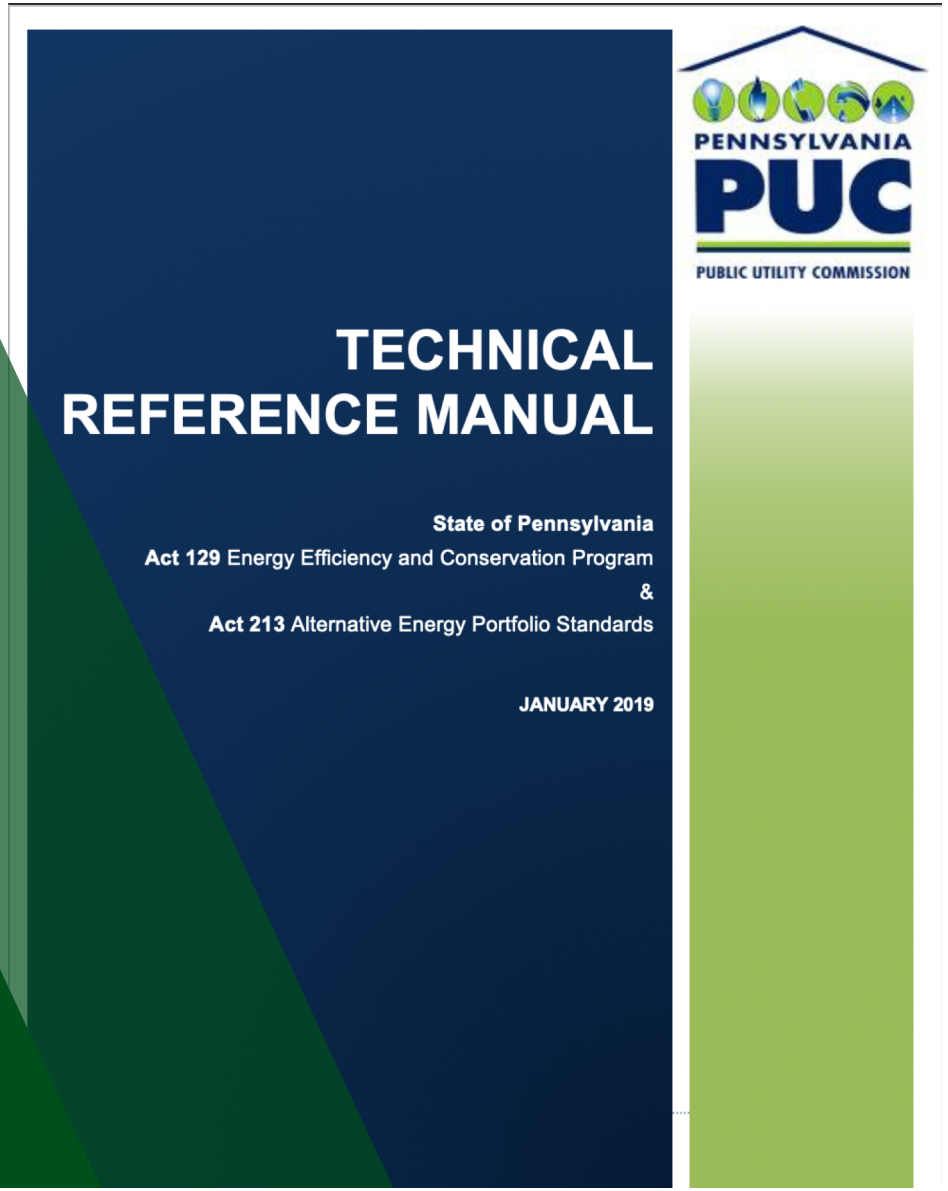
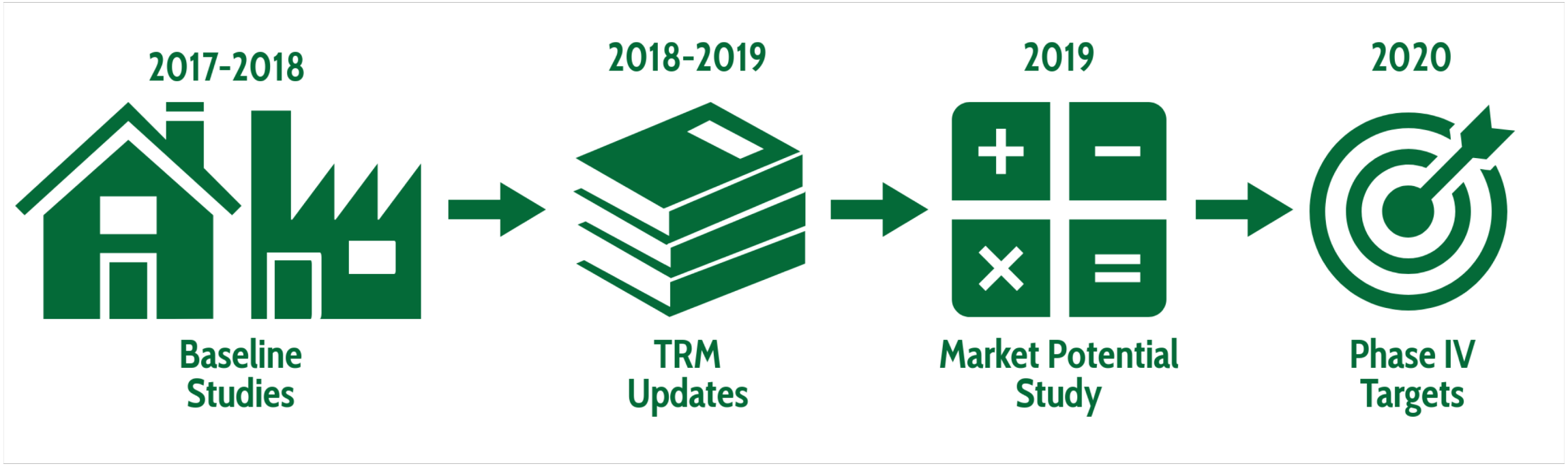
ACT 129 STAKEHOLDER MEETING: 2021 TECHNICAL REFERENCE MANUAL UPDATES



PA PUC
Commonwealth Keystone Building
Hearing Room 1
January 31, 2019
Presented by PA SWE Team

NMR Group, Inc. | Demand Side Analytics DATA DRIVEN RESEARCH AND INSIGHTS | ECOMETRIC | Optimal ENERGY Integrated Energy Resources | brightline GROUP

Phase IV Planning: Inputs and Timeline



CROSS-CUTTING TRM UPDATES

General Cross-Cutting Updates

- Three Volumes:
  - Vol. 1: General
  - Vol. 2: Residential Measures
  - Vol. 3: Commercial and Industrial Measures
- Updated relevant inputs based on Residential and Non-Residential Baseline Studies
- Updated any inputs based on changes to codes/standards (IECC, Federal standards, ENERGY STAR, etc.)

General Cross-Cutting Updates

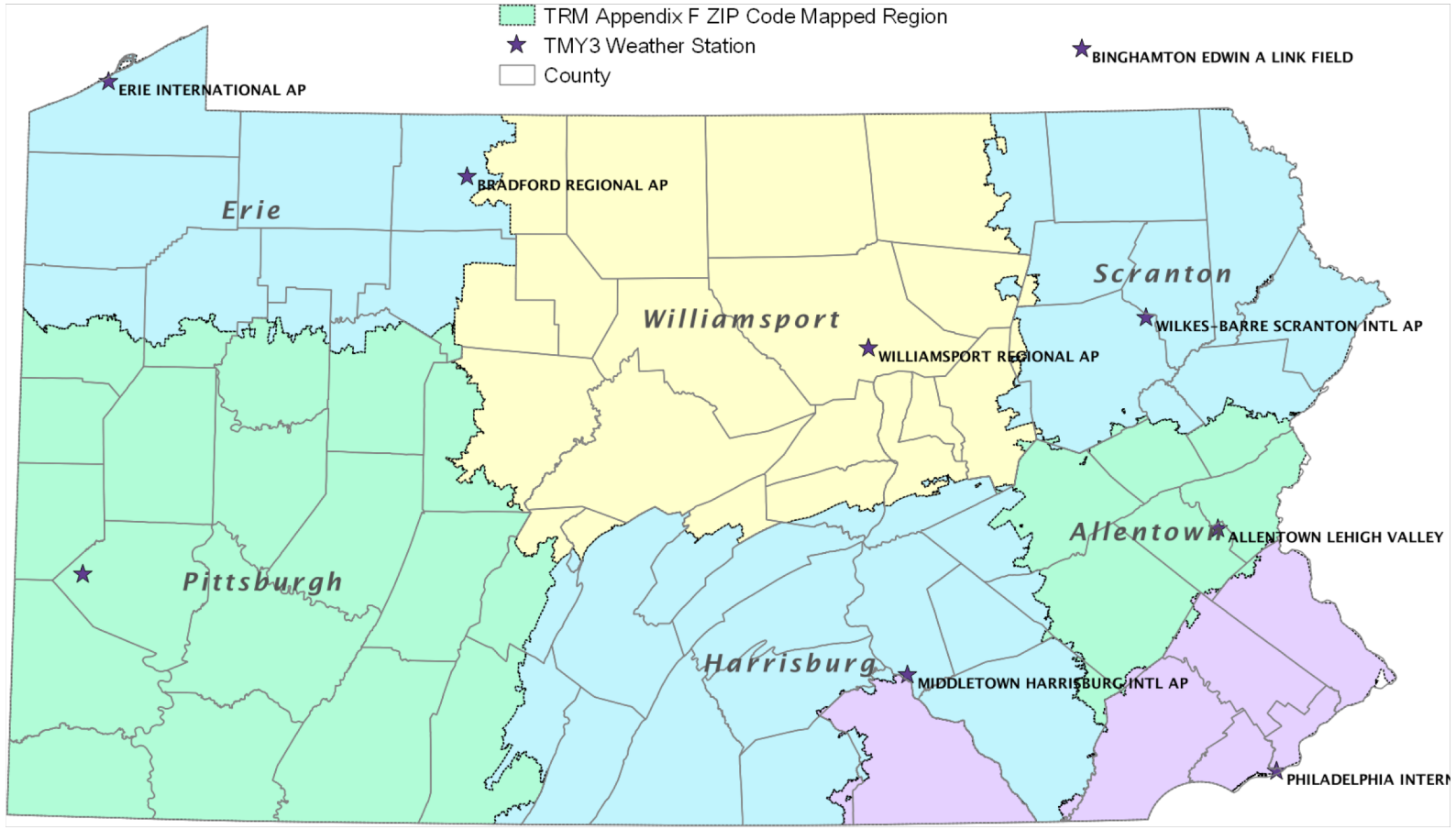
- Eliminated Appendix A: Measure Lives
- Updated old references (e.g., updated values from outdated version(s) of Mid-Atlantic TRM to values from the current version)

CROSS-CUTTING TRM UPDATES: CLIMATE-DEPENDENT VALUES

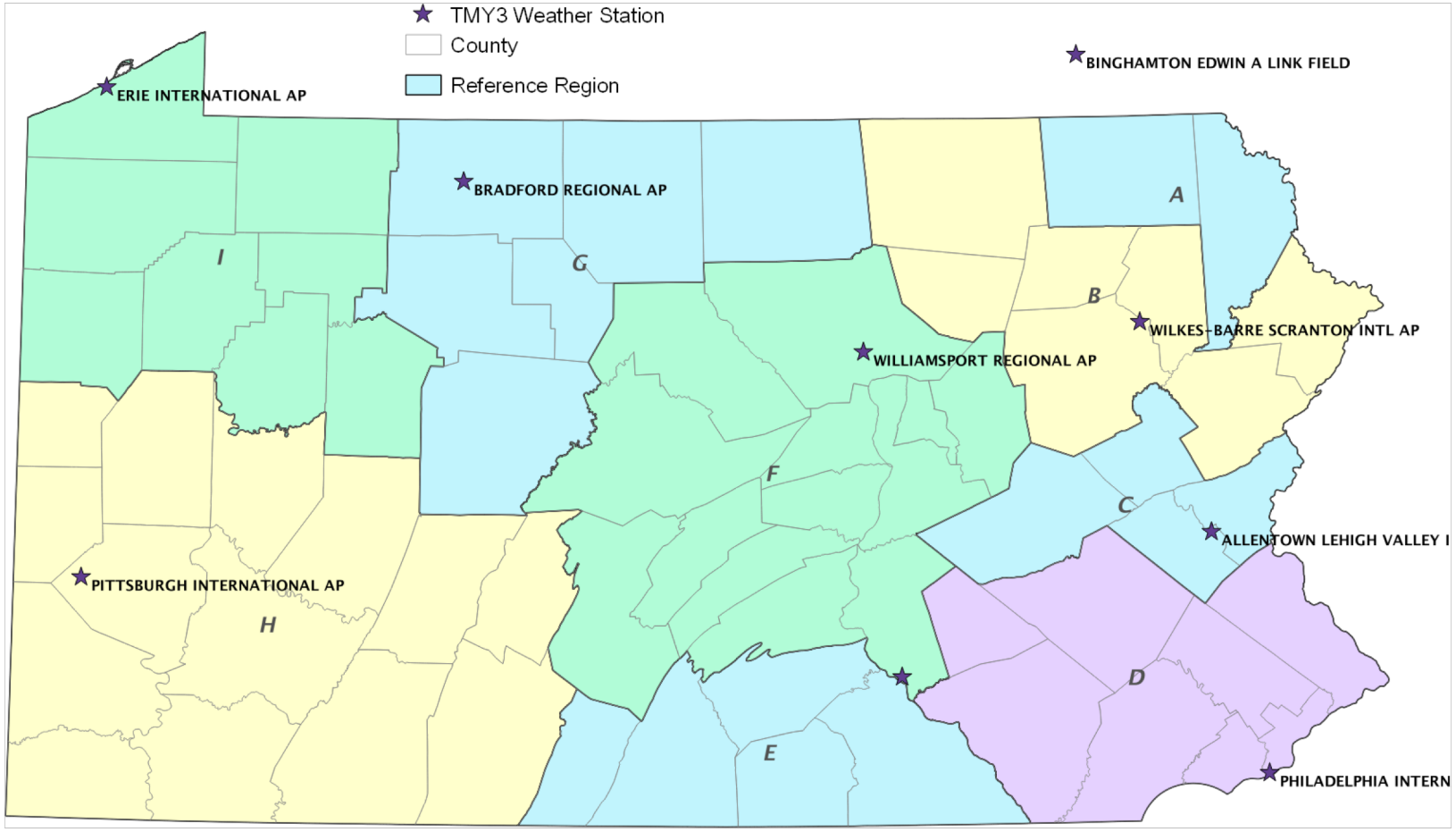
Climate-Dependent Values

- Value of climate-dependent measures like building shell and HVAC will increase with expected decline in lighting savings in Phase IV
- New Appendix A in Volume 1
- Added two new reference weather cities (Binghamton, NY & Bradford)
- Updated using more recent HDD/CDD values and newly available EFLH data
- Spreadsheet tool will be available
- EDCs can apply by project/measure location or using EDC Climate Region Weights

Phase III TRM Reference Regions



New Reference Regions



Residential HVAC EFLH Update

Objectives

- Develop a single set of $EFLH_{cool}$ and $EFLH_{heat}$ by weather zone
- Calculate separate coincidence factors for each zone
- Affects most HVAC measures and some Building Shell and Whole Building

Results

Climate Region	Reference City	CF	EFLH				
			Cooling		Heating		
			$EFLH_{cool}$	Room AC or secondary	Non Heat Pump	Heat Pump, Primary	Heat Pump, Secondary
C	Allentown	0.354	575	178	906	1,235	845
A	Binghamton, NY	0.265	333	103	1,152	1,494	1,060
G	Bradford	0.218	206	64	1,347	1,672	1,218
I	Erie	0.265	468	145	1,054	1,422	1,004
E	Harrisburg	0.451	731	227	997	1,319	940
D	Philadelphia	0.424	781	242	761	1,084	727
H	Pittsburgh	0.369	544	169	942	1,269	876
B	Scranton	0.326	474	147	1,000	1,346	939
F	Williamsport	0.391	559	173	935	1,280	890

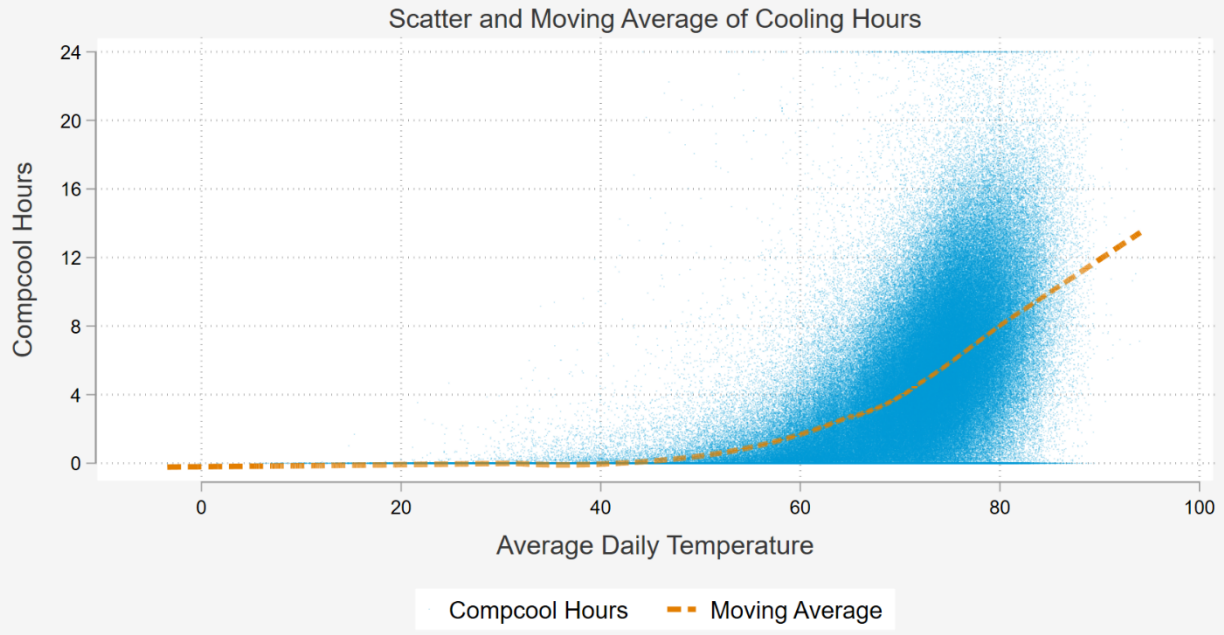
Methods – Ecobee Donate Your Data

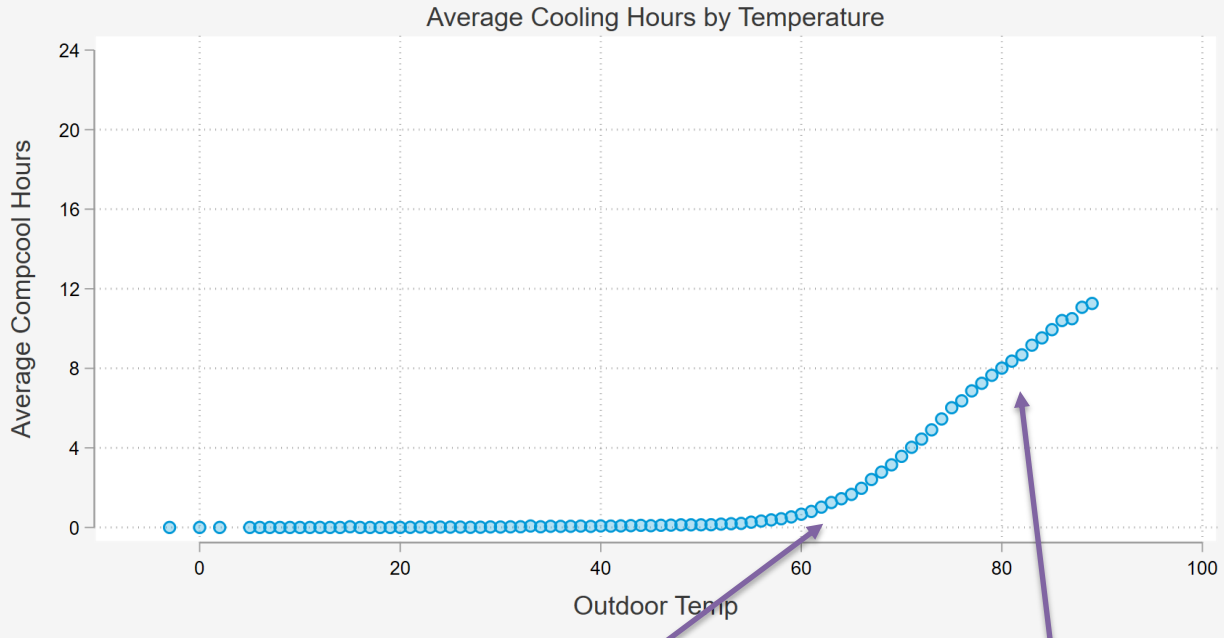
- Time period: April 2015 – September 2017
- Thermostats in Pennsylvania and neighboring states
  - NJ, NY, OH, WV, MD, and DE
    - Excluding NYC, Brooklyn, Yonkers, Jersey City, Newark, and Hoboken
- 2,588 unique thermostats (559 in PA)
  - Floor area [sqft] ranges from 0 to 10,000 (mean = 2,667)
  - Age of home ranges from 0 to 120 years(mean = 37)
  - Number of occupants ranges from 0 to 12 (mean = 1.95)
- 5-minute interval data converted into hourly and daily for analysis

What about the embedded energy efficiency?

- All data is for connected thermostats
- We assume connected thermostats reduce runtime
- We use the ESF Values from the Connected Thermostat measure to “add back” the assumed reduction
  - $ESF_{Cool} = 0.048$
  - $ESF_{Heat} = 0.064$
  - $EFLH = EFLH_{Connected\ Tstat}/(1 - ESF)$

Modeling Approach



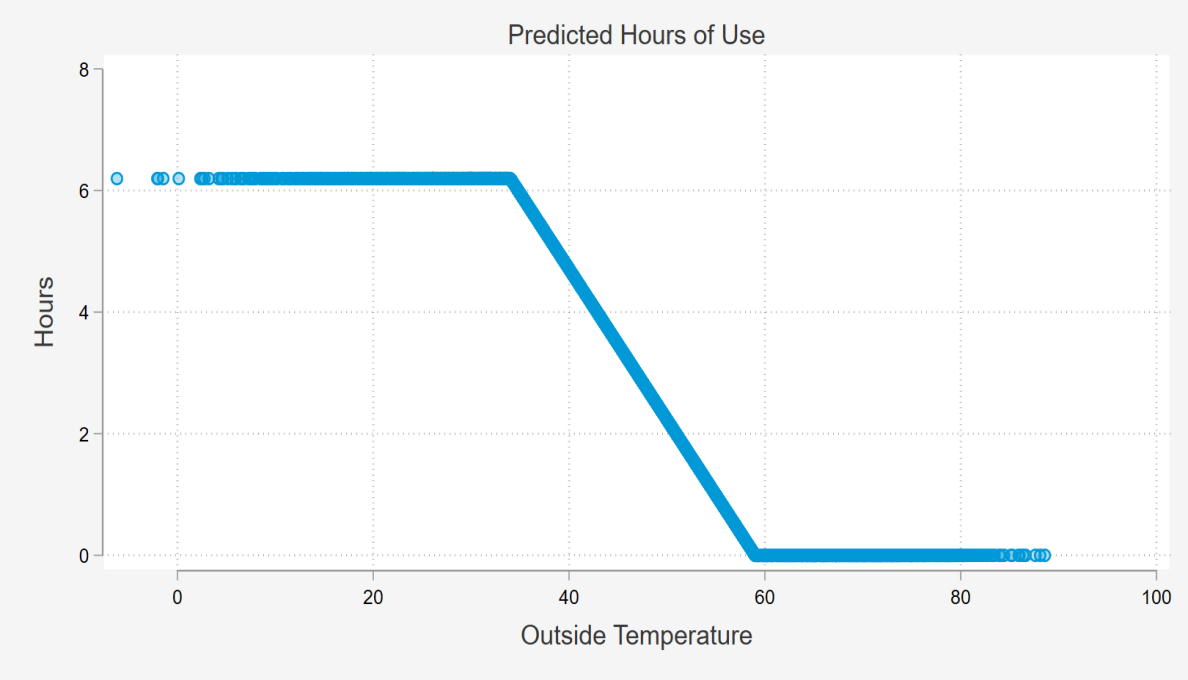


What temp does cooling begin?

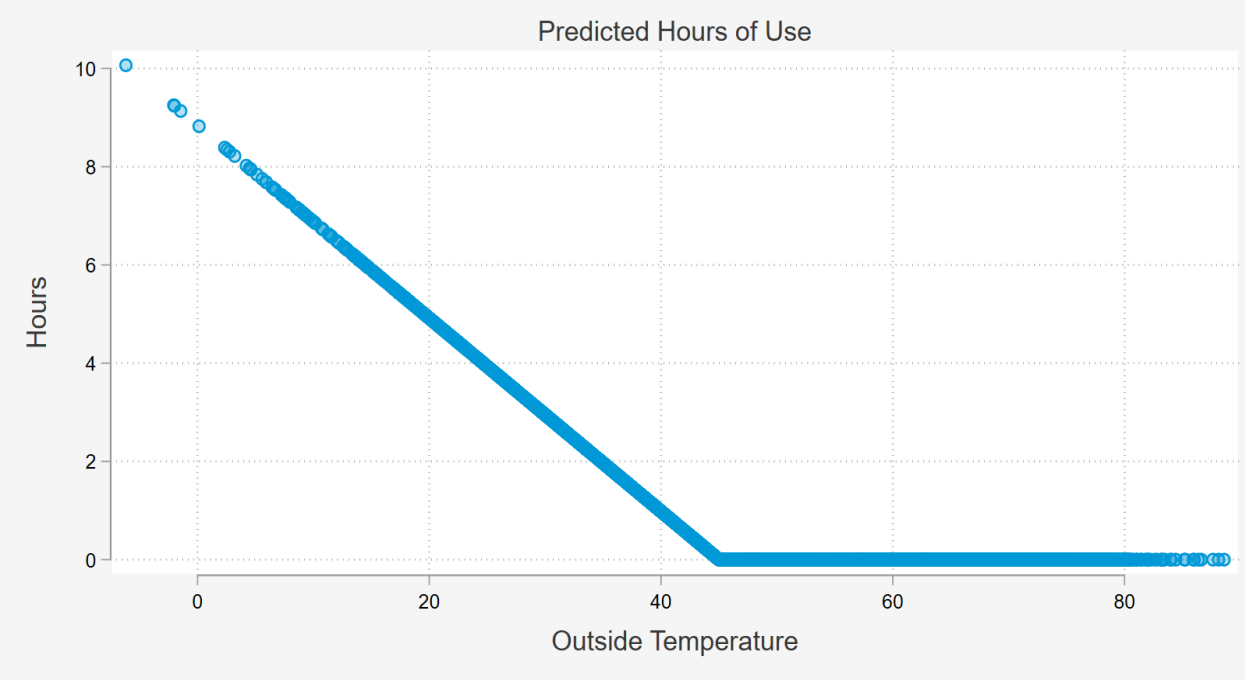
What is the slope?

Air Source Heat Pumps

Compressor



Auxiliary



CROSS-CUTTING TRM UPDATES: MIDSTREAM PROGRAM DELIVERY

TRM Implications of Midstream Program Delivery

- Midstream programs:
  - Provide incentives to intermediaries on eligible products, encouraging them to stock, promote, and sell more-efficient technologies
- Midstream delivery presents many advantages
  - Working directly with distributors reduces transactions
  - Increased likelihood of market transformation
  - Reduced administrative requirements for participants and contractors
- Requires compromises in TRM protocols because baseline information is not collected
  - Assumed lighting baselines based on incented lamps/fixtures
  - Loss of “usage groups” and lighting schedules
  - Composite baselines for ductless heat pumps
- SWE approach
  - Rely on historic implementation/evaluation data to develop conservative default baseline values
  - Increased evaluation requirements initially

CROSS-CUTTING TRM UPDATES: Q & A

RESIDENTIAL TRM UPDATES

Residential: General Updates

- Federal standards updates
- ENERGY STAR specification changes
- 2015 IECC
- 2018 Residential Baseline study
- Updated references to other TRMs and more recent research

RESIDENTIAL TRM UPDATES: UPDATED MEASURES

Updated Measures: Lighting

- ENERGY STAR Lighting
- Residential Occupancy Sensors
  - Now with upstream option
- LED and Electroluminescent Nightlights
  - Combines two measures in Phase III TRM
  - Lower default in-service rate based on EDC evaluation data

ENERGY STAR Lighting

- Traditionally the largest source of savings (34% of savings for PY9)
- EISA 2020 provisions will greatly reduce opportunity
- New baseline is 45 lumens/Watt regardless of lamp type
- Measure now includes specific equations and default values for cross-sector sales (7.4%)

Updated Measures: HVAC

- High Efficiency Equipment – ASHP, CAC, GSHP, PTAC, PTHP
  - Algorithms simplified
  - Properly Sized Cooling, ECM Circulation Fan, GSHP Desuperheater, AC & Heat Pump Maintenance are now standalone measures
- High Efficiency Equipment – Ductless Heat Pumps with Midstream Delivery Option
  - Requires ENERGY STAR model
  - Midstream delivery option based on composite baseline

Updated Measures: HVAC

- Duct Sealing and Insulation
  - Simplified methods
  - Adds insulation option

Table 2-34: Distribution Efficiency by Climate Zone; Conditioned Air Type; Duct Location, Leakage & Insulation

Insulation	Location	Attic				Basement				Vented Crawl			
	HVAC Type	Heat		Cool		Heat		Cool		Heat		Cool	
	Leakage \ CZ*	4&5	6	4&5	6	4&5	6	4&5	6	4&5	6	4&5	6
R-0	Leaky	69%	64%	61%	61%	93%	92%	81%	92%	74%	71%	76%	90%
	Average	73%	68%	64%	66%	94%	94%	87%	95%	78%	74%	83%	93%
	Tight	77%	73%	73%	74%	95%	95%	94%	98%	82%	78%	91%	97%
R-2	Leaky	76%	73%	65%	67%	94%	94%	83%	92%	80%	78%	78%	91%
	Average	82%	79%	74%	75%	96%	95%	88%	95%	85%	83%	85%	94%
	Tight	87%	85%	84%	85%	97%	97%	95%	98%	90%	88%	93%	97%
R-4+	Leaky	79%	76%	67%	70%	95%	95%	83%	93%	82%	80%	79%	91%
	Average	84%	82%	77%	78%	96%	96%	89%	95%	87%	85%	86%	94%
	Tight	90%	89%	87%	88%	98%	98%	95%	98%	92%	91%	94%	97%
R-8+	Leaky	80%	78%	69%	71%	95%	95%	83%	93%	84%	82%	79%	91%
	Average	86%	84%	79%	80%	97%	97%	89%	95%	89%	87%	87%	94%
	Tight	92%	91%	90%	90%	98%	98%	95%	98%	94%	93%	94%	98%

* Climate Regions A and G correspond to IECC Climate Zone 6, the rest of the state is IECC Climate Zone 4 or 5.

Updated Measures: DHW

- Updated cold water inlet temperature
- Updated for Federal standards that went into effect in April 2015
- Updated to use Uniform Energy Factor

Updated Measures: Appliances

- ENERGY STAR Refrigerators
  - Updated for changes to ENERGY STAR Most Efficient specification
- ENERGY STAR Freezers
  - Corrected error in default savings calculations
- Refrigerator/Freezer Recycling
  - Eliminated default savings
  - Updated part-use factors with program data
- ENERGY STAR Clothes Washers, Dryers
  - Updated for Federal standards, ENERGY STAR specifications

Updated Measures: Appliances

- ENERGY STAR Dehumidifiers
  - Updated for Federal standards and ENERGY STAR updates
  - Added ENERGY STAR Most Efficient criteria
- ENERGY STAR Ceiling Fans
  - Updated for new ENERGY STAR specifications

Updated Measures: Building Shell

- Residential Air Sealing &
- ENERGY STAR Windows
  - Updated energy models
  - Now incorporates HVAC system efficiency
  - Climate-dependent
  - Savings increase for most locations/HVAC systems

- Ceiling/Attic, Wall, Floor, and Rim Joist Insulation
  - Incorporates previously separate Rim Joist Insulation measure
  - Adds floor insulation from IMP
  - Simplifies algorithms

Updated Measures: Whole Home

- New section that includes measures previously in Building Shell and new measures
- Res. New Construction, Home Performance with ENERGY STAR, ENERGY STAR Manufactured Homes, + two new measures
- Updated due to IECC 2015 code changes and baseline study data
- Passive House modeling software approved for use in Res. New Construction and Low-Rise MF New Construction
- New construction measures can use model outputs for quantifying all savings, not just weather-sensitive items

Updated Measures: Other

- Advanced Power Strips
  - Renamed from Smart Strip Plug Outlets
  - Updated using new research
  - Savings increase for Tier 1, decrease for Tier 2
- Variable Speed Pool Pumps
  - Removed load shifting option

RESIDENTIAL TRM UPDATES: NEW MEASURES

New Measures: HVAC

- Separated from 2.1.1 Electric HVAC:
  - Properly Sized Cooling
  - ECM Circulation Fan
    - New algorithm based on EFLH
  - GSHP Desuperheater
  - Air Conditioner & Heat Pump Maintenance
- Furnace Maintenance
- ENERGY STAR Certified Connected Thermostats

New Measures: HVAC

- ENERGY STAR Connected Thermostats
  - Savings depend on delivery method and baseline thermostat

Installation Type	Baseline Thermostat	Cooling ESF	Heating ESF
Upstream buy-down (Customer Self-Installation)	Unknown Mix Default	4.8%	6.4%
Customer Self-Installation with Education	Unknown Mix Default	7.5%	7.9%
Professional Installation	Manual	11.3%	11.5%
	Conventional Programmable	9.3%	7.9%

New Measures: Appliances

- Heat Pump Clothes Dryers
- Dehumidifier Retirement
- ENERGY STAR Air Purifier

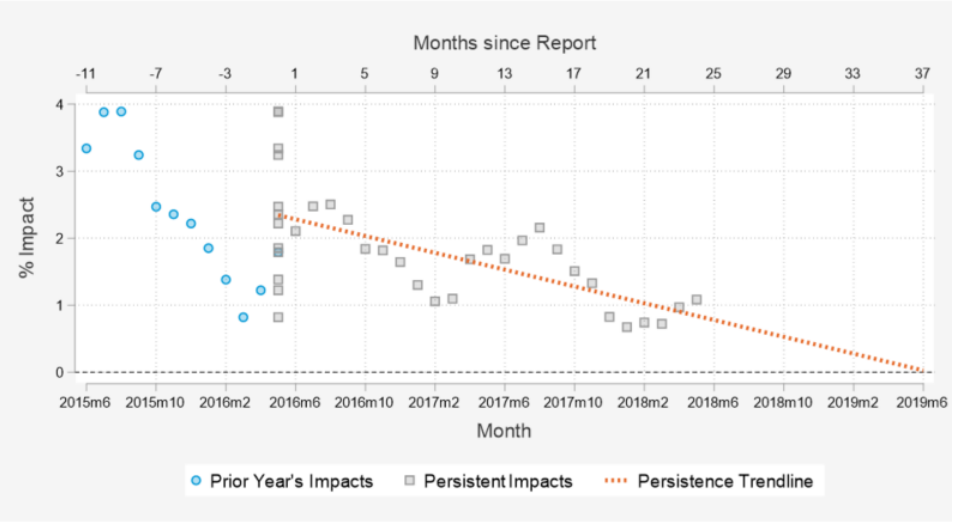
New Measures: Building Shell

- Weather Stripping, Caulking, and Outlet Gaskets
  - Limited to <400 kWh
- Basement Wall Insulation
- Residential Window Repair

New Measures: Whole Home

- Low-Rise Multifamily New Construction
- Home Energy Reports

Home Energy Reports



- New TRM protocol on calculation of first-year (compliance) and lifetime savings
  - Act 129 status quo was a 1-year EUL
- Adopts a “decay” perspective
  - Based on findings of SWE HER Persistence Study
  - 31.3% annual decay rate

RESIDENTIAL TRM UPDATES: DELETED MEASURES

Deleted Measures

- 2.2.8 Programmable Thermostats
- 2.2.9 Residential Whole House Fans
- 2.3.4 Fuel Switching: Heat Pump Water Heater to Fossil Fuel Water Heater
- 2.4.9 ENERGY STAR Water Coolers
- 2.5.1 ENERGY STAR Televisions
- 2.7.1 Pool Pump Load Shifting

RESIDENTIAL TRM UPDATES: Q & A

NON-RESIDENTIAL TRM UPDATES

NON-RESIDENTIAL TRM UPDATES: UPDATED MEASURES

Non-Residential: General Updates

- Standardized the building type list across end uses
- Updated any inputs based on codes/standards (IECC, ENERGY STAR, EISA, etc.)
  - Within measures and Appendix C (Lighting Audit and Design Tool)
- Update relevant inputs based on 2018 Non-Residential Baseline Study

3.1.1 Lighting Improvements

- Lighting Improvements
  - Revised all general service baselines for consistency with EISA 2007 efficacy standards (45 lumens per Watt)
- Added a permanent removal option
- Added separate EUL assumptions for linear LED retrofits
  - Type A, direct installation of an LED tube into an existing fluorescent fixture: 5 years
  - Type B, line voltage linear LEDs with integrated drivers: 15 years
  - Type C, LED driver retrofit kit: 15 years
  - Mechanism to capture the type in Appendix C forms

3.1.2 New Construction Lighting

- Updated for consistency with IECC 2015. Previous version cited ASHRAE 90.1-2007
  - Lighting Power Density (LPD) allowances
    - By building area
    - By space type
  - Exterior Lighting Power Densities
  - Baseline Savings Control Factors
  - Updated App C calculator to reflect these changes

Updated New Construction LPDs

ASHRAE 90.1-2007

Building Area Type[251]	LPD (W/ft^2)	Building Area Type	LPD (W/ft^2)
Automotive facility	0.9	Multifamily	0.7
Convention center	1.2	Museum	1.1
Courthouse	1.2	Office	1.0
Dining: bar lounge/leisure	1.3	Parking garage	0.3
Dining: cafeteria/fast food	1.4	Penitentiary	1.0
Dining: family	1.6	Performing arts theater	1.6
Dormitory	1.0	Police/fire station	1.0
Exercise center	1.0	Post office	1.1
Gymnasium	1.1	Religious building	1.3
Health-care clinic	1.0	Retail	1.5
Hospital	1.2	School/university	1.2
Hotel	1.0	Sports arena	1.1
Library	1.3	Town hall	1.1
Manufacturing facility	1.3	Transportation	1.0
Motel	1.0	Warehouse	0.8
Motion picture theater	1.2	Workshop	1.4

IECC 2015

Building Area Type	LPD (W/ft^2)	Building Area Type	LPD (W/ft^2)
Automotive facility	0.80	Multifamily	0.51
Convention center	1.01	Museum	1.02
Courthouse	1.01	Office	0.82
Dining: bar lounge/leisure	1.01	Parking garage	0.21
Dining: cafeteria/fast food	0.90	Penitentiary	0.81
Dining: family	0.95	Performing arts theater	1.39
Dormitory	0.57	Police station	0.87
Exercise center	0.84	Post office	0.87
Fire station	0.67	Religious building	1.00
Gymnasium	0.94	Retail	1.26
Health care clinic	0.90	School/university	0.87
Hospital	1.05	Sports arena	0.91
Hotel/Motel	0.87	Town hall	0.89
Library	1.19	Transportation	0.70
Manufacturing facility	1.17	Warehouse	0.66
Motion picture theater	0.76	Workshop	1.19

Other Lighting Measures

- LED Exit Signs
  - Corrected default savings
- LED Channel Signage
  - Updated algorithms to account for the fact that savings are per linear foot and need to be multiplied by total linear feet
  - Updated default values for kW_{base} and kW_{ee} based on a 2016 Southern California Edison workpaper

Appendix C

- All algorithms/inputs were updated to reflect updates made in section 3.1 of the TRM
  - Baseline wattage override for incandescent and halogen screw-ins
- Use of the Appendix C form is still preferred, but it is no longer required in cases where ICSPs have developed in-house lighting inventory forms
  - Alternative forms must be approved by the SWE
  - If the ICSP tool and Appendix C disagree, the Appendix C result is considered the TRM-supported savings value

HVAC

- Updated replace-on-burnout and new construction HVAC equipment baseline efficiency parameter to match IECC 2015 and/or upcoming federal standard requirements, whichever is stricter

2016 TRM

Equipment Type and Capacity	Cooling Baseline	Heating Baseline
$< 65{,}000 \frac{Btu}{hr}$	13 SEER	7.7 HSPF
$\geq 65{,}000 \frac{Btu}{hr}$ and $<135{,}000 \frac{Btu}{hr}$	11.0 EER 11.2 IEER	3.3 COP

2021 TRM

Equipment Type and Capacity	Subcategory or Rating Condition	Cooling Baseline		Heating Baseline	
		PY13-PY14	PY15-PY17	PY13-PY14	PY15-PY17
< 65,000 Btu/h	Split System	14.0 SEER	14.0 SEER	8.2 HSPF	8.2 HSPF
	Single Package	14.0 SEER	14.0 SEER	8.0 HSPF	8.0 HSPF
≥ 65,000 Btu/h and < 135,000 Btu/h	Split System and Single Package	11.0 EER	12.0 EER	3.3 COP	3.4 COP
		12.2 IEER	14.1 IEER		
		11.9 IEER	11.9 IEER		

- Updated existing HVAC equipment baseline efficiencies to align with 2018 non-residential baseline report, when applicable.

Motors and VFDs

- Changed Variable Frequency Drive algorithm
  - Removed basic Energy and Demand Saving Factor based on outdated peer TRM methodology
  - Replaced with hourly bin load profile savings approach based on control type and motor application

Table 3-74: Default Load Profiles for HVAC Fans and Pumps

Equipment Type	Flow Fraction (%)										
	0	10	20	30	40	50	60	70	80	90	100
HVAC Fan	0%	0%	0%	0%	0%	10%	20%	30%	20%	15%	5%
HVAC Pump	0%	0%	0%	5%	10%	20%	30%	20%	10%	5%	0%

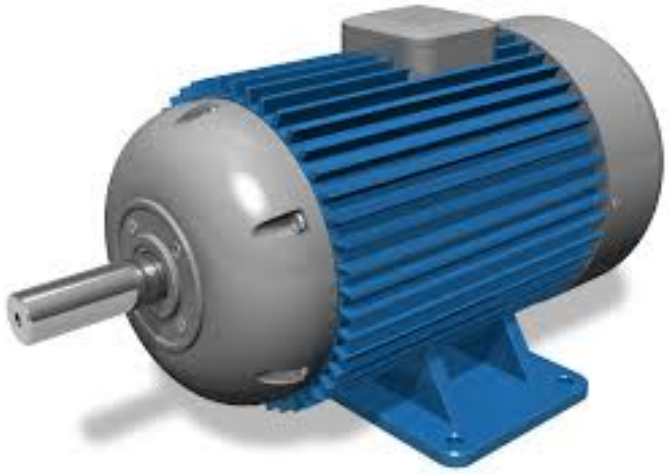
Table 3-75: Supply/Return and Cooling Tower Fan Power Part Load Ratios

Control Type	Flow Fraction (%)										
	0	10	20	30	40	50	60	70	80	90	100
Constant Volume	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two-Speed	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Air Foil/Backward Incline	0.56	0.53	0.53	0.57	0.64	0.72	0.80	0.89	0.96	1.02	1.05
Air Foil/Backward Incline with Inlet Guide Vanes	0.47	0.53	0.56	0.57	0.59	0.60	0.62	0.67	0.74	0.85	1.00
Forward Curved	0.20	0.22	0.26	0.30	0.37	0.45	0.54	0.65	0.77	0.91	1.06
Forward Curved with Inlet Guide Vanes	0.20	0.21	0.22	0.23	0.26	0.31	0.39	0.49	0.63	0.81	1.04
Variable Frequency Drive	0.05	0.05	0.05	0.08	0.13	0.20	0.30	0.43	0.60	0.80	1.03

Table 3-76: HVAC Pump Power Part Load Ratios

Control Type	Flow Fraction (%)										
	0	10	20	30	40	50	60	70	80	90	100
Constant Volume	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Throttle Valve	0.55	0.61	0.67	0.73	0.78	0.82	0.87	0.90	0.94	0.97	1.00
Variable Frequency Drive	0.27	0.19	0.14	0.13	0.15	0.21	0.30	0.43	0.60	0.79	1.03

Motors and VFDs



- Appendix D savings calculator has been updated to align with new methodology
  - Incorporates algorithm changes
  - Allows custom user defined load profile
- ECM Circulating Fan
  - Simplified interactive factor algorithm
  - Updated motor efficiency assumptions if unknown

Domestic Hot Water

- Heat Pump Water Heaters
  - Updated baseline energy factors to current standards
  - New ES spec did not change energy factor for the efficient unit
  - Developed new ETDFs and gallons/year assumptions
  - Added default savings for Midstream delivery
- Low Flow Pre-Rinse Sprayers
  - Combined two sections (Retrofit and Time of Sale) into one
  - Simplified savings algorithms

Domestic Hot Water

- Fuel Switching: Electric Resistance Water Heaters to Gas/Oil/Propane
  - Updated minimum uniform energy factor standards
  - Added default savings for Midstream
  - Developed new ETDFs

Refrigeration

- High Efficiency Refrigerated/Freezer Cases
  - Updated to align with Energy Star requirements
- Combined two sections for simplicity
  - High-Efficiency Evap Fan Motor for Reach-in Refrigerated Case
  - High-Efficiency Evap Fan Motor for Walk-in Freezer Case
- Updated algorithms and parameters for twelve measures to align with more contemporary studies, including:
  - NEEP Commercial Refrigeration Loadshape Project
  - Commercial refrigeration focused studies by DOE and Oak Ridge National Lab

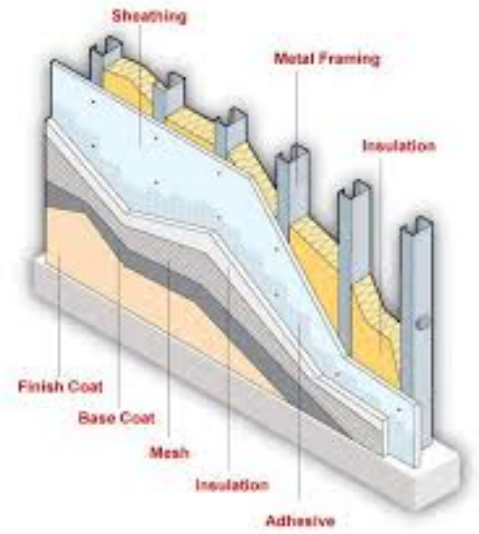
Appliances

- ENERGY STAR Clothes Washers
  - Update standards
    - Update baseline energy factors based on new federal efficiency standards
    - Update efficient energy factors based on new ES spec
  - Updated defaults based on ES database of certified products (for example, capacity of efficient washer)
  - Updated default savings

Food Service Equipment

- Updated Energy Star measures to align with updated standards
  - High Efficiency Ice Machines
  - Electric Steam Cooker
- Beverage Machine Controls
  - Reduced baseline energy consumption to align with modern equipment

Building Shell



- Updates to initial R values:
  - For New Construction buildings, defaults were updated to reflect updates standards (IECC 2015)
  - For Existing buildings, defaults were changed to EDC Data Gathering
    - EDCs must know the final R value to calculate savings, thus they should also know the initial R value

Consumer Electronics

- Energy Star Office Equipment measure updated
  - Added permutation detail to align with 2016 Energy Star requirements (e.g. “computer” segmented into “Desktop” and “Laptop”)
- Network Power Management Enabling
  - Deemed values for desktops and laptops updated to align with Energy Star guidelines
- Advanced Power Strips
  - Algorithms updated to consider application use (e.g. integrated occupancy sensor and use of power management)

Compressed Air

- No major changes
- Updated hours of use and coincidence factors by shift type and applied to all measures

Agricultural

- No major changes
- Added clarifying language in several places
  - Related to the number of cows milked per day (each cow is assumed to be milked twice per day)
  - Related to measure unit
- Changed CFs to ETDFs
- Updated sources where possible

NON-RESIDENTIAL TRM UPDATES: NEW MEASURES

Midstream Lighting

- Incentives offered through commercial sales channels such as distributors of lighting products (not customers or trade allies)
- Eligibility
  - Fixture, lamp, or lamp/ballast replacement
  - Replace on burnout or early replacement
  - One-for-One replacements
- Code minimum baseline (where applicable) and least efficient readily available product are used to determine baseline wattage
  - EISA requires all general service lamps sold on or after 1/1/2020 to meet efficacy requirements of 45 lm/W

Midstream Lighting

- Lamps and fixtures included:
  - Omnidirectional, directional, and decorative screw-based lamps
  - LED lamps and fixtures
  - Highbay and lowbay fixtures
  - Highbay and lowbay fixtures with integrated controls
  - Exterior area and wall pack fixtures
  - Parking garage lighting

Midstream Lighting

- Evaluation protocols
  - EDCs have the option to collect building type data or use a default HOU for all building types. This decision should be documented in the EM&V plan and handled consistently
  - Using SVG_{base} values from the TRM is acceptable for both implementation and evaluation. EDCs are encouraged to collect customer-specific controls information where feasible
  - The default baseline wattage can be used to estimate savings provided that the distributor certifies the lamp type, lamp wattage, ballast type and fixture configuration (2 lamp, 4 lamp, etc.)

Other New Measures

- HVAC
  - Computer Room Air Conditioner
  - Computer Room Air Conditioner/Handler (CRAC/H) Electronically Commutated Plug Fans
  - CRAC/H VSD on AC Fan Motors
  - Circulation Fan: High-Volume Low-Speed
- Motors and VFDs
  - ECM Circulator Pump
  - High Efficiency Pumps
- Refrigeration
  - Air-Cooled Refrigeration Condenser
  - Refrigerated Case Light Occupancy Sensor
  - Refrigeration Economizers

Other New Measures

- Appliances
  - ENERGY STAR Bathroom Ventilation Fan
- Food Service Equipment
  - ES Electric Steam Cooker
  - ES Combination Oven
  - ES Commercial Convection Oven
  - ES Commercial Fryer
  - ES Commercial Hot Food Holding Cabinet
  - ES Commercial Dishwasher
  - ES Commercial Griddle
- Consumer Electronics
  - ES Servers (moved from Miscellaneous)
  - Server Virtualization

Other New Measures

- Compressed Air
  - Variable-Speed Drive Air Compressor
  - Compressed Air Controller
  - Compressed Air Low Pressure Drop Filters
  - Compressed Air Mist Eliminators
- Miscellaneous
  - High Efficiency Transformer
  - Engine Block Heat Timer
  - High Frequency Battery Chargers

NON-RESIDENTIAL TRM UPDATES: DELETED MEASURES

Deleted Measures

- 3.1.4 Traffic Lights
- 3.7.5 Refrigerated Beverage Machine
- 3.4.5 Fuel Switching: Heat Pump Water Heaters to Gas/Oil/Propane

NON-RESIDENTIAL TRM UPDATES: Q & A

2021 TRM TIMELINE

2021 TRM TIMELINE: PRELIMINARY RECOMMENDATION FOR ANNUAL LIMITED REVIEW

Preliminary Recommendation: Annual TRM Limited Review

- A five-year fixed TRM can become misaligned with codes, standards, and the marketplace.
- Full annual updates are cumbersome.
- An annual review limited to codes & standards updates provides a compromise.

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Preliminary Recommendation: Annual TRM Limited Review

- Code and standard changes could include:
  - IECC
  - Federal standards
  - ENERGY STAR specifications
- Potential upcoming changes are generally known about well before they are enacted.
- Defined triggers, based on estimated impacts, would determine whether a particular measure would be updated, or whether any updates will be made in a program year.

Preliminary Recommendation: Annual TRM Limited Review

Date of Program Year	Action
March 15	SWE memo analyzing impact of code or standards changes will be delivered to PUC.
April 15	PUC will determine if a simple update is warranted or if a traditional Order and comment process is required.
July 1	Codes and standards must be in effect by this date.
July 15	Tentative TRM Order and Manual on Public Meeting Agenda
July 15 – November 1	Comment and review process
November 1	Final TRM Order and Manual on Public Meeting Agenda

Timeline for 2021 TRM Updates

Date	Item
March 28, 2019	Tentative 2021 TRM Order and Manual on Public Meeting Agenda
April 13, 2019	Tentative 2021 TRM Order and Manual entered into the PA Bulletin
May 3, 2019	Tentative 2021 TRM Order and Manual comments due
May 20, 2019	Tentative 2021 TRM Order and Manual reply comments due
July 11, 2019	Final 2021 TRM Order and Manual on Public Meeting Agenda