U.S. DEPARTMENT OF ENERGY

Uniform Methods Project
Overview for EPATEE

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Current EM&V Practice

There are multiple ways to calculate energy savings for the same energy efficiency measure or program.

- Lack of methodological consistency leads to difficulty understanding and comparing results.
- There is a general lack of transparency about the assumptions and details of savings calculations.

Why is This Project Needed?

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Seventeen Technical Reference Manuals (TRMs) have been identified, covering 21 states and D.C. (as of Spring 2012)

Different methods for calculating savings for same measures

Savings estimates for same measures varied widely with no clear explanation of the source

Widespread use of the UMP protocols could provide consistency across TRMs

What is This Project?

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Develop Savings Calculation Protocols for Energy Efficiency Measures and Programs

- Addresses most common residential and commercial efficiency measures in incentive programs
- Presents step-by-step calculations for determining gross savings
- Includes additional sections to address cross-cutting evaluation requirements

Project Goals & Benefits

Create greater consistency of savings calculations

- Quickly establish good M&V practices
- Facilitate meaningful comparisons

Provide transparency reduces uncertainty

Support development of best practices for energy efficiency

- Sets data requirements early on
- Confidence when setting and meeting savings targets

Provide educational value to broad stakeholder community

- Protocols identify key inputs
- Documentation of methods and calculations
- Educating those new to EM&V

Intended Audience

- **Jurisdictions with no existing protocols or TRMs**
- **Regulators**
- **Program administrators**
- **Implementers**
- **Evaluators**
- **Three primary pathways for adoption**
  - Formally by regulators
  - Adopted by program administrators and provided to implementers and evaluators
  - Recommended to clients by evaluators

Project Organization

Protocols developed in collaboration with energy efficiency program stakeholders:

- Regulators
- Program administrators
- EM&V consultants (including the major U.S. firms that do a large portion of efficiency evaluations)

Industry review process allowed for input from all stakeholders

Public review process allowed for input from all interested parties

Technical Experts & Technical Advisory Group

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ADM ENERGY RESEARCH AND EVALUATION

CADMUS

sbw ENERGY · WATER · EFFICIENCY

APEX ANALYTICS, LLC

WARREN ENERGY ENGINEERING, LLC

Itron

Left Fork Energy

Jacobson Energy Research LLC

DNV·GL

ICF Marbek an ICF International Company

NREL NATIONAL RENEWABLE ENERGY LABORATORY

NAVIGANT CONSULTING

GDS Associates, Inc. Engineers and Consultants

Nexant

BuildingMetrics, Inc.

TETRA TECH

Commercial Measures

Commercial and Industrial Lighting Evaluation Protocol (October 2017)

Commercial and Industrial Lighting Controls Evaluation Protocol (September 2017)

Chiller Evaluation Protocol (September 2017)

Commercial New Construction Protocol (September 2017)

Retrocommissioning Evaluation Protocol (September 2017

Variable Frequency Drive Evaluation Protocol (June 2017)

HVAC Controls (DDC/EMS/BAS) Evaluation Protocol (September 2017)

Data Center IT Efficiency Measures (October 2017)

Compressed Air Evaluation Protocol (October 2017)

Combined Heat and Power Evaluation Protocol (October 2017)

Strategic Energy Management (SEM) Evaluation Protocol (May 2017)

Residential Measures

Residential Furnaces and Boilers Evaluation Protocol (September 2017)

Residential Lighting Evaluation Protocol (October 2017)

Residential Behavior Protocol (October 2017)

Refrigerator Recycling Evaluation Protocol (September 2017)

Small Commercial and Residential Unitary and Split System HVAC Cooling Equipment-Efficiency Upgrade Evaluation Protocol (October 2017)

Whole-Building Retrofit with Consumption Data Analysis Evaluation Protocol (November 2017)

Cross Cutting Issues

Metering Cross-Cutting Protocol (September 2017)

Peak Demand and Time-Differentiated Energy Savings Cross-Cutting Protocol (October 2017)

Sample Design Cross-Cutting Protocol (October 2017)

Survey Design and Implementation for Estimating Gross Savings Cross-Cutting Protocol (September 2017)

Assessing Persistence and Other Evaluation Issues Cross-Cutting Protocol (September 2017)

Estimating Net Savings - Common Practices (October 2017)

Covered in Each Protocol

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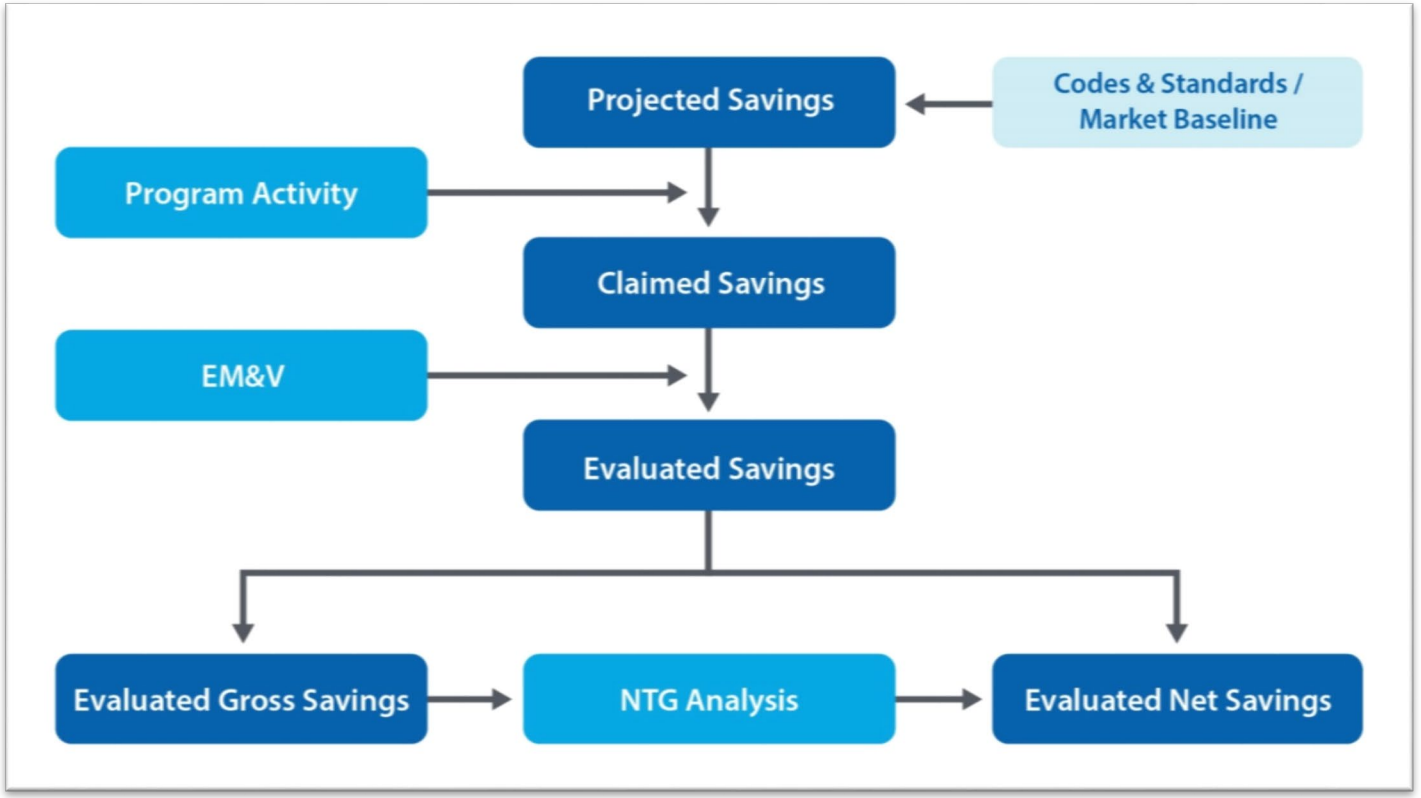
- Measure Description and Application
- Conditions of Protocol Application
- Gross Savings Calculations
- Critical Parameters
- M&V Plan
- Data Requirements
- Other Evaluation Issues

About Savings (Definitions)



Citations in EM&V RFPs

- **Pay As You Save® Impact Evaluation**
  - Whole-Building Retrofit with Consumption Data Analysis Evaluation Protocol
- **Con Edison Impact Evaluation**
- **Duke Energy**
  - Non-Residential Custom Programs
  - Energy Efficiency Education for Schools Program
- **Energize Connecticut**
  - Commercial & Industrial (C&I) Program Evaluation Projects and Related Research

Citations in consultant proposals to RFPs

- **Con Edison Impact Evaluation**
- **Avista Utilities**
  - Net savings
- **PSE Commercial**
  - Commercial lighting
- **Consumers Energy for C&I and Residential EE Programs**
- **Duke Energy**
- **Vectren**
  - Appliance recycling; net savings
- **Clean Energy Works**
  - Whole-Building Retrofit with Consumption Data Analysis Evaluation Protocol
- **Entergy LA**
- **Southern California Edison**
  - Commercial Lighting Evaluation Protocol

Examples in M&V studies

- **Ameren Illinois Appliance Recycling Impact Evaluation**
  - Refrigerator Recycling Evaluation Protocol
- **PacifiCorp HES Evaluation**
  - Residential Lighting Evaluation Protocol
- **EmPOWER**
  - Sample Design Cross-Cutting Protocol
- **Vectren Indiana Gas DSM Portfolio Evaluation**
  - Residential Furnaces and Boilers Evaluation Protocol
- **Massachusetts Low-Income Multifamily Initiative Impact Evaluation**
  - Whole-Building Retrofit with Consumption Data Analysis Evaluation Protocol
- **Xcel Energy**
  - Residential Lighting Evaluation Protocol

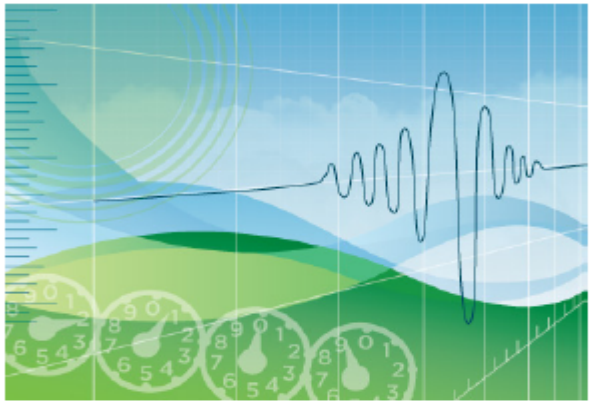
Uses in TRMs

- **2015 Pennsylvania Technical Reference Manual**
  - http://www.puc.pa.gov/pcdocs/1333318.docx
- **Illinois Statewide Technical Reference Manual Version 4.0**
  - https://www.icc.illinois.gov/Electricity/TRM.aspx
- **2015 Iowa Technical Reference Manual**
  - https://iub.iowa.gov/technical-reference-manual-version-1

Where to Find it

eere.energy.gov/ump

The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures



January 2012 — March 2013

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