF: 0.90

MEMD Use

How the HOU and CF values are used

$$Demand\ Reduction\ (kW\ savings) = \frac{Existing\ Watts - Replacement\ Watts}{1{,}000}$$

$$Peak\ Demand\ Reduction = Demand\ Reduction \times \boldsymbol{CF}$$

$$Energy\ Savings\ \left(\frac{kWh}{yr}\right) = Demand\ Reduction \times \boldsymbol{HOU}$$

Study Design

Collect real-world data on C&I lighting from a sample of representative facilities in Michigan

Analyze and extrapolate these data to the population

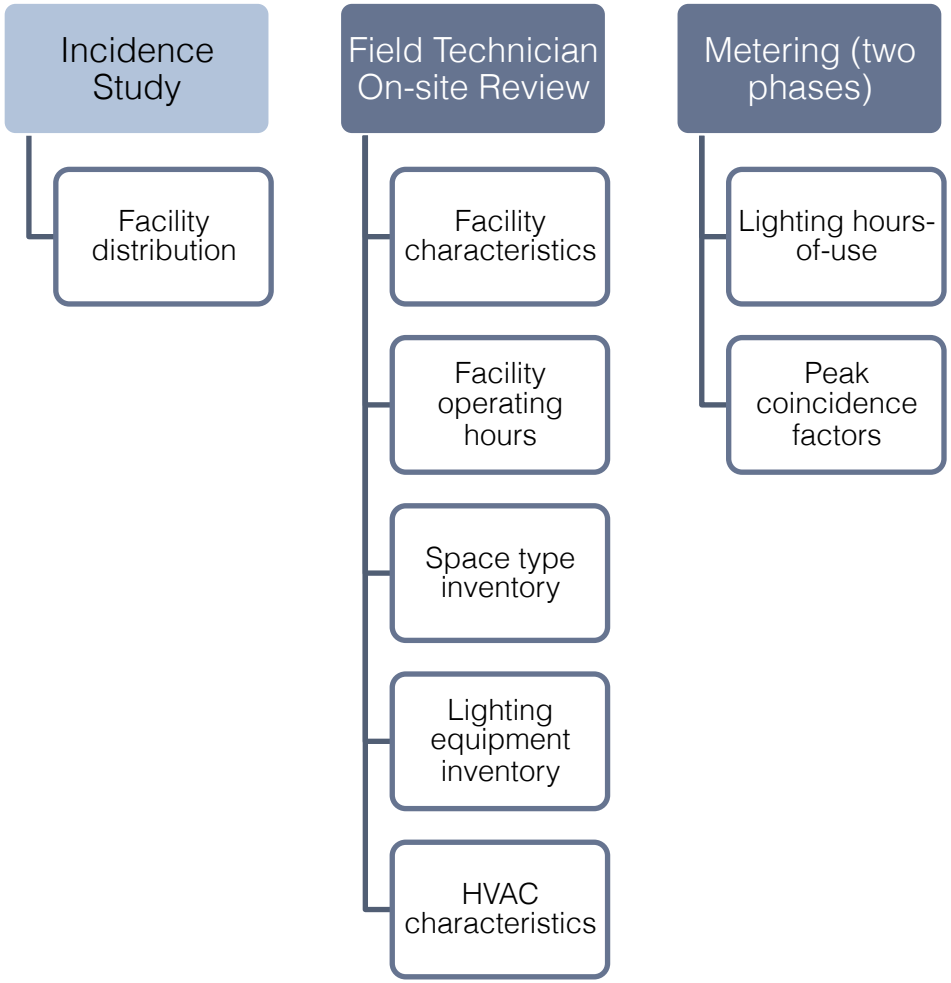
Report findings to support MEMD refinement

Sampling

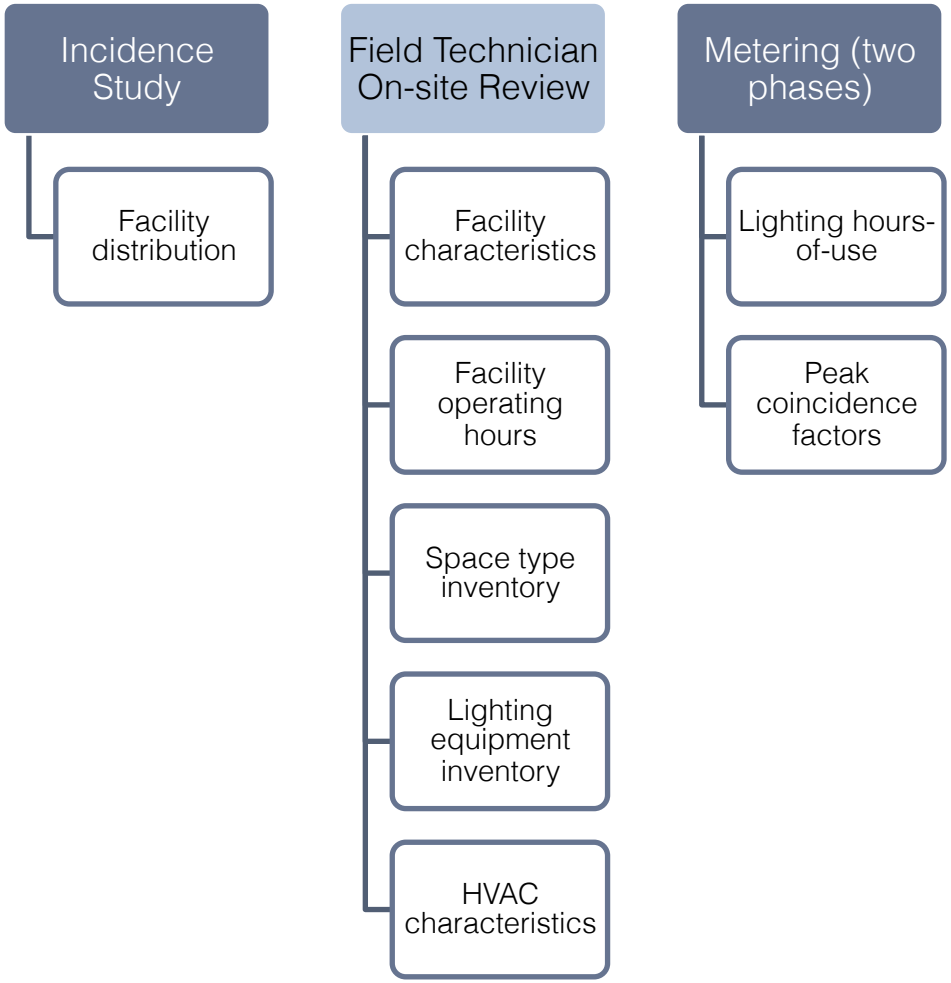
- Sample design balances accuracy and cost
- Scientifically designed to be representative of all C&I customers
- Pulled from actual customer records from DTE Energy and Consumers Energy
- 1800 metered fixtures (10 per 180 sites)

Facility Type	On-sites	Estimated Relative Precision at 90% CI
Industrial	35	14.9%
All Other	145	11.0%
Total	180	10.0%

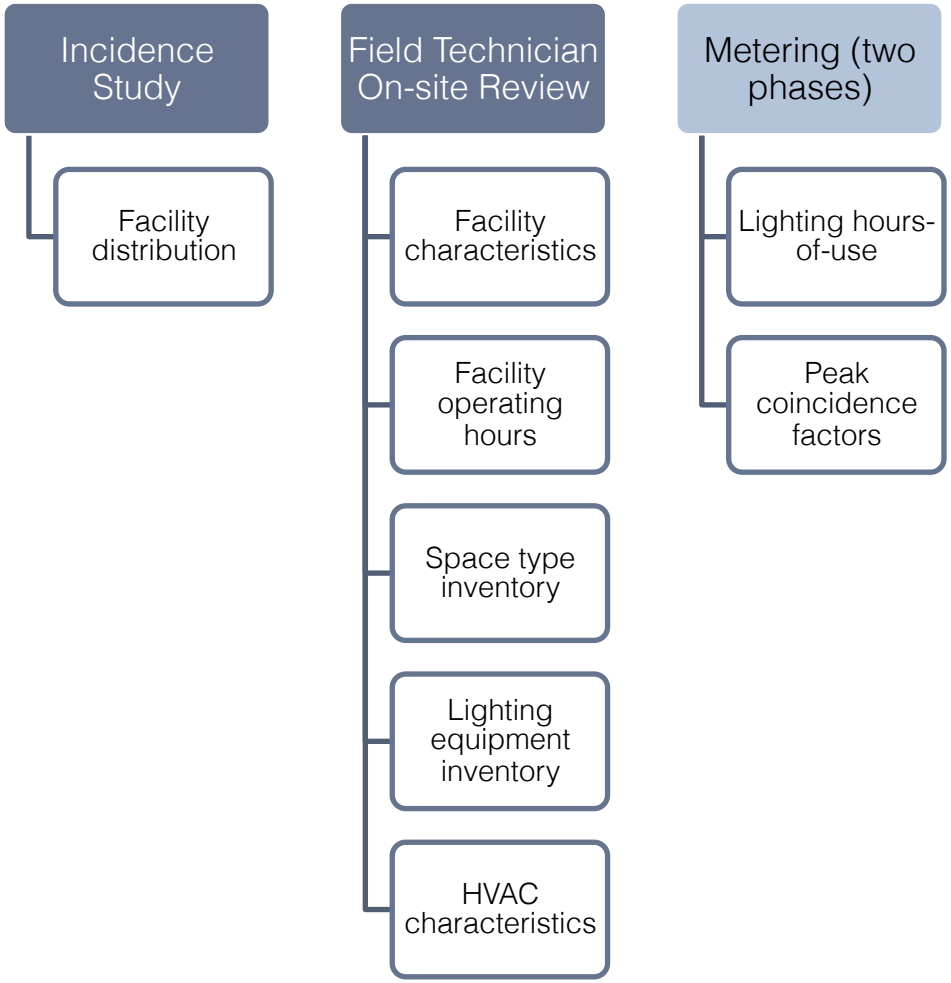
Data Collection



Data Collection

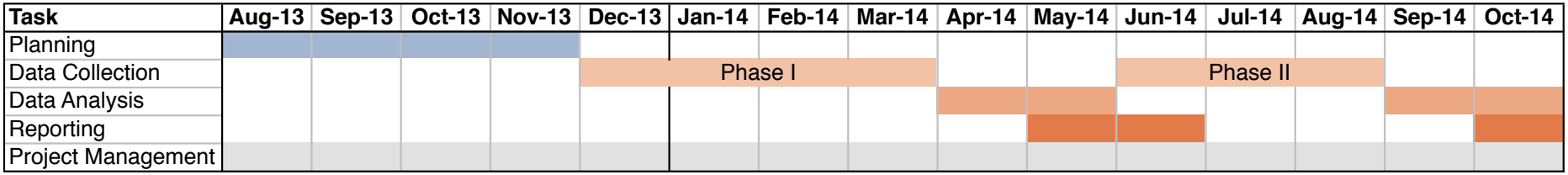


Data Collection



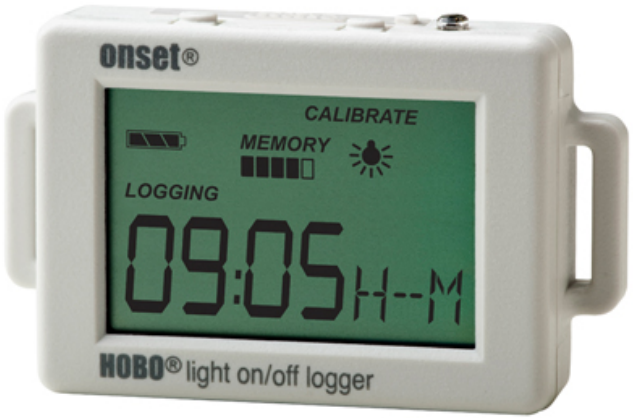
Data Collection Schedule

- Phase I – Winter/Spring 2014
  - Recruit facilities
  - Install meters
  - Collect data for June report on HOU & CF
  - Leave meters installed
- Phase II – Summer 2014
  - Recruit new facilities as needed
  - Collect data during peak period for report update on CF

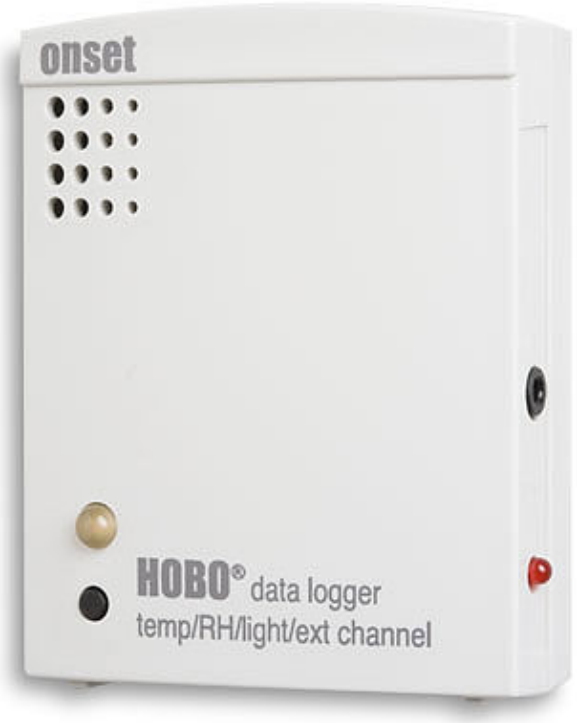


Metering

Hobo UX-90-002



Hobo U12-012



Analysis

Annual HOU

- Average metered HOU extrapolated to the year based on reported operating characteristics
- Facility operating hours reported alongside HOU estimates

Peak CF

- Average percentage of the peak period each metered light is on
- 3PM to 6PM on non-holiday weekdays during the three consecutive hottest days in July
- Based on modeled **and** metered data

Analysis

Results reported overall and by the following facility types:

- Assembly (churches, etc.)
- Hospital
- Industry
- Lodging
- Office
- Restaurant
- Retail
- School (K-12)
- School (College/University)
- Warehouse

Reporting Schedule

- **Phase I report** – June 1, 2014
  - Metered HOU
  - Modeled CF
- **Phase II update** – October 30, 2014
  - Update with Metered CF

Task	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
Planning															
Data Collection					Phase I						Phase II				
Data Analysis															
Reporting															
Project Management															

Questions

Jeremy Kraft
jkraft@emiconsulting.com
(608) 298-7190

Jess Chandler
jchandler@emiconsulting.com
(757) 224-6639