

# ANNUAL STAKEHOLDER MEETING

## *2015 Technical Reference Manual High Impact C&I Measure Updates*

July 11, 2014

*Presented by the Statewide Evaluation Team:*

 **Nexant**

  
GDS Associates, Inc.  
Engineers and Consultants

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# MEETING AGENDA



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# MEETING AGENDA

- Weather Mapping
- Lighting Measures Screw Bulb HOU and CF
- Lighting Measures Wattage Tables
- Lighting Measures New Construction HOU
- Coincidence Factors
- Federal Code Changes
- HVAC Measures
- Measure Life



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# WEATHER MAPPING



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# WEATHER MAPPING

- **Background:**

- In absence of other data, TRM references CA DEER for some refrigeration measures.
- CA DEER provides savings for 16 climate zones.
- 2014 PA TRM maps 7 PA reference cities to a CA CZ.
- Measures in question make up <<1% of overall portfolio.

- **Issue:**

- Stakeholders requested revisiting mapping table



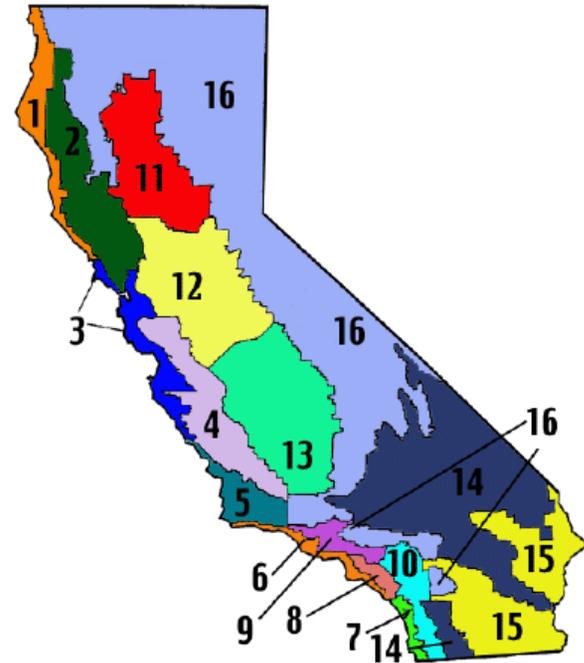
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# WEATHER MAPPING

- Map all PA cities to a single California climate zone
- Climate Zone 4 selected due to similarities in:
  - Average Dry Bulb Temperature
  - Average Wet Bulb Temperature
  - Average Relative Humidity
  - Cooling Degree Hours



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# LIGHTING SCREW BULB HOU AND CF



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# SCREW BULB HOU AND CF

- **Issue:**
  - TRM does not differentiate between screw base bulbs and non-screw base bulbs
  - i.e., Hours of use (HOU) and coincidence factor (CF) values are the same regardless of base type.



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# SCREW BULB HOU AND CF

- Evidence of Differences

Other TRMs make distinction (Mid-Atlantic & Illinois)

Pennsylvania Baseline Study suggests HOU differences

Preliminary findings from Pennsylvania Lighting Metering Study suggest HOU differences



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# SCREW BULB HOU AND CF

## Goals

**Increase reliability of savings** in light of high impact of cross-sector sales from residential upstream lighting programs.

Update assumptions based on **Pennsylvania-specific** information.

## Issues

**Requires modifications** to program administration processes, e.g., program tracking databases and application forms.

Maintaining **simplicity** of TRM approach.



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# SCREW BULB HOU AND CF

- Resolution
  - Review final findings from PA Lighting Metering Study (available late 2014)
  - If necessary, create new HOU and CF tables for screw-base bulbs in 2016 TRM
  - Tables apply to both cross-sector CFLs and commercial sector bulbs
  - Provide early notice of changes to minimize programmatic costs



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# LIGHTING WATTAGE TABLE



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# WATTAGE TABLE

- **Issue:**

- Appendix C Lighting Wattage Table contains list of “fixture codes”. Lighting not included can be inputted as a custom fixture code.
- EDCs requested expansion of Wattage Table to ease implementation.



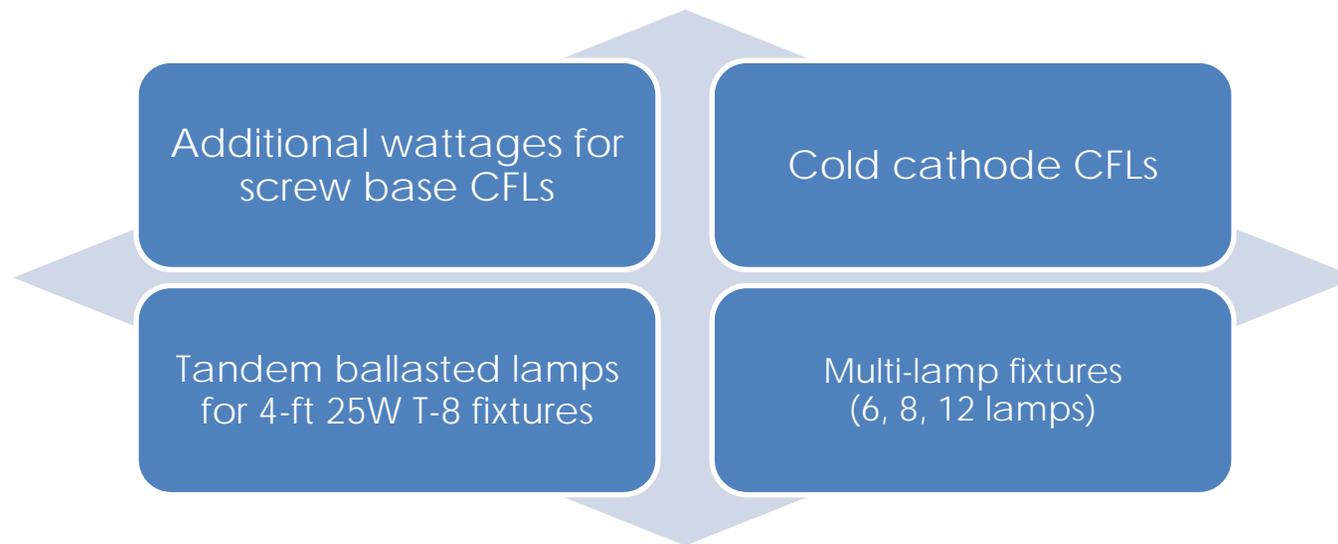
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# WATTAGE TABLE

- **Resolution:**
  - Added new codes (both baseline and efficient case) based on implementation needs



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# LIGHTING NEW CONSTRUCTION HOU



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# NC LIGHTING

- **Issue:**
  - Lighting controls required for certain scenarios in New Construction buildings per code
  - Current lighting protocol does not explicitly reference building code



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# NC LIGHTING

- Applicable Codes
  - ASHRAE 90.1-2007 (Section 9.4.1)
  - IECC 2009 (Section 505)
- Requirements
  - Interior and exterior lighting controls
  - Automatic shutoff (time clock, OS) for system
  - Occupancy controls for many spaces



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# NC LIGHTING

- Notable Exemptions

Buildings under 5,000 square feet

24-hour operations

Patient care spaces

Spaces with multi-scene lighting control systems

Shop and laboratory classrooms

Spaces where an automatic shutoff would endanger the safety or security of the room or building occupant(s)



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# NC LIGHTING

- **Resolution:**
  - Require NC lighting projects to call out baseline code conditions
  - Apply controls factor to baseline HOU to eliminate savings due to controls required by code
  - Provide new controls factors based on ASHRAE 90.1 for controls above code to prevent double counting of controls savings



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# COINCIDENCE FACTORS



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# COINCIDENCE FACTORS

- **Issue:**
  - Some coincidence factors not in alignment with new summer peak demand window

## Phase I

- Top 100 Hours

## Phase II

- June through August
- 2:00 pm to 6:00 pm
- Non-holiday weekdays

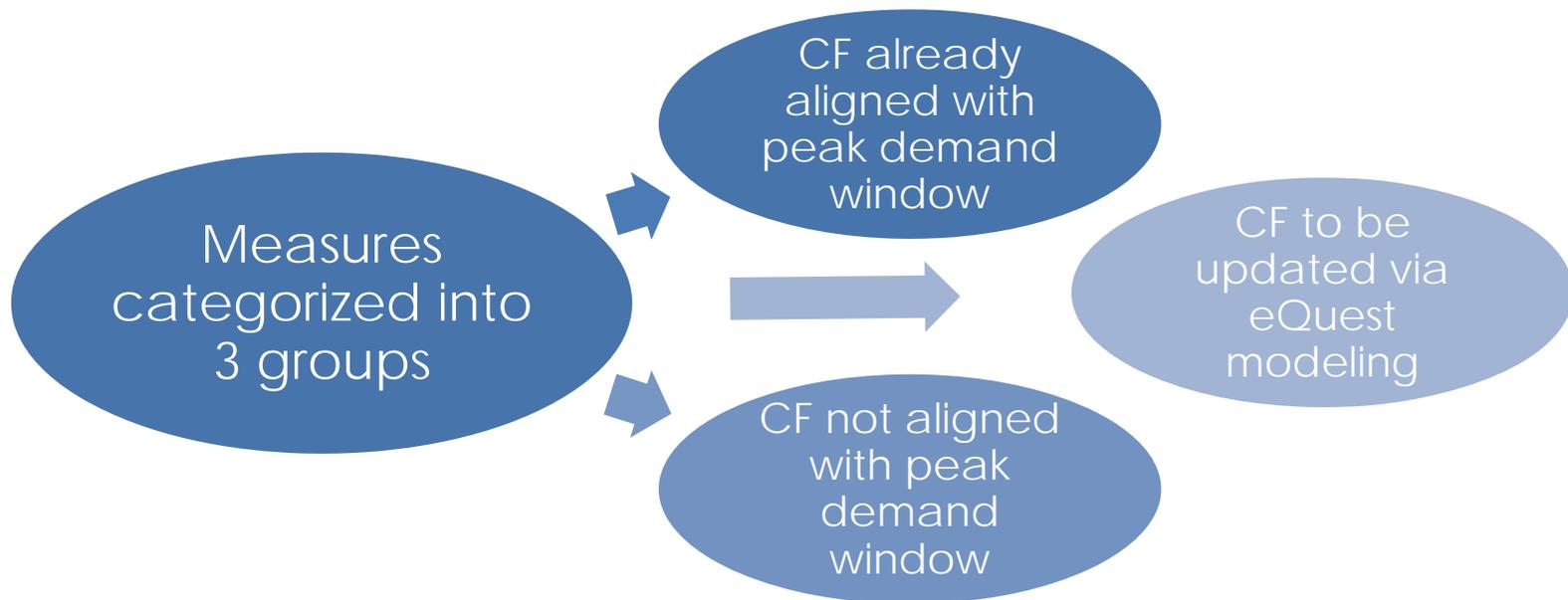


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# COINCIDENCE FACTORS



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# COINCIDENCE FACTORS

- Measures not aligned with peak demand window
  - 3.8: High-Efficiency Refrigeration/Freezer Cases
  - 3.11: ENERGY STAR Office Equipment
  - 3.12: Smart Strip Plug Outlets
  - 3.14: High-Efficiency Ice Machines
  - 3.21: Office Equipment – Network Power Management Enabling
  - 3.22: Refrigeration-Auto Closers
  - 3.23: Refrigeration – Door Gaskets for Walk-in and Reach-in Coolers and Freezers
  - 3.24: Refrigeration – Suction Pipes Insulation for Walk-in Coolers and Freezers
  - 3.26: ENERGY STAR Clothes Washer



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# COINCIDENCE FACTORS

- eQuest modeling will be used to determine CF for the following HVAC-related measures:
  - 3.3: Premium Efficiency Motors
  - 3.4: Variable Frequency Drive (VFD) Improvements
  - 3.5: HVAC Systems
  - 3.6: Electric Chillers
  - 3.17: Water-Source & Geothermal Heat Pumps
  - 3.18: Ductless Mini-Split Heat Pumps (Commercial)



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# COINCIDENCE FACTORS

- **Resolution:**
  - Review current source documentation
  - Research alternative sources from evaluation studies and technical reference manuals from other jurisdictions
  - Apply load factors where connected load and coincidence factor approach is inappropriate



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# FEDERAL CODE CHANGES



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# FEDERAL CODE CHANGES

- **Issue:**
  - IECC 2009 is applicable statewide building code
  - Recent federal updates have surpassed minimum efficiency standards in IECC 2009
- Where federal code exceeds state code, federal code shall be observed



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# FEDERAL CODE CHANGES

- PTAC/PTHP
  - Current standards took effect...
    - For standard size PTAC/PTHP: September 30, 2012
    - For non-standard size PTAC/PTHP: September 30, 2010
  - Compliance date for newest ruling anticipated to be 2018
  - No changes required to TRM at this time



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# FEDERAL CODE CHANGES

- Air-source A/C (greater than 65 kbtu/h)
  - Current standards took effect on January 1, 2010
  - Compliance date for newest ruling anticipated to be 2016
  - No changes required to TRM at this time



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# FEDERAL CODE CHANGES

- Water-cooled and Evaporatively-cooled A/C
  - DOE Final Rule on May 16, 2012
  - Federal standards for water cooled and evaporatively cooled A/C equipment more stringent than IECC 2009 standards
  - Federal standards **do not** prescribe minimum IEER values.



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# FEDERAL CODE CHANGES

- Water-cooled and Evaporatively-cooled A/C
  - Adopt federal standards for EER baselines
  - Adopt IECC 2012 standards for IEER baselines
  - Where federal standards are not applicable, keep IECC 2009 + ASHRAE 90.1-2007 Addendum S
    - Over 760 kbtu/h



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# FEDERAL CODE CHANGES

Equipment Type and Capacity	Cooling Baseline		
	2014 TRM (IECC 2009 + ASHRAE 90.1-2007 Addendum S)	2015 TRM Proposal (Federal Code + IECC 2012) <b>(Updates to 2014 TRM Values in Red)</b> <b>(No Federal Update for Values Green)</b>	
		Water-Cooled and Evaporatively-Cooled A/C	Water-Cooled A/C
<65,000 Btu/h	12.1 EER / 12.3 IEER	12.1 EER / 12.3 IEER	12.1 EER / 12.3 IEER
≥65,000 Btu/h and <135,000 Btu/h	11.5 EER / 11.7 IEER	<b>12.1 EER / 12.3 IEER</b>	<b>12.1 EER / 12.3 IEER</b>
≥135,000 Btu/h and <240,000 Btu/h	11.0 EER / 11.2 IEER	<b>12.5 EER / 12.7 IEER</b>	<b>12.0 EER / 12.2 IEER</b>
≥240,000 Btu/h and <760,000 Btu/h	11.0 EER / 11.1 IEER	<b>12.4 EER / 12.6 IEER</b>	<b>11.9 EER / 12.1 IEER</b>
≥ 760,000 Btu/h	11.0 EER / 11.1 IEER	<b>11.0 EER / 11.1 IEER</b>	<b>11.0 EER / 11.1 IEER</b>



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# HVAC MEASURES



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# HVAC MEASURES

## Equation Updates

- Use part-load efficiency values (SEER, IEER, CEER) to calculate energy savings, which is more representative of typical usage.
- Continue use of full-load efficiency values (EER) to calculate peak demand savings.

## Eligibility Updates

- All HVAC measures apply to comfort applications only.
- Process cooling applications are considered custom measures.

## EFLH and CF Updates

- Update EFLH and CF values based on building simulations using eQuest.



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# HVAC MEASURES

2014 Section	Measure Name	Equation Update	Eligibility Update	EFLH & CF Update
3.3	Premium Efficiency Motors	No	No	Yes
3.5	HVAC Systems	Yes	Yes	Yes
3.6	Electric Chillers	Yes	No	Yes
3.17	Water Source & Ground Source Heat Pumps	Yes	Yes	Yes
3.18	Ductless Mini-Split Heat Pumps <5.4 tons	No	Yes	Yes
3.32	Small C/I HVAC Refrigerant Charge Correction	No	Yes	Yes
3.34	ENERGY STAR Room Air Conditioner	Yes	Yes	Yes



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# MEASURE LIFE



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# MEASURE LIFE

- Alignment of Appendix A and Measure Pages

## Additions

- O&M Savings: 3 years

## Removals

- Commercial Custom – New/Replacement: 18 years
- Industrial Custom – Non-Process: 18 years
- Industrial Custom – Process: 18 years



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# QUESTIONS?



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