

ACT 129 STAKEHOLDER MEETING

Technical Reference Manual Residential Updates

July 11, 2014

Presented by the Statewide Evaluation Team:

 **Nexant**


GDS Associates, Inc.
Engineers and Consultants

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APEX
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CROSS-CUTTING AGENDA

- TRM Formatting Changes
- Interim Measure Protocols
- Updating Standards – Federal and EPA



RESIDENTIAL AGENDA

- Updating Coincidence Factors and Load Shape Data
- Revising Existing Measures
- Adding New Measures
- Removing Some Measures



CROSS CUTTING UPDATES



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TRM FORMATTING

- Measure Template
 - Submit IMPs using this format
 - All measures will be updated to match this template

2015 TRM - Interim Measure Protocol: **Measure Name**

1. PLACINGHOLDERS - DO NOT DELETE

1.1 Residential Pool Pump Load Shifting

Measure Name	Residential Pool Pump Load Shifting
Target Sector	Residential Establishments
Measure Unit	Pool Pump Load Shifting
Unit Energy Savings	Variable
Unit Peak Demand Reduction	Variable
Measure Life	1 year (Provide source as footnote)

[Provide an introduction and summary of the measure and benefit of the measure over the baseline condition. Describe the baseline condition here.]

1.1.1 Eligibility
 [This section describes the application of the measure, criteria for savings eligibility, and the sector at which the measure is targeted.]

1.1.2 Algorithms
 [This section contains the relevant algorithms, accompanied by brief descriptions of them including assumptions made, limitations, explanations of various options, etc. Algorithms for energy savings and peak demand savings are minimum requirements.]

Formulas are written using Insert >Equation. Calibri Math is the default font and will be the font used. Include units within the formula for conversion factors only. Use the algorithm guide for instructions regarding subscripts and formatting.]

$$\Delta \text{kWh} = \left(\text{RTW} \times 365 \frac{\text{days}}{\text{yr}} \times 1 \frac{\text{BTU}}{\text{lb} \cdot ^\circ\text{F}} \times 8.3 \frac{\text{lb}}{\text{gal}} \times (\text{T}_{\text{cool}} - \text{T}_{\text{ambient}}) \right) \div 3413 \frac{\text{BTU}}{\text{kWh}}$$

$$\Delta \text{kWh}_{\text{peak}} = \text{CF} \times \Delta \text{kWh}$$

1.1.3 Definition of Terms
 [This section defines the terms used in the above algorithms and gives values for constants and options for variables. Sources are provided for any assumptions or values. Definitions of terms are included in the table instead of separately before the table, which resulted in redundancy.]

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APEX ANALYTICS



TRM FORMATTING

- Measure Template
 - Summary Table at beginning of each measure
 - Eligibility
 - Algorithms (more uniformity)
 - Definitions (tables)
 - Default Values
 - Evaluation Protocols
 - Sources (moved to end of measure, effort to provide more URLs)



TRM FORMATTING

- Algorithm Guide
 - Follow conventions for all IMPs and redline suggestions for TRM updates
 - Provides consistency for common variable names and subscripts

2015 TRM – Algorithm Guide

General Rules:

- Formulas are written using Insert→Equation
- Include units within the formula for conversion factors only
- Use "*" for multiplication in equations and "" for multiplication in units
- Left justify formula
- Have equal sign align with 1.5" indent
- Variables in all CAPS
- Subscripts in all lowercase

Example:

$$\Delta kW/h = \frac{(HW \times 365 \frac{days}{yr} \times 1 \frac{BTU}{lb \cdot ^\circ F} \times 8.3 \frac{lb}{gal} \times (T_{hot} - T_{cold}))}{3413 \frac{BTU}{kW \cdot h}}$$

$$\Delta kW_{peak} = \frac{\Delta kW/h}{ROU} \times CF$$

Table 1: Common Subscripts

Unit	Meaning
(XYZ) _{base}	Subscript for "baseline" condition
(XYZ) _{ee}	Subscript for "energy efficient" condition
(XYZ) _{cool}	Subscript for "cooling" or air conditioning
(XYZ) _{heat}	Subscript for "heating"

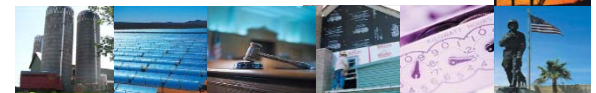
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TRM MEASURE ORGANIZATION

- New Measure Order
 - Restructured TRM to group measures by end-use
 - Based on working group input and industry trends
 - New measures will be added to corresponding sections



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TRM MEASURE ORGANIZATION

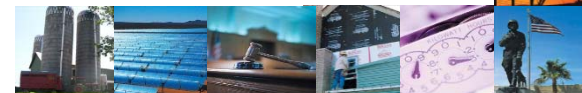
Residential	C&I	Agricultural
Lighting	Lighting	Agricultural
HVAC	HVAC	
Domestic Hot Water	Motors & Drives	
Appliances	Domestic Hot Water	
Electronics	Refrigeration	
Shell	Appliances	
Miscellaneous	Food Service	
	Shell	
	Electronics	
	Compressed Air	
	Miscellaneous	

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TRM MEASURE ORGANIZATION

- New numbering system
 - Header 1: Sector
 - Header 2: End-use Category
 - Header 3: Measure
- **2.0 RESIDENTIAL**
 - **2.1 LIGHTING**
 - **2.1.1 ENERGY STAR LIGHTING**
 - **2.1.2 RESIDENTIAL OCCUPANCY SENSORS**
 - **2.1.3 ELECTROLUMINESCENT NIGHTLIGHT**

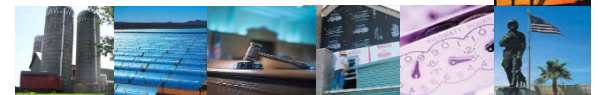
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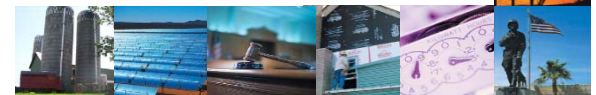
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INTERIM MEASURE PROTOCOLS

- Projected Timeline
 - ~~5/30~~ — EDC Submission to SWE for Review
 - ~~6/13~~ — SWE Review Comments
 - ~~6/17~~ — SWE & EDC Discussion
 - ~~6/27~~ — Distribute to TRM TWG for Review
 - ~~7/9~~ — Discuss at TRM TWG
 - 7/18 – Finalize IMPs & SWE Approval



INTERIM MEASURE PROTOCOLS

- Currently undergoing review with submitting EDCs



INTERIM MEASURE PROTOCOLS

ID	Measure End Use Category	New Measure Name	Original Author
RES-04	Fuel Switching	Fuel Switch: Electric Clothes Dryer to Gas Clothes Dryer	PECO
RES-05	Shell	Home Air Sealing Electric Space Heating	PECO
RES-06	Whole building	Manufactured Homes	PPL
RES-07	Water heating	Showerstart	PPL



INTERIM MEASURE PROTOCOLS

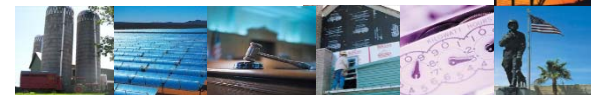
- Section 2.3.6.1.1 of the Evaluation Framework:
 - New Measure Interim Protocols
 - *“This category of interim protocols refers to completely new measures or additions that expand the applicability of an existing protocol, provided that the additions do not change the existing TRM algorithms, assumptions, and deemed savings values. For new measures, an approved IMP will apply for the entire program year in which it was approved. This IMP will be included in the next TRM update for PUC approval. The PUC-approved TRM protocol, whether changed or unchanged, will apply prospectively; a PUC-approved TRM protocol will not apply retrospectively, unless the PUC formally approves a request by an EDC to do so.”*
- All approved IMPs will be:
 - Included in the 2015 TRM, subject to public comment and Commission approval
 - Available for use during the 2014 Program Year

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STANDARD ADOPTION

- New guidelines established for adopting federal and ENERGY STAR standards updates into future TRMs
- This procedure for adopting new Federal and Energy Star standards will be incorporated into 2015 TRM



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RESIDENTIAL SECTOR



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COINCIDENCE FACTORS

- Definition
 - CF is defined, for a statistically significant sample of electric equipment units, as:
 - the ratio of the (1) sum of every unit's average kW load during the 260-hour PJM peak load period (June through August, non-holiday weekdays, 2 pm to 6 pm) to the (2) sum of the non-coincident maximum peak kW demand for every unit.
- Review of all residential measure CF's and sources
 - Comparison to other TRM's (Mid-Atlantic, Illinois, Conn.)
 - Not much Pennsylvania-specific data

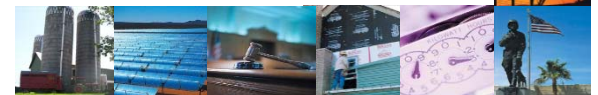


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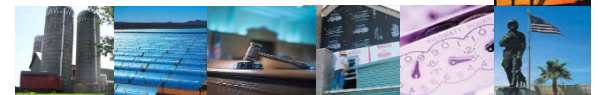
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COINCIDENCE FACTORS

- Updated End-Use CF's:
 - Central AC
 - Water Heaters
 - Clothes Washers
 - Clothes Dryers
 - Room AC
 - Refrigerators & Freezers
 - Dehumidifiers
 - Dishwashers
 - Televisions
 - Smart Strips
 - Pool Pumps



REVISED MEASURES

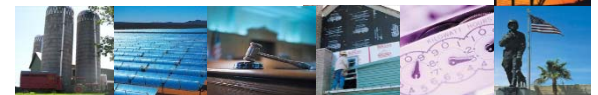
- Update on 2014 TRM Navigant comments
 - High priority complete, medium measures almost complete, 80% of comments addressed
 - Large portion were Coincidence Factor update requests
- To date, 10 measures have changes to either the kWh or kW savings algorithms
- EPA and Federal strawman proposal
 - Language would update the TRM in the program year following an EPA or Federal standard update

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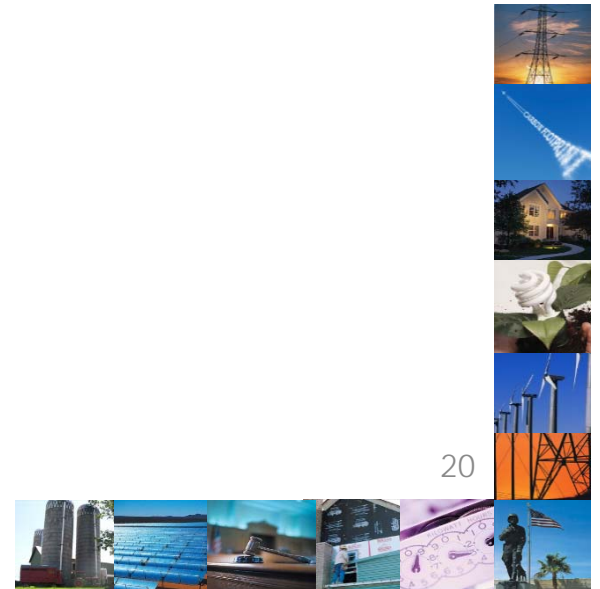
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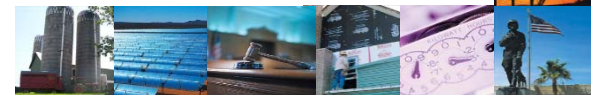
STANDARDS UPDATES

- Federal Standards
 - Room AC
 - Refrigerators and Freezers
 - Central AC & Heat Pumps
 - Clothes Dryers
- ENERGY STAR Requirements
 - Room AC
 - Refrigerators and Freezers
 - Central AC & Heat Pumps
 - Clothes Dryers



NEW MEASURES

- Considered and not final:
 - ShowerStart
 - ENERGY STAR Dryer
 - Residential Air Sealing
 - ENERGY STAR Ceiling Fans
 - Fuel Switching (Elec. to Gas) Clothes Dryer
 - ENERGY STAR Manufactured Homes



REMOVED MEASURES

- Considered for removal:
 - ENERGY STAR Audit (proposed by Navigant)
 - Electric Clothes Dryer with Moisture Sensor (replaced by ENERGY STAR Dryer)



QUESTIONS?



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