Measure	Measure name	Parameter
PSD2.1.1	Standard Lighting	CFL - lighting coincidence factor
PSD2.1.1	Standard Lighting	H - Facility lighting hours of use
PSD2.1.1	Standard Lighting	Sector (C&I, Residential)
PSD2.1.1	Standard Lighting	Baseline equipment
PSD2.1.1	Standard Lighting	Energy efficient equipment
PSD2.1.1	Standard Lighting	Energy efficient equipment
PSD2.1.1	Standard Lighting	CFL - lighting coincidence factor
PSD2.1.1	Standard Lighting	CF_os- Occupancy sensor coincidence factor
PSD2.1.1	Standard Lighting	H - Facility lighting hours of use

PSD2.1.1	Standard Lighting	LPD- lighting power density, Watt/ft2
PSD2.1.1	Standard Lighting	N - Number of different fixture types with occupancy sensors
PSD2.1.1	Standard Lighting	O_n - Quantity of fixtures of type N that have occupancy sensors
PSD2.1.1	Standard Lighting	S_os- Energy savings from occupancy sensors, if applicable
PSD2.1.1	Standard Lighting	W_allowance - baseline W for exterior fixture lighting power
PSD2.1.1	Standard Lighting	Occupancy sensor savings fraction
PSD2.1.1	Standard Lighting	W_allowance - baseline W for exterior fixture lighting power
PSD2.1.1	Standard Lighting	S
PSD2.1.1	Standard Lighting	S_os
PSD2.1.1	Standard Lighting	S_c
PSD2.1.1	Standard Lighting	Annual oil savings
PSD2.1.1	Standard Lighting	Annual gas savings

PSD2.1.1	Standard Lighting	kW(summer)
PSD2.1.1	Standard Lighting	kW(winter)
PSD2.1.1	Standard Lighting	Occupancy sensor savings fraction
PSD2.1.1	Standard Lighting	Annual Natural Gas Savings
PSD2.1.1	Standard Lighting	Annual Oil Gas Savings
PSD2.1.1	Standard Lighting	Coincidence factor lighting table

PSD2.1.1	Standard Lighting	Coincidence factor occupancy sensor table
PSD2.1.1	Standard Lighting	Create separate occupancy sensor measure
PSD2.1.1	Standard Lighting	Hours of Use
PSD2.1.2	Upstream Lighting	ΔW - Change in Watts
PSD2.1.2	Upstream Lighting	H - Hours of Use
PSD2.1.2	Upstream Lighting	ISR - in-service rate
PSD2.1.2	Upstream Lighting	AMMBtu - Annual heating energy interactive effects
PSD2.1.2	Upstream Lighting	Energy efficient equipment
PSD2.1.2	Upstream Lighting	ΔW - Change in Watts

PSD2.1.2	Upstream Lighting	H - Hours of Use
PSD2.1.2	Upstream Lighting	CF_s - summer lighting coincidence factor
PSD2.1.2	Upstream Lighting	CF_w - winter lighting coincidence factor
PSD2.1.2	Upstream Lighting	HVAC_int_c - HVAC interactivity multiplier, cooling
PSD2.1.2	Upstream Lighting	HVAC_int_h - HVAC interactivity multiplier, heating
PSD2.1.2	Upstream Lighting	ISR - in-service rate
PSD2.1.2	Upstream Lighting	AKWH - Annual energy savings
PSD2.1.2	Upstream Lighting	SKW - Summer Demand Savings

PSD2.1.2	Upstream Lighting	WKW - Winter Demand Savings
PSD2.1.2	Upstream Lighting	AMMBtu - Annual heating energy interactive effects
PSD2.1.2	Upstream Lighting	ΔW - Change in Watts
PSD2.1.2	Upstream Lighting	Coincidence factor lighting table
PSD2.1.2	Upstream Lighting	ΔW - Change in Watts

PSD2.2.2	Unitary AC and HP	AKWHH - Annual Electric Energy Savings (Heating)
PSD2.2.2	Unitary AC and HP	WKW - Winter Demand Savings

PSD2.2.2	Unitary AC and HP	Energy efficient equipment
PSD2.2.2	Unitary AC and HP	CFC - Seasonal Summer Cooling Coincidence Factor
PSD2.2.2	Unitary AC and HP	EERb - EER , 65,000 Btu/hr – Baseline
PSD2.2.2	Unitary AC and HP	COPb - High Temperature COP, Heat Pumps 65,000 Btu/hr – Baseline
PSD2.2.2	Unitary AC and HP	AKWHC - Annual Gross Electric Energy Savings (Cooling)

PSD2.2.2	Unitary AC and HP	AKWHH - Annual Electric Energy Savings (Heating)
PSD2.2.2	Unitary AC and HP	WKW - Winter Demand Savings
PSD2.2.2	Unitary AC and HP	CF for Multifamily application

PSD2.2.2	Unitary AC and HP	Reference
PSD2.2.3	Water and GSHP	CFH - Seasonal Summer Heating Coincidence Factor
PSD2.2.3	Water and GSHP	EERi - EER–Installed (ISO 13256-1)
PSD2.2.3	Water and GSHP	CFC - Seasonal Summer Cooling Coincidence Factor
PSD2.2.3	Water and GSHP	CFH - Seasonal Summer Heating Coincidence Factor
PSD2.2.3	Water and GSHP	EERb - EER Baseline

PSD2.2.3	Water and GSHP	COPb - High Temperature COP, Heat Pumps 65,000 Btu/hr – Baseline
PSD2.2.3	Water and GSHP	WKW - Winter Demand Savings
PSD2.2.3	Water and GSHP	CF for Multifamily application
PSD2.2.3	Water and GSHP	Reference
PSD2.2.3	Water and GSHP	Recommendation if offered as Retrofit
PSD2.2.3	Water and GSHP	Sector (C&I, Residential)

PSD2.2.3	Water and GSHP	Baseline equipment
PSD2.2.4	Dual Enthalpy	DOE-2 Model [1][2]
PSD2.2.4	Dual Enthalpy	DOE-2 Model [1][2]
PSD2.2.4	Dual Enthalpy	DOE-2 Model [1][2]

PSD2.2.4	Dual Enthalpy	ADET - Annual Differential Electrical Energy Savings per Ton
PSD2.2.4	Dual Enthalpy	Assumption
PSD2.2.5	DCV	Measure application type (Lost opportunity, Retrofit, etc.)
PSD2.2.5	DCV	Measure application type (Lost opportunity, Retrofit, etc.)

PSD2.2.9	VRF HVAC	Spreadsheet analysis
PSD2.2.9	VRF HVAC	Spreadsheet analysis
PSD2.2.9	VRF HVAC	Spreadsheet analysis
PSD2.2.9	VRF HVAC	VRF air conditioners

PSD2.2.9	VRF HVAC	Table reference
PSD2.2.9	VRF HVAC	Table 2-KK: Baseline Efficiencies
PSD2.2.9	VRF HVAC	Note [1]
PSD2.2.9	VRF HVAC	Add VRF to EUL Appendix
PSD2.2.9	VRF HVAC	Measure Description
PSD3.1.1	Standard Lighting	H, hours of operation
PSD3.1.1	Standard Lighting	CFL, Lighting Coincidence Factor
PSD3.1.1	Standard Lighting	AKWH
PSD3.1.1	Standard Lighting	Hours of Use

PSD3.1.1	Standard Lighting	Sector (C&I, Residential)
PSD3.1.1	Standard Lighting	CFL, Lighting Coincidence Factor
PSD3.1.1	Standard Lighting	Cfos, Occupancy Sensor Coincidence Factor
PSD3.1.1	Standard Lighting	0.3, Occupancy Sensor Savings Factor
PSD3.1.1	Standard Lighting	0.3, Occupancy Sensor Savings Factor

PSD4.1.1	Lighting	Retrofit & Lost Opportunity
PSD4.1.1	Lighting	CFs, summer coincidence factor
PSD4.1.1	Lighting	CFw, winter coincidence factor
PSD4.1.1	Lighting	hd, daily hours of use, by room type; or "unknown"
PSD4.1.1	Lighting	1.04; lighting interactive effect on kWh savings
PSD4.1.1	Lighting	Retrofit & Lost Opportunity
PSD4.1.1	Lighting	WattΔ = Wattpre- Wattpost
PSD4.2.2	Heat Pump	Sector (C&I, Residential)

PSD4.2.2	Heat Pump	Measure application type (Lost opportunity, Retrofit, etc.)
PSD4.2.2	Heat Pump	Baseline equipment (Lost Opportunity)
PSD4.2.2	Heat Pump	EFLHH - Heating Equivalent Full-Load Hours
PSD4.2.2	Heat Pump	HSPFb - Heating Season Performance Factor, Baseline, Representing Baseline New Model

PSD4.2.2	Heat Pump	HSPFe - Heating Season Performance Factor of Existing Unit (AHRI-Verified)
PSD4.2.2	Heat Pump	AKWHH,LostOpp

PSD4.2.2	Heat Pump	AKWHH,Retire
PSD4.2.2	Heat Pump	AMMBTUH,Retire

PSD4.2.2	Heat Pump	WKW - Winter Demand Savings
PSD4.2.2	Heat Pump	EUL
PSD4.2.2	Heat Pump	AMMBTUH,Retire

PSD4.2.3	Geothermal HP	Sector (C&I, Residential)
PSD4.2.3	Geothermal HP	Baseline equipment
PSD4.2.3	Geothermal HP	AKWHH - Annual Heating Energy Savings
PSD4.2.3	Geothermal HP	AKWHC - Annual Cooling Energy Savings
PSD4.2.3	Geothermal HP	Sector (C&I, Residential)
PSD4.2.3	Geothermal HP	Measure application type (Lost opportunity, Retrofit, etc.)

PSD4.2.3	Geothermal HP	Energy efficient equipment
PSD4.2.3	Geothermal HP	AHCDH - Annual Heating Energy Usage per Ton
PSD4.2.3	Geothermal HP	AHB - Annual Heating Energy Usage, Baseline
PSD4.2.3	Geothermal HP	AHi - Annual Heating Energy Usage, Installed
PSD4.2.3	Geothermal HP	ACCDH - Annual Cooling Energy Usage per Ton
PSD4.2.3	Geothermal HP	ACi - Annual Cooling Energy Usage, Installed
PSD4.2.3	Geothermal HP	ACb - Annual Cooling Energy Usage, Baseline
PSD4.2.3	Geothermal HP	CFC - Coincidence Factor, Residential Cooling
PSD4.2.3	Geothermal HP	EFLHH - Effective Full Load Hours - Heating
PSD4.2.3	Geothermal HP	EFLHC - Effective Full Load Hours - Cooling

PSD4.2.3	Geothermal HP	COPb - Baseline COP
PSD4.2.3	Geothermal HP	COPCDH - EER Used to Model Consumption in the CDH Study
PSD4.2.3	Geothermal HP	EERCDH - EER Used to Model Consumption in the CDH Study
PSD4.2.3	Geothermal HP	EERb - Baseline EER
PSD4.2.3	Geothermal HP	SKWCHD - Summer kW per Ton
PSD4.2.3	Geothermal HP	AKWHC - Annual Cooling Energy Savings
PSD4.2.3	Geothermal HP	AKWHH - Annual Heating Energy Savings
PSD4.2.3	Geothermal HP	AKWHC - Annual Cooling Energy Savings

PSD4.2.3	Geothermal HP	AKWHH - Annual Heating Energy Savings
PSD4.2.3	Geothermal HP	AMMBTUH - Annual Heating Fossil Fuel Savings
PSD4.2.3	Geothermal HP	SKWC - Summer Seasonal Demand Savings
PSD4.2.3	Geothermal HP	WKWH - Winter Seasonal Demand Savings

PSD4.2.3	Geothermal HP	SKWC - Summer Seasonal Demand Savings
PSD4.2.3	Geothermal HP	WKWH - Winter Seasonal Demand Savings
PSD4.2.6	Ductless HP	Baseline equipment (Lost Opportunity)
PSD4.2.6	Ductless HP	HSPFB - Heating Season Performance Factor, Baseline
PSD4.2.6	Ductless HP	SEERB - Seasonal Energy Efficiency Ratio, Baseline
PSD4.2.6	Ductless HP	WCF - Winter Coincidence Factor

PSD4.2.6	Ductless HP	AKWHH
PSD4.2.6	Ductless HP	WKW

PSD4.2.6	Ductless HP	WKW
PSD4.2.6	Ductless HP	Baseline equipment (Retrofit)
PSD4.2.6	Ductless HP	Energy efficient equipment (Lost Opportunity)

PSD4.2.6	Ductless HP	SCF - Summer Coincidence Factor
PSD4.2.6	Ductless HP	WCF - Winter Coincidence Factor
PSD4.2.6	Ductless HP	AKWHH

PSD4.2.6	Ductless HP	WKW
PSD4.2.6	Ductless HP	AKWHH

PSD4.2.9	Duct Insulation	DIH
PSD4.2.9	Duct Insulation	DIC
PSD4.2.14	Wi-Fi Thermostat	Energy efficient equipment
PSD4.2.14	Wi-Fi Thermostat	Capacity_h_in - heating capacity, input Btu/hr
PSD4.2.14	Wi-Fi Thermostat	Capacity_h_out - heating capacity, output Btu/hr
PSD4.2.15	Wi-Fi Thermostat	Eff_cooling - Cooling system efficiency, SEER

PSD4.2.14	Wi-Fi Thermostat	From table 4-RR
PSD4.2.15	Wi-Fi Thermostat	From table 4-SS
PSD4.2.16	Wi-Fi Thermostat	From table 4-SS
PSD4.2.14	Wi-Fi Thermostat	Energy Savings Factor
PSD4.2.14	Wi-Fi Thermostat	Title
PSD4.2.14	Wi-Fi Thermostat	Baseline equipment

PSD4.2.14	Wi-Fi Thermostat	Energy efficient equipment
PSD4.2.14	Wi-Fi Thermostat	Deemed savings
PSD4.2.14	Wi-Fi Thermostat	Cooling capacity
PSD4.2.14	Wi-Fi Thermostat	Heating capacity
PSD4.2.14	Wi-Fi Thermostat	Cooling efficiency
PSD4.2.14	Wi-Fi Thermostat	Heating efficiency
PSD4.2.14	Wi-Fi Thermostat	Energy Savings Factor for cooling

PSD4.2.14	Wi-Fi Thermostat	Energy Savings Factor for heating
PSD4.2.14	Wi-Fi Thermostat	Central electric cooling flag
PSD4.2.14	Wi-Fi Thermostat	Central electric heating flag
PSD4.2.14	Wi-Fi Thermostat	Central gas heating flag
PSD4.2.14	Wi-Fi Thermostat	Central oil heating flag
PSD4.2.14	Wi-Fi Thermostat	Central propane heating flag
PSD4.2.14	Wi-Fi Thermostat	AKWH_C - Annual gross electric energy savings, cooling
PSD4.2.14	Wi-Fi Thermostat	AKWH_H - Annual gross electric energy savings, heating
PSD4.2.14	Wi-Fi Thermostat	AKWH_H-ER - Annual gross electric energy savings- electric resistance heating
PSD4.2.14	Wi-Fi Thermostat	AKWH_H-HP - Annual gross electric energy savings- heat pump
PSD4.2.14	Wi-Fi Thermostat	AKWH_H-GHP - Annual gross electric energy savings -
PSD4.2.14	Wi-Fi Thermostat	ACCF_H - Annual gross natural gas energy savings - heating
PSD4.2.14	Wi-Fi Thermostat	AGO_H - Annual gross oil energy savings - heating
PSD4.2.14	Wi-Fi Thermostat	AGP_H - Annual gross propane energy savings - heating

PSD4.2.14	Wi-Fi Thermostat	PD_H - Gas peak day savings
PSD4.2.14	Wi-Fi Thermostat	Capacity_c - cooling capacity, ton/unit
PSD4.2.14	Wi-Fi Thermostat	Capacity_h_in - heating capacity, input Btu/hr
PSD4.2.14	Wi-Fi Thermostat	Capacity_h_out - heating capacity, output Btu/hr
PSD4.2.14	Wi-Fi Thermostat	Eff_cooling - Cooling system efficiency, SEER
PSD4.2.14	Wi-Fi Thermostat	HSPF - Heat pump seasonal performance factor
PSD4.2.14	Wi-Fi Thermostat	EFLH_cooling - cooling equivalent full load hours
PSD4.2.14	Wi-Fi Thermostat	EFLH_heating - heating equivalent full load hours
PSD4.2.14	Wi-Fi Thermostat	ESF_cooling - energy savings factor for cooling

PSD4.2.14	Wi-Fi Thermostat	ESF_heating - energy savings factor for heating
PSD4.2.14	Wi-Fi Thermostat	F_CEC - central electric cooling flag
PSD4.2.14	Wi-Fi Thermostat	F_EH - central electric heating flag
PSD4.2.14	Wi-Fi Thermostat	F_GH - central gas heating flag
PSD4.2.14	Wi-Fi Thermostat	F_OH - central oil heating flag
PSD4.2.14	Wi-Fi Thermostat	F_PH - central propane heating flag
PSD4.2.14	Wi-Fi Thermostat	From table 4-RR
PSD4.2.14	Wi-Fi Thermostat	From table 4-SS
PSD4.2.14	Wi-Fi Thermostat	From table 4-SS

PSD4.2.14	Wi-Fi Thermostat	From table 4-SS
PSD4.2.14	Wi-Fi Thermostat	PD_H
PSD4.2.14	Wi-Fi Thermostat	Deemed savings values
PSD4.2.14	Wi-Fi Thermostat	Energy Savings Factor
PSD4.2.14	Wi-Fi Thermostat	Heating System Capacity and Efficiency
PSD4.2.14	Wi-Fi Thermostat	Cooling system capacity and efficiency
PSD4.2.14	Wi-Fi Thermostat	Shares of buildings with different AC and fuel types
PSD4.2.15	Clean, Tune and Test	HF

PSD4.2.15	Clean, Tune and Test	Energy savings
PSD4.2.15	Clean, Tune and Test	AFUEE

PSD4.2.15	Clean, Tune and Test	A
PSD4.2.15	Clean, Tune and Test	AFUE
PSD4.2.15	Clean, Tune and Test	HF
PSD4.3.1	Res Appliances	Baseline equipment
PSD4.3.1	Res Appliances	Energy efficient equipment
PSD4.3.1	Res Appliances	Clothes Dryer (ENERGY STAR)
PSD4.3.1	Res Appliances	Clothes Dryer (Hybrid)

PSD4.3.1	Res Appliances	Clothes Dryer (Heat Pump)
PSD4.3.1	Res Appliances	Room Air Conditioner
PSD4.3.1	Res Appliances	Air Cleaner/Purifier
PSD4.3.1	Res Appliances	Clothes Dryer (ENERGY STAR)
PSD4.3.1	Res Appliances	Clothes Dryer (Hybrid)
PSD4.3.1	Res Appliances	Clothes Dryer (Heat Pump)

PSD4.3.1	Res Appliances	Refrigerator Tier I (10% greater than ENERGY STAR)
PSD4.3.1	Res Appliances	Refrigerator Tier II (15% greater than ENERGY STAR)
PSD4.3.1	Res Appliances	Dehumidifier
PSD4.3.1	Res Appliances	Ref [1]
PSD4.3.1	Res Appliances	Ref [4]
PSD4.3.1	Res Appliances	Ref [5]
PSD4.3.1	Res Appliances	Savings Potentials

PSD4.3.2	Electronics	AKWH
PSD4.3.2	Electronics	AKWH
PSD4.3.2	Electronics	AKWH
PSD4.3.2	Electronics	demand savings

PSD4.3.2	Electronics	Ref[1]
PSD4.3.2	Electronics	Ref[2]
PSD4.4.3	Wind Glass Door Replace	AEC - Annual Electric Cooling Usage
PSD4.4.3	Wind Glass Door Replace	AEH - Annual Electric Heating Usage
PSD4.4.3	Wind Glass Door Replace	AGU - Annual Natural Gas Usage
PSD4.4.3	Wind Glass Door Replace	AOU - Annual Oil Usage
PSD4.4.3	Wind Glass Door Replace	APU - Annual Propane Usage
PSD4.4.3	Wind Glass Door Replace	AKWH - Annual electric energy savings

PSD4.4.3	Wind Glass Door Replace	WKW, SKW - winter & summer demand savings
PSD4.4.4	Thermal Enclosure	Sector (C&I, Residential)
PSD4.4.4	Thermal Enclosure	Measure application type (Lost opportunity, Retrofit, etc.)
PSD4.4.4	Thermal Enclosure	Baseline equipment

PSD4.4.4	Thermal Enclosure	Baseline equipment
PSD4.4.4	Thermal Enclosure	Energy efficient equipment
PSD4.4.4	Thermal Enclosure	Savings Methodology
PSD4.4.4	Thermal Enclosure	REMSKW
PSD4.4.4	Thermal Enclosure	SKW - Summer Demand Savings
PSD4.4.4	Thermal Enclosure	WKW - Winter Demand Savings
PSD4.4.4	Thermal Enclosure	AKWHH - Annual Electric Energy Savings, Heating

PSD4.4.4	Thermal Enclosure	Annual Natural Gas/Oil/Propane savings
PSD4.4.4	Thermal Enclosure	SkW - Summer Demand Savings (kW), WkW - Winter Demand Savings (kW)
PSD4.4.4	Thermal Enclosure	Reference [1]
PSD4.4.4	Thermal Enclosure	EUL
PSD4.4.4	Thermal Enclosure	Update modeling software to reflect multifamily building baseline insulation standards.

PSD4.4.5	Storm Window	Energy efficient equipment
PSD4.4.5	Storm Window	Annual Electric Energy Usage
PSD4.4.6	Insulate Attic Openings	Baseline equipment

PSD4.4.6	Insulate Attic Openings	Infitration reduction savings
PSD4.4.6	Insulate Attic Openings	blower door reduction (Measure 4.4.4)
PSD4.4.6	Insulate Attic Openings	Dh, Dw
PSD4.4.6	Insulate Attic Openings	EF - Heating System Efficiency

PSD4.4.6	Insulate Attic Openings	HDD - Heating Degree Days
PSD4.4.6	Insulate Attic Openings	PDH - Peak Day Savings - Heating
PSD4.4.6	Insulate Attic Openings	ABTUConductive,Re, Ri
PSD4.4.6	Insulate Attic Openings	ABTUInfiltration
PSD4.4.6	Insulate Attic Openings	ACCFH,AOGH, APGH
PSD4.4.6	Insulate Attic Openings	ABTUConductive - Attic Hatch
PSD4.4.6	Insulate Attic Openings	Winter Peak Demand Savings
PSD4.4.6	Insulate Attic Openings	Not allowed for multifamily

Current PSD Value	Recommended Value
Varies by building type. See PSD Table A-1-1.	0.80 summer, 0.61 winter
Site specific, or as tabulated in A5-1	Update table A5-1 based on forthcoming evaluation
C&I	C&I
Energy code baseline	Energy code baseline, using either Space-By-Space method or Building Area method
Exceeds current energy code	Exceeds current energy code with DLC- or EnergyStar-approved lighting equipment
Exceeds current energy code	Update efficacy based on forthcoming NMR Retail Lighting Study.
Varies by building type. See PSD Table A-1-1.	0.80 summer, 0.61 winter
Varies by building type. See PSD Table A-1-1.	Create separate measure for Occupancy Sensor
Site specific, or as tabulated in A5-1	Update table A5-1 based on forthcoming evaluation

Varies by site; baselines by building area method in table 2-D per IECC 2015	Varies by site; baselines by building area method in table 2-D per IECC 2018 for 2021 PSD Update. Specify that the space-by-space method may also be used (IECC 2018 C405.3.2(2)) for 2021 PSD Update.
Varies by site	Create separate measure for Occupancy Sensor
Varies by site	Create separate measure for Occupancy Sensor
Varies by site	Create separate measure for Occupancy Sensor
Not included	Include in nomenclature
0.3	Create separate measure for Occupancy Sensor
As tabulated per 2-E, 2-F, and 2-G, based on IECC 2015	As tabulated per 2-E, 2-F, and 2-G, based on IECC 2018 (for PSD 2021 update)
S = S_lpd + S_os + S_hw + S_c	S_int = S_lpd + S_hw + S_c
S_os = 0.3 x H / 1000 x Σ(O_n x W_n)	Create separate measure for Occupancy Sensor
S_c = (S_lpd + S_os + S_hw) x F / COP	S_c = (S_lpd + S_hw) x F / COP
-0.0007129 MMBtu/kWh saved	-0.000162279 MMBtu/kWh saved
-0.000175 MMBtu/kWh saved	-0.000162279 MMBtu/kWh saved

kW(summer) = ((CF_L x (Allowable LPD - Actual LPD) x A) + (CF_os x Σ(O_n x W_n))/1000 + (CF_hw x ΣDeltaW_hw)/1000) x (1 + G / COP)	kW(summer) = ((CF_L x (Allowable LPD - Actual LPD) x A) + (CF_hw x ΣDeltaW_hw)/1000) x (1 + G / COP)
kW(winter) = ((CF_L x (Allowable LPD - Actual LPD) x A) + (CF_os x Σ(O_n x W_n))/1000 + (CF_hw x ΣDeltaW_hw)/1000)	kW(winter) = ((CF_L x (Allowable LPD - Actual LPD) x A) + (CF_hw x ΣDeltaW_hw)/1000)
D. Maniccia, B. Von Neida, and A. Tweed. An analysis of the energy and cost savings potential of occupancy sensors for commercial lighting systems, Illuminating Engineering Society of North America 2000 Annual Conference: Proceedings. IESNA: New York, NY, pp. 433-459.	DNV KEMA (2014) Retrofit Lighting Controls Measures Summary of Findings FINAL REPORT. Pg 5-26, table 12
Massachusetts Technical Reference Manual, 2012 Program Year, p. 170.	DNV GL (2017). Impact Evaluation of PY2015 Massachusetts Commercial and Industrial Upstream Lighting Initiative. DNVGL_2017_Upstream_Lighting_Impact_Evaluation
Massachusetts Technical Reference Manual, 2012 Program Year, p. 170.	DNV GL (2017). Impact Evaluation of PY2015 Massachusetts Commercial and Industrial Upstream Lighting Initiative. DNVGL_2017_Upstream_Lighting_Impact_Evaluation
RLW, Coincidence Factor Study Residential and Commercial Industrial Lighting Measures, Spring 2007. (NH)	DNV GL (2017). Impact Evaluation of PY2015 Massachusetts Commercial and Industrial Upstream Lighting Initiative. DNVGL_2017_Upstream_Lighting_Impact_Evaluation

RLW, Coincidence Factor Study Residential and Commercial Industrial Lighting Measures, Spring 2007. (NH)	The Cadmus Group (2012). Final Report, Small Business Direct Install Program: Pre/Post Occupancy Sensor Study. CADMUS_2012_SBDI_PrePostLightingControl_Final. http://ma-eeac.org/wordpress/wp-content/uploads/Massachusetts-Small-Business-Direct-Install_2010-2012-Impact-Evaluations-1.29.13.pdf
NA	Create separate occupancy measure
6388 for Multifamily	5,950 for Multifamily
Varies by technology- see Table 2-J	Update Table 2-J to match MA evaluated results- See 2.1.2 Tables. Fixtures that were not included in the MA evaluation use previous CT TRM values until CT-specific evaluation results are available.
Varies by site - See A5-1	Update A5-1 table based on forthcoming evaluation
Not currently in algorithm. Would vary by technology as shown in MA evaluation results table 1-4	Add Installation Rate by technology type as shown in table
Not currently in algorithm.	AMMBtu = AKWH x HVAC_int_h
Not defined specifically, but given as a deemed ΔW depending on the product	ENERGY STAR or DLC-certified lighting products
Varies by technology- see Table 2-J	Update Table 2-J to match MA evaluated results- See 2.1.2 Tables. Fixtures that were not included in the MA evaluation use previous CT TRM values until CT-specific evaluation results are available.

Varies by site - See A5-1	Update A5-1 table based on forthcoming evaluation
Varies by site- See A1-1	0.80 summer
Varies by site- See A1-1	0.61 winter
Not currently in algorithm. Would vary by technology as shown in MA evaluation results table 1-4	Add HVAC_int_c by technology type as shown in table
Not currently in algorithm.	-0.000329
Not currently in algorithm. Would vary by technology as shown in MA evaluation results table 1-4	Add Installation Rate by technology type as shown in table
AKWH = N x ΔW x H / 1000	Update- if using MA evaluated results, could keep the delta W value and use CT-specific hours results from CT evaluation. However, will need to include a cooling interactive effect multiplier- recommend as shown in MA table under "hvac Interactive effect". AKWH = N x ΔW x H x HVAC_int x ISR / 1000
SKW = N x ΔW x CF_s / 1000	SKW = N x ΔW x CF_s x ISR / 1000

WKW = N x ΔW x CF_w / 1000	WKW = N x ΔW x CF_w x ISR / 1000
Not currently in algorithm.	AMMBtu = AKWH x HVAC_int_h
C&I Upstream Lighting Program. Mass Saves. Available at: https://www.masssave.com/en/learn/partners/upstream-lighting/. Last accessed Mar. 20, 2019.	Source: Impact Evaluation of PY2015 Massachusetts Commercial and Industrial Upstream Lighting Initiative, Prepared by DNV-GL for MA PAs and MA EEAC
RLW, Coincidence Factor Study Residential and Commercial Industrial Lighting Measures, Spring 2007. (NH)	DNV GL (2017). Impact Evaluation of PY2015 Massachusetts Commercial and Industrial Upstream Lighting Initiative. DNVGL_2017_Upstream_Lighting_Impact_Evaluation
C&I Upstream Lighting Program. Mass Saves. Available at: https://www.masssave.com/en/learn/partners/upstream-lighting/. Last accessed Mar. 20, 2019.	Source: Impact Evaluation of PY2015 Massachusetts Commercial and Industrial Upstream Lighting Initiative, Prepared by DNV-GL for MA PAs and MA EEAC

AKWHH = EFLHH * CAPH * (1/HSPFb - 1/HSPFi) * (1/1000)	AKWHH = EFLHH * CAPH * (1/HSPFb - 1/HSPFi) * (1/1000) If heating efficiency is in COP: AKWHH = EFLHH * CAPH * (1/COPb - 1/COPi) * (1/1000) * (1/3.412) CAPH = 0.9 * CAPC for non cold-climate ASHP units AND supplemental heating source is present CAPH = 1.0 * CAPC for cold-climate ASHP units where, CAPC = Cooling Capacity of efficient ASHP unit (kBtu/h)
WKW = 0	WKW = 0 if installed unit is a unitary AC or non-ccASHP WKW = CAPH,5F * (1 - 1/COPH,5F) *(12/3.412) * CFH if installed unit is ccASHP where, CAPH,5F = Heating capacity of installed ccASHP at 5F (kBtu/h) COPH,5F = Coefficient of performance of installed ccASHP at 5F 12 = Conversion factor from kBtu/h to kW 3.412 = Conversion factor from COP to HSPF CFH = Winter coincidence factor (Heating) = 0.74 (DMSHP) CT PSD

High-efficiency Direct-Expansion (“DX”) unitary or split cooling system or air-source heat pump.	High-efficiency Direct-Expansion (“DX”) unitary or split cooling system or air-source heat pump (including cold-climate ASHP).
0.82	0.45
0	Recommend update to federal standard when more stringent.
0	Recommend update to federal standard when more stringent.

AKWHC = EFLHC * CAPC * (1/EERb - 1/EERi) * (1/1000)	AKWHC = EFLHC * CAPC * (1/EERb - 1/EERi) * (1/1000)
	
	if CAPC < 65,000 kBtu/hr:
	AKWHC = EFLHC * CAPC * (1/SEERb - 1/SEERi) * (1/1000)
	
	if CAPC > 65,000 kBtu/hr and IEER is known:
	AKWHC = EFLHC * CAPC * (1/IEERb - 1/ISEERi) * (1/1000)

AKWHH = EFLHH * CAPH * (1/HSPFb - 1/HSPFi) * (1/1000)	AKWHH = EFLHH * CAPH * (1/HSPFb - 1/HSPFi) * (1/1000) If heating efficiency is in COP: AKWHH = EFLHH * CAPH * (1/COPb - 1/COPi) * (1/1000) * (1/3.412) CAPH = 0.9 * CAPC for non cold-climate ASHP units AND supplemental heating source is present CAPH = 1.0 * CAPC for cold-climate ASHP units where, CAPC = Cooling Capacity of efficient ASHP unit (kBtu/h)
WKW = 0	WKW = 0 if installed unit is a unitary AC or non-ccASHP WKW = CAPH,5F * (1 - 1/COPH,5F) *(12/3.412) * CFH if installed unit is ccASHP where, CAPH,5F = Heating capacity of installed ccASHP at 5F (kBtu/h) COPH,5F = Coefficient of performance of installed ccASHP at 5F 12 = Conversion factor from kBtu/h to kW 3.412 = Conversion factor from COP to HSPF CFH = Winter coincidence factor (Heating) = 0.74 (DMSHP) CT PSD
0.82	0.59

Appendix One	CFc ; ADM Associates, Inc., Residential Central A/C Regional Evaluation: Final Report, Nov. 2009, Table 4-17, CT weighted average. Winter seasonal peak CF is assumed to be zero.
0.82	0.45
Varies per equipment	Varies per equipment - Recommend additional language around application of the variable EER.
0.82	0.45
0.82	0.45
0	No change in values. Update reference to IECC 2018 when CT adopts new code.

0	Ground Water Heat Pump COPb = 3.7 to align with 2015 IECC. Update IECC 2018 when CT adopts new code.
WKWH = CAPH * (1/COPb - 1/COPi) *CFH * (1/3.412) * (1/1000)	WKWH = CAPH * (1/COPb - 1/COPi) *CFH * (1/3.412) * (1/1000) WKWH = 0 if supplemental heating system is present or if boiler-fed hot water loop supplies heating side of WSHP
CF_c = 0.82 CF_h = 0.82	CFc (MF) = 0.59 CFh (MF)= 1.00
CF_c: RLW, Final Report, 2005 Coincidence Factor Study, Jan. 4, 2007, Table 5. CF_h: "The seasonal coincidence factor is assumed to be the same as the summer factor = 0.82"	Appendix One
Not offered	Installation of WSHP or GSHP will rarely replace existing, less efficient WSHP or GSHP. Consider expanding savings estimations to accommodate for replacement scenario of alternate HVAC system to more accurately quantify savings and to not leave savings on the table
C&I	C&I

Code compliant HP unit of same type as efficient unit	Code compliant HP unit of same type as efficient unit
DOE-2 Model	Consider updating the deemed values to NY TRM values for Poughkeepsie which are based on DOE2-2 model
DOE-2 Model	Consider updating the deemed values to NY TRM values for Poughkeepsie which are based on DOE2-2 model
DOE-2 Model	Consider updating the deemed values to NY TRM values for Poughkeepsie which are based on DOE2-2 model

276	Consider updating the deemed values to NY TRM values for Poughkeepsie which are based on DOE2-2 model
Based on weather for Hartford CT	Consider using outside temperature data for one coastal (Bridgeport) and one non-coastal (Hartford) city.
Lost opportunity	Lost opportunity & Retrofit
Lost opportunity	Lost opportunity & Retrofit

Savings are custom calculated using a temperature BIN model.	Modify the tool to be able to use it for water-cooled systems.
Spreadsheet analysis used by Eversource	Ensure that both utilities use the tool for consistency
Algorithms not listed in PSD	List algorithms in PSD
Minimum efficiency values for VRF air conditioners are not listed in PSD	List the miniumum efficiency values for cooling-only VRF air conditioners in the PSD

The calculation is performed once for the VRF meeting the baseline efficiencies, Table 2-II, and again for the proposed VRF, and the difference determines the kWh and kW savings for each period.	Replace the Table 2-II with Table 2-KK in the sentence.
For systems over 65,000 btu/h and under 135,000 btu/h, the EER values with and without heat recovery in cooling mode are listed as 11.0 and 10.8. The IEERs are listed as 14.6 and 14.4, but are incorrectly labeled as EER instead of IEER.	Correct the table to note IEER instead of EER.
Table 3-II above is based on the 2016 ASHRAE Code, Table 6.8.1-10.	Replace the Table 3-II with Table 2-KK. Update the code to ASHRAE 2019.
15	15
Excludes multifamily	Remove exclusion of MF applications
If available, varies per site	Varies per site
Varies by building type. See PSD Table A-1-1.	0.80 summer, 0.61 winter
AKWH = Sr + Sos + Sc = [(kWb- kWa)xH] + [0.3H/1000xΣOnWn] + [(Sr+Sos)xF/COP]	AKWH = Sr + Sc = [(kWb- kWa)xH] + [(Sr+Sos)xF/COP]
6388 for Multifamily	5,950 for Multifamily

C&I	C&I
Varies by building type. See PSD Table A-1-1.	0.80 summer, 0.61 winter
Varies by building type. See PSD Table A-1-1.	Create separate measure for Occupancy Sensor
0.3	0.28
0.3	0.28

Retrofit & Lost Opportunity	Retrofit
0.13	0.13
0.2	0.2
See table on Supporting Info	See table on Supporting Info
1.04	1.04
Retrofit & Lost Opportunity	Retrofit
24 if unknown pre and post, for a light bulb 26.3 if unknown pre and post, luminaire	25 if unknown pre and post, for a light bulb 26.3 if unknown pre and post, luminaire
Residential	Residential

Lost Opportunity & Retrofit	Lost Opportunity & Retrofit
IECC2015 Code compliant HP - 8.2 HSPF	IECC 2018 Code compliant HP - 8.2 HSPF
1349 hours	862 hours
8.2 HSPF	8.2 HSPF

- 6.8 HSPF for preexisting ASHP system IF actual HSPF value is not known - 3.14 HSPF if preexisting heating system was electric heat	Use site-pecific preexisting equipment HSPF value if known. If installment year of preexisting system is known use: - 6.8 HSPF if preexisting ASHP system was installed before 2006 - 7.7 HSPF if preexisting ASHP system was installed between 2006 -2014 - 8.2 HSPF if preexisting ASHP system was installed after 2015 If neither the HSPF nor installment year of preexisting system is known: - 7.7 HSPF If preexisting heating system is electric heat: - 3.14 HSPF
AKWHH,LostOpp = EFLHH * CAPH,i * (1/HSPFb - 1/HSPFi) * (1/1000)	AKWHH,LostOpp = EFLHH * CAPH,i * (1/HSPFb - 1/HSPFi) * (1/1000) CAPH,i = 0.9 * CAPC,i for non cold-climate ASHP units AND supplemental heating source is present CAPH,i = 1.0 * CAPC,i for cold-climate ASHP units where, CAPC,i = Cooling Capacity of efficient ASHP unit (kBtu/h)

	AKWHH,Retire = EFLHH * CAPH,i * (1/HSPFe - 1/HSPFi) * (1/1000) CAPH,i = 0.9 * CAPC,i for non cold-climate ASHP units AND supplemental heating source is present CAPH,i = 1.0 * CAPC,i for cold-climate ASHP units where, CAPC,i = Cooling Capacity of efficient ASHP unit (kBtu/h)
AKWHH,Retire = EFLHH * CAPH,i * (1/HSPFe - 1/HSPFi) * (1/1000)	If replacing fossil fuel equiment: (1/HSPFe) = 0
Not Defined	Fossil fuel savings: AMMBTUH = CAPH,i * EFLHH * (1/1000) * (1/AFUE) where, AMMBTUH = Annual MMBTU savings AFUE = Annual fuel utilization efficiency of replaced fossil fuel heating system (%) * Fossil fuel savings are based on pilot assumptions of the program where HP units will replace fossil fuel heat sources

WKW = 0	WKW = 0 if installed unit is a non-ccASHP WKW = CAPH,5F,i * (1 - 1/COPH,5F,i) *(12/3.412) * CFH if installed unit is ccASHP where, CAPH,5F,i = Heating capacity of installed ccASHP at 5F (kBtu/h) COPH,5F,i = Coefficient of performance of installed ccASHP at 5F 12 = Conversion factor from kBtu/h to kW 3.412 = Conversion factor from COP to HSPF CFH = Winter coincidence factor (Heating) = 0.5 in CT PSD
18 (Lost opportunity), 5 (Remaining useful life)	EUL 15
Not Defined	Fossil fuel savings: AMMBTUH = CAPH,i * EFLHH * (1/1000) * (1/AFUE) where, AMMBTUH = Annual MMBTU savings AFUE = Annual fuel utilization efficiency of replaced fossil fuel heating system (%) * Fossil fuel savings are based on pilot assumptions of the program where HP units will replace fossil fuel heat sources

Reisdential	Reisdential
EnergyStar rated Tier 1 Geothermal system	For Lost Opportunity: Code Compliant Geothermal system For retrofit: Site Specific electric cooling (CAC/HP) Site specific electric heating system (electric resistance/HP) or fossil fuel heating system (Boiler/furnace)
AKWHH = CAPi * AHCDH * ((COPCDH/COPb)-(COPCDH/COPi))	AKWHH = CAPH,i * EFLHH * (1/COPb)-(1/COPi) * (1/3.412) where, CAPH,i = installed heating capacity (kBtu/hr). Can be assumed equal to installed cooling capacity if unknown
Not defined	AKWHC = CAPC,i * EFLHC * (1/EERe)-(1/EERi) where, CAPC,i = installed cooling capacity (kBtu/hr) EERe = Energy efficiency ratio of preexisting electric cooling system
Reisdential	Reisdential
Lost Opportunity	Lost Opportunity/Retrofit

Energy Efficient GSHP system	Energy Efficient GSHP system
1569 kWh/ton/year	No longer required
Varies per equipment	No longer required
Varies per equipment	No longer required
326 kWh/ton/year	No longer required
Varies per equipment	No longer required
Varies per equipment	No longer required
0.59	0.69
Not defined	862 hours
Not defined	470 hours

Closed Loop (Water - Air) = 3.3 Closed Loop (Water - Water) = 3.0 DGX = 3.5	Closed Loop (Water - Air) = 4.7 Closed Loop (Water - Water) = 3.1 DGX = 3.5
3.9	No longer required
17.1	No longer required
Closed Loop (Water - Air) = 14.1 Closed Loop (Water - Water) = 15.1 DGX = 15.0	Closed Loop (Water - Air) = 18.0 Closed Loop (Water - Water) = 16.3 DGX = 15.0
0.71	No longer required
AKWHC = CAPi * ACCDH * ((EERCDH/EERb)-(EERCDH/EERi))	AKWHC = CAPC,i * EFLHC * (1/EERb)-(1/EERi) where, CAPC,i = installed cooling capacity (kBtu/hr)
AKWHH = CAPi * AHCDH * ((COPCDH/COPb)-(COPCDH/COPi))	AKWHH = CAPH,i * EFLHH * (1/COPb)-(1/COPi) * (1/3.412) where, CAPH,i = installed heating capacity (kBtu/hr). Can be assumed equal to installed cooling capacity if unknown
Not defined	AKWHC = CAPC,i * EFLHC * (1/EERe)-(1/EERi) where, CAPC,i = installed cooling capacity (kBtu/hr) EERe = Energy efficiency ratio of preexisting electric cooling system

Not defined	AKWHH = EFLHH * CAPH,i * (1/HSPFe - 1/HSPFi) where, CAPH,i = installed heating capacity (kBtu/hr). HSPFe = Heating seasonal performance factor of preexisting heating system if replacing electric resistance heating: HSPFe = 3.412 Btu/W-hr If replacing fossil fuel equiment: (1/HSPFe) = 0
Not defined	Fossil fuel savings: AMMBTUH = CAPH,i * EFLHH * (1/1000) * (1/AFUE) where, AMMBTUH = Annual MMBTU savings AFUE = Annual fuel utilization efficiency of replaced fossil fuel heating system (%) * Fossil fuel savings are based on pilot assumptions of the program where HP units will replace fossil fuel heat sources
SKWC = CAPi * SKWCDH * (EERCDH/EERb) - (EERCDH/EERi)) * CFC	SKWC = CAPC,i * (1/EERb - 1/EERi) * CFC where, CAPC,i = installed cooing capacity (kBtu/hr)
WKWH = CAPi * (12000/3412) * (1/COPb - 1/COPi) * CFH	WKWH = CAPH,i * (1/3.412) * (1/COPb - 1/COPi) * CFH

Not defined	SKWC = CAPC,i * (1/EERe - 1/EERi) * CFC where, CAPC,i = installed cooing capacity (kBtu/hr) EERe = Energy efficiency ratio of preexisting electric cooling system
Not defined	WKWH = CAPH,i * (1/3.412) * (1/COPe - 1/COPi) * CFH where, CAPH,i = installed heating capacity (kBtu/hr). COPe = Coefficient of performance of preexisting heating system
Code compliant DHP unit	Code compliant DHP unit
8.2	8.2
14	14
0.74	0.125

AKWHH = CAPH * (1/HSPFB - 1/HSPFi) * (1/1000)	AKWHH = EFLHH * CAPH * (1/HSPFB - 1/HSPFi) * (1/1000) CAPH = 0.9 * CAPC for non cold-climate DHP units CAPH = 1.0 * CAPC for cold-climate DHP units where, CAPC = Cooling Capacity of efficient DHP unit (kBtu/h)
WKW = CAPH * (1/HSPFB - 1/HSPFi) * WCF * (1/1000)	WKW = 0 if installed unit is a non-ccDHP WKW = CAPH,5F,i * (1 - 1/COPH,5F,i) *(12/3.412) * WCF if installed unit is ccDHP where, CAPH,5F,i = Heating capacity of installed ccDHP at 5F (kBtu/h) COPH,5F,i = Coefficient of performance of installed ccDHP at 5F 12 = Conversion factor from kBtu/h to kW 3.412 = Conversion factor from COP to HSPF WCF = Winter coincidence factor (Heating)

WKW = CAPH * (1/HSPFE - 1/HSPFi) * WCF * (1/1000)	WKW = 0 if installed unit is a non-ccDHP WKW = CAPH,5F,i * (1 - 1/COPH,5F,i) *(12/3.412) * WCF if installed unit is ccDHP where, CAPH,5F,i = Heating capacity of installed ccDHP at 5F (kBtu/h) COPH,5F,i = Coefficient of performance of installed ccDHP at 5F 12 = Conversion factor from kBtu/h to kW 3.412 = Conversion factor from COP to HSPF WCF = Winter coincidence factor (Heating)
Installation of an energy-efficient air ductless heat pump as replacement of a working electric resistance heating system.	Installation of an energy-efficient ductless air source heat pump as replacement of a working, less-efficient electric heating system, including ductless heat pumps and electric resistance heating or replacement of a fossil fuel-based heating system
Energy Efficient DHP unit	Energy Efficient DHP or ccDHP unit

0.447	0.18
0.74	0.125
AKWHH = CAPH * (1/HSPFB - 1/HSPFi) * (1/1000)	AKWHH = EFLHH * CAPH * (1/HSPFB - 1/HSPFi) * (1/1000) CAPH = 0.9 * CAPC for non cold-climate DHP units CAPH = 1.0 * CAPC for cold-climate DHP units where, CAPC = Cooling Capacity of efficient DHP unit (kBtu/h)

WKW = CAPH * (1/HSPFB - 1/HSPFi) * WCF * (1/1000)	WKW = 0 if installed unit is a non-ccDHP WKW = CAPH,5F,i * (1 - 1/COPH,5F,i) *(12/3.412) * WCF if installed unit is ccDHP where, CAPH,5F,i = Heating capacity of installed ccDHP at 5F (kBtu/h) COPH,5F,i = Coefficient of performance of installed ccDHP at 5F 12 = Conversion factor from kBtu/h to kW 3.412 = Conversion factor from COP to HSPF WCF = Winter coincidence factor (Heating)
AKWHH = CAPH * (1/HSPFE - 1/HSPFi) * (1/1000)	AKWHH = EFLHH * CAPH * (1/HSPFE - 1/HSPFi) * (1/1000) CAPH = 0.9 * CAPC for non cold-climate DHP units AND supplemental heating source is present CAPH = 1.0 * CAPC for cold-climate DHP units where, CAPC = Cooling Capacity of efficient DHP unit (kBtu/h) If replacing fossil fuel equiment: (1/HSPFE) = 0

Tables 4-EE and 3	Tables 4-DD and 4-EE
Tables 4-EE and 3	Tables 4-DD and 4-EE
Wi-Fi Thermostat	Energy Star Qualified Learning thermostat
Not currently in PSD	By site, or 132,500 Btu/hr based on results from R1614-1613 Residential HVAC Impact Evaluation
Not currently in PSD	By site, or 112,600 Btu/hr based on results from R1614-1613 Residential HVAC Impact Evaluation
Not currently in PSD	By site, or 14.0 SEER based on 10 CFR 430.32 (c)(1)

From table 4-RR	AKWH = (Capacity_c x (12 / Eff_cooling) x EFLH_cooling x ESF_cooling x F_CEC) + (Capacity_h_out x (1 / HSPF) x EFLH_heating x ESF_heating x F_EH)
From table 4-SS	ACCF_H = (Capacity_h_in x 1/102900 x EFLH_heating x ESF_heating x F_GH)
From table 4-SS	AGO_H = (Capacity_h_in x 1/138690 x EFLH_heating x ESF_heating x F_OH)
Not currently in PSD	ENERGY STAR® Program Requirements Product Specification for Connected Thermostat Products, Eligibility Criteria Version 1.0, January 2017, pg. 10
Wi-Fi Thermostat	Learning Thermostat
Existing thermostat	Existing manual or programmable thermostat

Wi-Fi Thermostat	Energy Star Qualified Learning thermostat
See Tables 4-RR and 4-SS on 4.2.14 tables	Single-line calculation
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	Default value from table

Not currently in PSD	Default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Not currently in PSD	By site, or default value from table
Varies by site as shown in Table 4-RR	Calculate using single-line savings calculation. Combine all AKWH_* variables into one AKWH
Varies by site as shown in Table 4-RR	Calculate using single-line savings calculation. Combine all AKWH_* variables into one AKWH
Varies by site as shown in Table 4-RR	Calculate using single-line savings calculation. Combine all AKWH_* variables into one AKWH
Varies by site as shown in Table 4-RR	Calculate using single-line savings calculation. Combine all AKWH_* variables into one AKWH
Varies by site as shown in Table 4-RR	Calculate using single-line savings calculation. Combine all AKWH_* variables into one AKWH
Varies by site as shown in Table 4-SS	Calculate using single-line savings calculation
Varies by site as shown in Table 4-SS	Calculate using single-line savings calculation
Varies by site as shown in Table 4-SS	Calculate using single-line savings calculation

Varies by program type	By site, based on gas savings
Not currently in PSD	By site, or default 2.8 tons based on R8 Central AC Impact and Process Evaluation
Not currently in PSD	By site, or 132,500 Btu/hr based on results from R1614-1613 Residential HVAC Impact Evaluation
Not currently in PSD	By site, or 112,600 Btu/hr based on results from R1614-1613 Residential HVAC Impact Evaluation
Not currently in PSD	By site, or 14.0 SEER based on 10 CFR 430.32 (c)(1)
Not currently in PSD	By site, or 8.2 HSPF based on 10 CFR 430.32 (c)(1) for heat pumps, or 3.4 HSPF for electric resistance systems
Not currently in PSD	804 hr/yr, based on annual savings and seasonal demand savings factor results from R8 Central AC Impact and Process Evaluation
Not currently in PSD	842 hr/yr, based on average of boiler and furnace heating EFLH from R1614-1613 Residential HVAC Impact Evaluation
Not currently in PSD	Interim value of 0.1 based on ENERGY STAR® Program Requirements Product Specification for Connected Thermostat Products, Eligibility Criteria Version 1.0, January 2017, pg. 10. Recommend CT-specific program evaluation to determine an updated ESF

Not currently in PSD	Interim value of 0.08 based on ENERGY STAR® Program Requirements Product Specification for Connected Thermostat Products, Eligibility Criteria Version 1.0, January 2017, pg. 10. Recommend CT-specific program evaluation to determine an updated ESF
Not currently in PSD	1.0 for central cooling; 0 for no central cooling; 0.277 for unknown based on 2015 RECS data for New England
Not currently in PSD	1.0 for electric heat; 0 for no electric heat; 0.06 for unknown based on 2015 RECS data for New England
Not currently in PSD	1.0 for gas heat; 0 for no gas heat; 0.34 for unknown based on 2015 RECS data for New England
Not currently in PSD	1.0 for oil heat; 0 for no oil heat; 0.42 for unknown based on 2015 RECS data for New England
Not currently in PSD	1.0 for propane heat; 0 for no propane heat; 0.08 for unknown based on 2015 RECS data for New England
From table 4-RR	AKWH = (Capacity_c x (12 / Eff_cooling) x EFLH_cooling x ESF_cooling x F_CEC) + (Capacity_h_out x (1 / HSPF) x EFLH_heating x ESF_heating x F_EH)
From table 4-SS	ACCF_H = (Capacity_h_in x 1/102900 x EFLH_heating x ESF_heating x F_GH)
From table 4-SS	AGO_H = (Capacity_h_in x 1/138690 x EFLH_heating x ESF_heating x F_OH)

From table 4-SS	AGP_H = (Capacity_h_in x 1/91330 x EFLH_heating x ESF_heating x F_PH)
0.295 ccf for direct install; 0.119 ccf for midstream	PD_H = 0.00977 x ACCF_H
The Cadmus Group, Inc. "Wi-Fi Programmable Thermostat Pilot Program Evaluation – Part of the Massachusetts 2011 Residential Retrofit and Low-Income Program Area Evaluation," Sep. 2012.	Remove reference
Not currently in PSD	ENERGY STAR® Program Requirements Product Specification for Connected Thermostat Products, Eligibility Criteria Version 1.0, January 2017, pg. 10
Not currently in PSD	R1614-1613 Residential HVAC Impact Evaluation
Not currently in PSD	R8 Central AC Impact and Process Evaluation
Not currently in PSD	EIA Residential Energy Consumption Survey (RECS) 2015 Microdata for New England states
46,400 Btu/ft2	46,400 Btu/ft2

2% of existing consumption	2% of existing consumption.
0.8	Use site-specific heating system efficiency if available. If unknown, use default of 80% for boilers, 78% for natural gas and propane furnaces, and 76% for oil furnaces.

2000 SF	MF area = 876 ft2
From application, default 0.8	AFUE: Boiler AFUE = 0.92, Furnace AFUE = 0.88
HF = 46,4000 BTU/ft2	MF Heating Factor = 20,300 MMBtu/ft2
Inefficient appliances	Inefficient appliances
ENERGY STAR-qualified appliances	ENERGY STAR-qualified appliances
AKWH = 93 kWh SKW = 0.012 kW WKW = 0.012 kW	AKWH = 194 kWh SKW = 0.026 kW WKW = 0.026 kW
AKWH = 229 kWh SKW = 0.029 kW WKW = 0.029 kW	AKWH = 412 kWh SKW = 0.05 kW WKW = 0.05 kW

AKWH = 472 kWh SKW = 0.059 kW WKW = 0.059 kW	AKWH = 658 kWh SKW = 0.08 kW WKW = 0.08 kW
AKWH = 77.5 kWh SKW = 0.029 kW WKW = 0.0 kW	AKWH = 77.5 kWh SKW = 0.029 kW WKW = 0.0 kW
AKWH = 227 kWh SKW = 0.026 kW WKW = 0.026 kW	AKWH = 227 kWh SKW = 0.026 kW WKW = 0.026 kW
AKWH = 93 kWh SKW = 0.012 kW WKW = 0.012 kW	AKWH = 194 kWh SKW = 0.026 kW WKW = 0.026 kW
AKWH = 229 kWh SKW = 0.029 kW WKW = 0.029 kW	AKWH = 412 kWh SKW = 0.05 kW WKW = 0.05 kW
AKWH = 472 kWh SKW = 0.059 kW WKW = 0.059 kW	AKWH = 658 kWh SKW = 0.08 kW WKW = 0.08 kW

AKWH = 64 kWh SKW = 0.012 kW WKW = 0.007 kW	AKWH = 59 kWh SKW = 0.007 kW WKW = 0.006 kW
AKWH = 96 kWh SKW = 0.018 kW WKW = 0.01 kW	AKWH = 89 kWh SKW = 0.0105 kW WKW = 0.008 kW
AKWH = 214 kWh SKW = 0.066 kW WKW = 0.0 kW	AKWH = 229 kWh SKW = 0.07 kW WKW = 0.0 kW
EPA Next Gen Product Analysis_10.9.14.xlsx. Last Accessed on Jul. 1, 2015.	Need to provide updated reference
Savings Calculator for ENERGY STAR Appliances, Available at: https://www.energystar.gov/sites/default/files/asset/document/appliance_calculator.xlsx, Last Accessed	Need to provide updated reference
Savings Calculator of ENERGY STAR Window A/C, Available at: https://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorRoomAC.xls	Need to provide updated reference
N/A	Select in-unit multifamily appliances savings potentials are included in Table 5-7 of R1705/R1709. Detailed Per-Unit and Statewide Technical Savings Potential by Measure.

0	0
Referenced to Table 4 -III	Should be referencing Table 4 -BBB
0	0
No demand savings are claimed for this measure	Include demand savings after further secondary research

https://www.energystar.gov/sites/default/files/asset/document/Consumer_Electronics_Calculator.xlsx	Provide correct reference
https://www.energystar.gov/sites/default/files/asset/document/Office%20Equipment%20Calculator.xlsx	Provide correct reference
0	Replace Table 4-SSS with Table 4-LLL in the values column in the nomenclature table 4-KKK for this parameter.
0	Replace Table 4-SS with Table 4-LLL in the values column in the nomenclature table 4-KKK for this parameter.
0	Replace Table 4-TT with Table 4-MMM in the values column in the nomenclature table 4-KKK for this parameter.
0	Replace Table 4-TTT with Table 4-MMM in the values column in the nomenclature table 4-KKK for this parameter.
0	Replace Table 4-TTT with Table 4-MMM in the values column in the nomenclature table 4-KKK for this parameter.
Values from Table 4-LLL used in these algorithms to calculate electric savings	Update the annual electric energy usage deemed values by running the model in RESFEN 6.

Values from Table 4-LLL used to calculate AKWH electric savings that are used in this algorithm'	Values from Table 4-LLL used to calculate AKWH electric savings that are used in this algorithm'
Residential	Residential
Lost Opportunity	Lost Opportunity
Baseline home according to NMR Group Inc., Connecticut 2011 Baseline Study of Single- Family Residential New Construction, Oct. 1, 2012.	Baseline home according to NMR Group Inc., R1602 Residential New Construction Program Baseline Study, December 5, 2017

Baseline home according to NMR Group Inc., Connecticut 2011 Baseline Study of Single- Family Residential New Construction, Oct. 1, 2012.	Baseline home according to NMR Group Inc., R1602 Residential New Construction Program Baseline Study, December 5, 2017
No reference was provided for RESNET standards	Reference added in supporting info for RESNET standards should be added
Savings were calculated based on REM/Rate modeling of homes with the insulation standards required by this measure compared to the Baseline new home	Re-run the simulation with updated baseline home values and confirm that no variables have changed that impact the savings values and update the 'Energy Savings' in the Table 4-PPP & Table 4-QQQ.
0.00039 kW/ft2	Re-run the simulation with updated baseline home values and confirm that no variables have changed that impact the savings values and update REMSKW.
SKW , SKWC	Use either SKW /SKWC consistently throughout the entire measure
WKW, WKWH	Use either WKW, WKWH consistently throughout the entire measure
Energy savings per square foot deemed values obtained from REM/rate based on baseline from study in 2012	Re-run the simulation with updated baseline home values and confirm that no variables have changed that impact the savings values and update the 'Energy Savings' in the Table 4-PPP & Table 4-QQQ.

Energy savings per square foot deemed values obtained from REM/rate based on baseline from study in 2012	Re-run the simulation with updated baseline home values and confirm that no variables have changed that impact the savings values and update the 'Energy Savings' in the Table 4-PPP & Table 4-QQQ.
Demand savings per square foot deemed values obtained from REM/rate based on baseline from study in 2012	Re-run the simulation with updated baseline home values and confirm that no variables have changed that impact the savings values and update REMSKW & REMWKW
Baseline study from 2012 is referenced	Recent baseline study from 2017 should be referenced
20 years (No value for specifically Thermal Enclosure, but based on the measure description, this measure falls under Appendix Four: Building Envelope Insulation)	25
New homes that meet or exceed the RESNET Grade 1 High Performance insulation standard. In addition, homes must have at least R-40 ceiling insulation and R-21 above grade wall insulation and must have a mechanical ventilation system.	Revise to include Multifamily

Installation of a storm window to augment an existing single-pane window	Installation of a storm window on the interior or exterior of the existing single-pane window
0	Remove the Energy Star windows energy usage from Table 4-TTT and update the 'Double Pane (or single with storm)' window type to 'Single Pane with Storm'. Additionally, update the annual electric energy usage deemed values by running the model in RESFEN 6.
Attic hatch, attic stairs, or whole house fan	Uninsulated attic hatch, attic stairs, or whole house fan

Infitration reduction savings from REM/Rate software Attic Hatch - 154,876 Btu/yr Attic Pull down stairs - 514,816 Btu/yr Whole house fan - 243,195 Btu/yr Based on REM/Rate model run in 2008	Re-run REM/rate model and update values
blower door reduction (Measure 4.4.4)	Infiltration Reduction Testing (Blower Door Test) (measure 4.4.2)
Not described in nomenclature	Dh , Dw = attic opening dimensions
An estimated value of 75% heating system efficiency is used	Use site-specific heating system efficiency if available. If unknown, use default of 80% for boilers, 78% for natural gas and propane furnaces, and 76% for oil furnaces.

CT State Average of 5,885 0F-days is used	Provide HDD/HDH for Hartford (to cover non-coastal regions) and Bridgeport (to cover coastal regions), if available.
Table 4-JJJJ	Table 4-CCCC
Table 4-EEEE	Table 4-XXX
Table 4-FFFF	Table 4-YYY
Table 4-HHHH	Table 4-AAAA
276,065 Btu/yr	276,202 Btu/yr
Algorithm not included in the measure	WKW = Annual electric energy savings for heating X PFw/1000
Applicable for resdential	Not allowed for multifamily buildings

Recommended action	Justification
Parameter update	MA TRM uses a much newer study by DNVGL (2017 vs 2007) and simplified coincidence factor calculation which streamlines program savings calculations.
Awaiting Evaluation Results	Evaluation results on lighting hours are forthcoming. C1635 EO Impact Evaluation.
No change	Aligns with other TRMs
Parameter update	Other TRMs use both space-by-space and building area methods
Parameter update	Adds specificity to the kinds of equipment that should be incentivized. Forthcoming NMR Retail Lighting Study.
Awaiting Evaluation Results	Adds specificity to the kinds of equipment that should be incentivized. Forthcoming NMR Retail Lighting Study.
Parameter update	MA TRM uses a much newer study by DNVGL (2017 vs 2007) and simplified coincidence factor calculation which streamlines program savings calculations.
New measure update	Align with TRC recommendation
Awaiting Evaluation Results	Evaluation results on lighting hours are forthcoming. C1635 EO Impact Evaluation.

Parameter update	Table 2-D Updated to 2018 IECC. Recommend including the Space-By-Space method LPDs as another compliance option to match with peer TRMs. See Supporting Information.
New measure update	Align with TRC recommendation
New measure update	Align with TRC recommendation
New measure update	Align with TRC recommendation
Parameter update	Include in nomenclature table for consistency
New measure update	Align with TRC recommendation
Parameter update	Tables 2-F and 2-G updated to IECC 2018. See Supporting Information.
Algorithm update	Update formula to specify S_int rather than just S for savings, as S_ext is a value later on. Remove occupancy sensor and create separate measure savings for occupancy sensor.
New measure update	Align with TRC recommendation
Algorithm update	Remove occupancy sensor and create separate measure savings for occupancy sensor.
Parameter update	MA TRM was referenced previously; recommend update based on the latest MA TRM with updated study
Parameter update	MA TRM was referenced previously; recommend update based on the latest MA TRM with updated study

Algorithm update	Remove occupancy sensor and create separate measure savings for occupancy sensor.
Algorithm update	Remove occupancy sensor and create separate measure savings for occupancy sensor.
Updated reference	Recommend updating to MA TRM value based on more recent impact report.
Updated reference	MA TRM recently updated. PSD reference should cite direct study used in the MA TRM.
Updated reference	MA TRM recently updated. PSD reference should cite direct study used in the MA TRM.
Updated reference	Recommend updating to MA TRM methodology based on more recent impact report.

Updated reference	Recommend updating to MA TRM methodology based on more recent impact report.
New measure update	See Tab in TRC MF Review Table: CA Lighting - LO
Parameter update	See Tab in TRC MF Review Table: CA Lighting - LO
Parameter update	CT PSD references a defunct MA program savings calculator; the updated table is evaluation results for MA upstream program
Awaiting Evaluation Results	Evaluation results on lighting hours are forthcoming.
Algorithm update	If using MA evaluation results, should follow MA upstream savings methodology
Algorithm update	Other TRMs include interactive fuel effects
Parameter update	Want to specify certification requirements in measure description
Parameter update	CT PSD references a defunct MA program savings calculator; the updated table is evaluation results for MA upstream program

Awaiting Evaluation Results	Evaluation results on lighting hours are forthcoming.
Parameter update	MA TRM uses a much newer study by DNVGL (2017 vs 2007) and simplified coincidence factor calculation streamlines program savings calculations
Parameter update	MA TRM uses a much newer study by DNVGL (2017 vs 2007) and simplified coincidence factor calculation streamlines program savings calculations
Algorithm update	If using MA evaluation results, should follow MA upstream savings methodology
Algorithm update	Other TRMs include interactive fuel effects
Algorithm update	If using MA evaluation results, should follow MA upstream savings methodology
Algorithm update	If using MA evaluation results, should follow MA upstream savings methodology (in-service rate is rolled into the Watts_EE portion of the MA algorithm)
Algorithm update	If using MA evaluation results, should follow MA upstream savings methodology (in-service rate is rolled into the Watts_EE portion of the MA algorithm)

Algorithm update	If using MA evaluation results, should follow MA upstream savings methodology (in-service rate is rolled into the Watts_EE portion of the MA algorithm)
Algorithm update	Other TRMs include interactive fuel effects
Updated reference	Previous reference is a defunct MA program spreadsheet; recommend updating to the MA upstream evaluation results
Updated reference	Recommend updating to MA TRM methodology based on more recent impact report.
Updated reference	Previous reference is a defunct MA program spreadsheet; recommend updating to the MA upstream evaluation results

Algorithm update	No change to the actual algorithm. Recommend the algorithm written in terms of both HSPF and COP to allow customer to choose based on available information. Also, ccASP heating capacity equations are listed to be used if heating capacity is unknown and cooling capacity is known.
New methodology update	This (WKW = 0) is a commonly adopted value because: 1. The peak savings in winter are a fraction of the peak savings in Summer 2. The non-cold-climate ASHP unit will have a backup heat source (fossil fuel furnace/electric heat) which will kick on during the coldest peak winter day, thereby minimizing the operation of the ASHP unit. However, if the installed unit is a cold-climate ASHP unit, it is designed to meet the heat load even at the coldest temperature. In this case the winter peak demand savings will be non-zero and can be calculated by an algorithm similar to the one used to calculate summer demand savings. This algorithm is based on the performance of the ccASHP unit at low temperatures. The ccASHP unit should be NEEP rated and the HSPF at 5F is used in the winter peak demand savings calculations.

New methodology update	Proposed measure description should include cold-climate ASHPs.
Parameter update	- Current value (82%) is based on RLW, Final Report, 2005 Coincidence Factor Study. - Recommended value is in line with MA TRM, which comes from KEMA (2011). C&I Unitary HVAC LoadShape Project – Final Report - NY TRM has no source listed for the CF value.
Parameter update	Recommend update to federal standard when more stringent.
Updated reference	Recommend update to federal standard when more stringent.
Algorithm update	No change to the actual algorithm. Recommend explicitly listing out which baseline efficiency terms to use based on different equipment capacities and available information. The IEER usage algorithm aligns with Mid-Atlantic and NY TRMs

Algorithm update	No change to the actual algorithm. Recommend the algorithm written in terms of both HSPF and COP to allow customer to choose based on available information. Also, ccASP heating capacity equations are listed to be used if heating capacity is unknown and cooling capacity is known.
New methodology update	This (WKW = 0) is a commonly adopted value because: 1. The peak savings in winter are a fraction of the peak savings in Summer 2. The non-cold-climate ASHP unit will have a backup heat source (fossil fuel furnace/electric heat) which will kick on during the coldest peak winter day, thereby minimizing the operation of the ASHP unit. However, if the installed unit is a cold-climate ASHP unit, it is designed to meet the heat load even at the coldest temperature. In this case the winter peak demand savings will be non-zero and can be calculated by an algorithm similar to the one used to calculate summer demand savings. This algorithm is based on the performance of the ccASHP unit at low temperatures. The ccASHP unit should be NEEP rated and the HSPF at 5F is used in the winter peak demand savings calculations.
Parameter update	See Tab in TRC MF Review Table: CA Unitary AC and HP - LO

Updated reference	See Tab in TRC MF Review Table: CA Unitary AC and HP - LO
Parameter update	Based on CT PSD method of equating SCF and WCF values.
Editorial update	EER is used as a placeholder for efficiency ratings. Cooling side of equipment is rated in SEER (units < 65MBH) and IEER (units > 65MBH). Additional language to explain the application of SEER/IEER in the savings equation would clarify the intention of the efficiency variable as applied here.
Parameter update	- Current value (82%) is based on RLW, Final Report, 2005 Coincidence Factor Study. - Recommended value is in line with MA TRM, which comes from KEMA (2011). C&I Unitary HVAC LoadShape Project – Final Report - NY TRM has no source listed for the CF value.
Parameter update	Based on CT PSD method of equating SCF and WCF values.
Updated reference	EER is used as a placeholder for efficiency ratings. Cooling side of equipment is rated in SEER (units < 65MBH) and IEER (units > 65MBH). Additional language to explain the application of SEER/IEER in the savings equation would clarify the intention of the efficiency variable as applied here.

Updated reference	2015 IECC C403.2.3 (2) https://codes.iccsafe.org/content/IECC2015/chapter-4-[ce]-commercial-energy-efficiency#IECC2015_Pt01_Ch04_SecC403.2.3
New methodology update	If supplemental heating systems such as fossil fuel equipment is present on site, they will kick on during peak winter days when the HP unit can not operate efficiently at such low temperatures. In this case, winter peak demand savings are 0.
Parameter update	See Tab in TRC MF Review Table: CA WSHP and GSHP - LO
Updated reference	See Tab in TRC MF Review Table: CA WSHP and GSHP - LO
New methodology update	See Tab in TRC MF Review Table: CA WSHP and GSHP - LO
No change	Aligns with other TRMs

No change	Aligns with other TRMs
Parameter update	The DOE-2 model that is used as the basis for the deemed values is from 2001. NY TRM used DOE 2-2. We could not verify the DOE-2 model. Since the NY TRM model is more recent and Poughkeepsie is most similar in weather to Hartford, we recommend using the NY TRM Poughkeepsie values. The values are listed in Appendix J in the NY TRM.
Parameter update	The DOE-2 model that is used as the basis for the deemed values is from 2001. NY TRM used DOE 2-2. We could not verify the DOE-2 model. Since the NY TRM model is more recent and Poughkeepsie is most similar in weather to Hartford, we recommend using the NY TRM Poughkeepsie values. The values are listed in Appendix J in the NY TRM.
Parameter update	The DOE-2 model that is used as the basis for the deemed values is from 2001. NY TRM used DOE 2-2. We could not verify the DOE-2 model. Since the NY TRM model is more recent and Poughkeepsie is most similar in weather to Hartford, we recommend using the NY TRM Poughkeepsie values. The values are listed in Appendix J in the NY TRM.

Parameter update	The DOE-2 model that is used as the basis for the deemed values is from 2001. NY TRM used DOE 2-2. We could not verify the DOE-2 model. Since the NY TRM model is more recent and Poughkeepsie is most similar in weather to Hartford, we recommend using the NY TRM Poughkeepsie values. The values are listed in Appendix J in the NY TRM.
Parameter update	If the DOE-2 model continues to be used as the basis for savings, update the deemed values to include temperature information for one coastal and one non-coastal city.
Parameter update	Recommend offer this measure both as lost opportunity and retrofit options. Aligns with other jurisdictions.
Parameter update	Recommend offer this measure both as lost opportunity and retrofit options. Aligns with other jurisdictions.

Proposed Further Secondary Research	We reviewed the CT PSD measure's savings spreadsheet analysis used by Eversource and found it to be reasonable. The savings calculator specifies that it is meant for air-cooled VRF systems. We recommend inlcuding the option to use the tool for water-cooled systems as well. Applying the tool to water-cooled systems would entail changes to efficiencies and would involve the inclusion of secondary impacts on the cooling tower system. Further research would be necessary to appropriately modify the tool to use it for water-cooled systems.
Algorithm update	It is unclear if both utilties use the same tool or if they use separate tools. We recommend using the same tool for consistency.
Algorithm update	While the program teams have the tools, it is challenging for those who don't have access to the spreadsheet tool to calculate savings without access to the savings algoithms used. We recommend listing all the savinsg algorithms in the PSD.
Parameter update	The savings algorithms in the PSD are applicable to all VRF measures including cooling-only air conditioners, however, minimum efficiency values are only listed for VRF heat pumps with and without heat recovery. We recommend listing the minimum efficiency values for VRF air coditioners, as shown in Table 6.8.1-9 in the supporting notes tab.

Updated reference	Table 2-II indicates inputs whereas Table 2-KK have the baseline efficiencies used in spreadsheet analysis.
Parameter update	Editorial update
Updated reference	Table 3-II related to 3.4.1 Cool Night Covers measure. 2-KK is the relevant table number that have listed baseline efficiencies. The baseline efficiencies in both ASHRAE 2016 and 2019 are same. Update the reference to 2019 ASHRAE code.
Parameter update	DEER 2014 should be used as the source for this measure, supporting the currently applied 15 years.
Editorial update	See Tab in TRC MF Review Table: CA VRF - LO
No change	Aligns with other TRMs
Parameter update	MA TRM uses a much newer study by DNVGL (2017 vs 2007) and simplified coincidence factor calculation which streamlines program savings calculations.
Algorithm update	Remove occupancy sensor and create separate measure savings for occupancy sensor.
Parameter update	See Tab in TRC MF Review Table: CA Lighting - Rx

No change	Aligns with other TRMs
Parameter update	MA TRM uses a much newer study by DNVGL (2017 vs 2007) and simplified coincidence factor calculation which streamlines program savings calculations.
New measure update	Align with TRC recommendation
New measure update	Align with TRC recommendation
New measure update	Align with TRC recommendation

Awaiting Evaluation Results	Recommend removing Lost Opportunity Path pending forthcoming NMR Market Study.
No change	CT-specific evaluation result
No change	CT-specific evaluation result
No change	CT-specific evaluation result
No change	CT-specific evaluation result
Awaiting Evaluation Results	Recommend removing Lost Opportunity Path pending forthcoming NMR Market Study.
Awaiting Evaluation Results	2014 CT-specific evaluation result may be updated after NMR retail lighting suppliers report is available
No Change	Aligns with other TRMs

No Change	Aligns with other TRMs
Awaiting Evaluation Results	MA Baseline evaluation forthcoming for fossil fuel baseline replacements.
Parameter update	Current value is based on outdated research (1979 - 2008). The updated value (862 hours) is the average detached single family FLHH for Poughkeepsie, NY (from NY TRM) which is the closest NY weather station to CT. The NY FLH is based on billing data analysis of heating load and heating system nameplate capacities for 23,573 homes in 2014
Code update	Aligns with other TRMs

Parameter update	The currently used HSPF value for preexisting ASHP is based on outdated source, which is the 1992 US established federal minimum heating efficiency standard for new heat pumps. The updated values are based on federal standards and account for the varying age of the preexisting system
Algorithm update	Provision of calculation of heating capacity of the installed unit based on cooling capacity, in the case that AHRI -specific values are not known. The relation between heating and cooling capacity are sourced from an internal analysis of NEEP certified ASHP/DMSP units.

Algorithm update	- Provision of calculation of heating capacity of the installed unit based on cooling capacity, in the case that AHRI -specific values are not known. The relation between heating and cooling capacity are sourced from an internal analysis of NEEP certified ASHP/DMSP units.
New methodology recommended	Allows calculation of fossil fuel savings if the new HP unit replaces a fossil fuel heat source.

New methodology recommended	This (WKW = 0) is a commonly adopted value because: 1. The peak savings in winter are a fraction of the peak savings in Summer 2. The non-cold-climate ASHP unit will have a backup heat source (fossil fuel furnace/electric heat) which will kick on during the coldest peak winter day, thereby minimizing the operation of the ASHP unit. However, if the installed unit is a cold-climate ASHP unit, it is designed to meet the heat load even at the coldest temperature. In this case the winter peak demand savings will be non-zero and can be calculated by an algorithm similar to the one used to calculate summer demand savings. This algorithm is based on the performance of the ccASHP unit at low temperatures. The ccASHP unit should be NEEP rated and the HSPF at 5F is used in the winter peak demand savings calculations.
Parameter update	Update to DEER 2014
New methodology recommended	Allows calculation of fossil fuel savings if the new HP unit replaces a fossil fuel heat source.

No change	Aligns with other TRMs
New methodology update	Allows less efficient system and fossil fuel system baseline cases
Algorithm update	Aligns with other TRMs
New methodology update	Allows cooling savings to be calculated for retrofit/early replacements
No change	Aligns with other TRMs
New methodology update	Allows for retrofit of less efficient system and fossil fuel systems

No change	Aligns with other TRMs
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
Parameter update	Aligns with other TRMs (except MA) and based on more recent research.
New parameter update	Aligned to NYTRM
New parameter update	Aligned to NYTRM

Parameter update	Updated to reflect IECC 2018 baseline COP values
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
Parameter update	Updated to reflect IECC 2018 baseline EER values
New methodology update	This value comes from the GSHP savings model in the CDH study. The recommended method for savings calculations will not require this input.
Algorithm update	Aligns with other TRMs
Algorithm update	Aligns with other TRMs
New methodology update	Allows cooling savings to be calculated for retrofit/early replacements

Algorithm update	Allows heating savings to be calculated for retrofit/early replacements where preexisting equipment can be electric heat (HPs, electric resistance)
New methodology update	Allows heating savings to be calculated for retrofit/early replacements where preexisting equipment can be fossil fuel heat
Algorithm update	Aligns with other TRMs
Algorithm update	Aligns with other TRMs

New methodology update	Allows calculation of summer peak demand savings in case of retrofit
New methodology update	Allows calculation of winter peak demand savings in case of retrofit
No change	Aligns with other TRMs
No change	Aligns with TRM and IECC 2018
No change	Aligns with TRM and IECC 2018
Parameter update	This value is based on 2016 CADMUS DMSHP evaluation (table 7). These values are recommended because: 1. They are based on metered data 2. Evaulation is much more recent than sources found in other TRMs 3. This is measure specific research

Algorithm update	Provision of calculation of heating capacity of the installed unit based on cooling capacity, in the case that AHRI -specific values are not known. The relation between heating and cooling capacity are sourced from an internal analysis of NEEP certified ASHP/DMSP units.
New methodology update	This (WKW = 0) is a commonly adopted value because: 1. The peak savings in winter are a fraction of the peak savings in Summer 2. The non-cold-climate DHP unit will have a backup heat source (fossil fuel furnace/electric heat) which will kick on during the coldest peak winter day, thereby minimizing the operation of the DHP unit. However, if the installed unit is a cold-climate DHP unit, it is designed to meet the heat load even at the coldest temperature. In this case the winter peak demand savings will be non-zero and can be calculated by an algorithm similar to the one used to calculate summer demand savings. This algorithm is based on the performance of the ccDHP unit at low temperatures. The ccDHP unit should be NEEP rated and the HSPF at 5F is used in the winter peak demand savings calculations.

New methodology update	This (WKW = 0) is a commonly adopted value because: 1. The peak savings in winter are a fraction of the peak savings in Summer 2. The non-cold-climate DHP unit will have a backup heat source (fossil fuel furnace/electric heat) which will kick on during the coldest peak winter day, thereby minimizing the operation of the DHP unit. However, if the installed unit is a cold-climate DHP unit, it is designed to meet the heat load even at the coldest temperature. In this case the winter peak demand savings will be non-zero and can be calculated by an algorithm similar to the one used to calculate summer demand savings. This algorithm is based on the performance of the ccDHP unit at low temperatures. The ccDHP unit should be NEEP rated and the HSPF at 5F is used in the winter peak demand savings calculations.
New methodology update	Inclusion of preexising less efficient DHP and fossil fuel heat source in the baseline case.
New methodology update	Proposed measure description should include cold-climate DHPs.

Parameter update	This value is based on 2016 CADMUS DMSHP evaluation (table 7). These values are recommended because: 1. They are based on metered data 2. Evaulation is much more recent than sources found in other TRMs 3. This is measure specific research
Parameter update	This value is based on 2016 CADMUS DMSHP evaluation (table 7). These values are recommended because: 1. They are based on metered data 2. Evaulation is much more recent than sources found in other TRMs 3. This is measure specific research
Algorithm update	Provision of calculation of heating capacity of the installed unit based on cooling capacity, in the case that AHRI -specific values are not known. The relation between heating and cooling capacity are sourced from an internal analysis of NEEP certified ASHP/DMSP units.

New methodology update	This (WKW = 0) is a commonly adopted value because: 1. The peak savings in winter are a fraction of the peak savings in Summer 2. The non-cold-climate DHP unit will have a backup heat source (fossil fuel furnace/electric heat) which will kick on during the coldest peak winter day, thereby minimizing the operation of the DHP unit. However, if the installed unit is a cold-climate DHP unit, it is designed to meet the heat load even at the coldest temperature. In this case the winter peak demand savings will be non-zero and can be calculated by an algorithm similar to the one used to calculate summer demand savings. This algorithm is based on the performance of the ccDHP unit at low temperatures. The ccDHP unit should be NEEP rated and the HSPF at 5F is used in the winter peak demand savings calculations.
Algorithm update	Provision of calculation of heating capacity of the installed unit based on cooling capacity, in the case that AHRI -specific values are not known. The relation between heating and cooling capacity are sourced from an internal analysis of NEEP certified ASHP/DMSP units.

Editorial update	Table 4-DD is not listed in the nomenclature along with Table 4-EE.
Editorial update	Table 4-DD is not listed in the nomenclature along with Table 4-EE.
Parameter update	supported by Energy Star. Only learning thermostats are available. The NY TRM has two thermostat measures: Wi-Fi Thermostat and Learning Thermostat. It provides deemed savings for Wi-Fi thermostats based on a 2012 pilot study. The Learning Thermostat measure uses a site-specific savings algorithm, with the option of using evaluation-based default values for sites with unknown heating or cooling equipment. Conversations with the NY TRC indicate that the Smart Thermostat measure should be used for most connected thermostats on the market as only a limited number of wifi-only thermostats are available, and the Wi-Fi thermostat measure has been slated for updating for several years. The NY TRM methodology for Learning Thermostats is strong and understandable, and many default inputs for it are available for CT based on CT evaluations.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. Federal standard

Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Updated reference	Modeling savings off of NY TRM methodology is recommended. This savings factor is recommended for an update when a CT-specific, or any other regional evaluation of learning thermostats is completed
Parameter update	Update to match recommended methodology change
Parameter update	Added clarity

Parameter update	supported by Energy Star. Only learning thermostats are available. The NY TRM has two thermostat measures: Wi-Fi Thermostat and Learning Thermostat. It provides deemed savings for Wi-Fi thermostats based on a 2012 pilot study. The Learning Thermostat measure uses a site-specific savings algorithm, with the option of using evaluation-based default values for sites with unknown heating or cooling equipment. Conversations with the NY TRC indicate that the Smart Thermostat measure should be used for most connected thermostats on the market as only a limited number of wifi-only thermostats are available, and the Wi-Fi thermostat measure has been slated for updating for several years. The NY TRM methodology for Learning Thermostats is strong and understandable, and many default inputs for it are available for CT based on CT evaluations.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.
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Algorithm update	Modeling savings off of NY TRM methodology is recommended.

Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. Federal standard
Algorithm update	Modeling savings off of NY TRM methodology is recommended. Federal standard
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Algorithm update	Modeling savings off of NY TRM methodology is recommended. CT specific evaluation result input.
Proposed primary research	Modeling savings off of NY TRM methodology is recommended. This savings factor is recommended for an update when a CT-specific, or any other regional evaluation of learning thermostats is completed

Proposed primary research	Modeling savings off of NY TRM methodology is recommended. This savings factor is recommended for an update when a CT-specific, or any other regional evaluation of learning thermostats is completed
Algorithm update	Modeling savings off of NY TRM methodology is recommended. RECS result duplicates NY TRM methodology but for New England instead of Mid-Atlantic
Algorithm update	Modeling savings off of NY TRM methodology is recommended. RECS result duplicates NY TRM methodology but for New England instead of Mid-Atlantic
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Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Modeling savings off of NY TRM methodology is recommended.

Algorithm update	Modeling savings off of NY TRM methodology is recommended.
Algorithm update	Uses CT PDF values alongside updated algorithm.
Updated reference	Deemed savings no longer used
Updated reference	Modeling savings off of NY TRM methodology is recommended. This savings factor is recommended for an update when a CT-specific, or any other regional evaluation of learning thermostats is completed
Updated reference	CT-specific evaluation reference
Updated reference	CT-specific evaluation reference
Updated reference	Based on NY TRM methodology but uses New England values
No change	Based on study by Cadmus Group, “High Efficiency Heating Equipment Impact Evaluation Final Report”, Mar. 2015.

No change	The CT Evaluation [R1614/R1613] found that residential boilers were performing 2% lower than their rated efficiency, based on site visit metering. The PSD currently cites the New York TRM as the source for the Energy Savings Factor. The NY TRM cites an Energy Trust of Oregon paper; Building Tune-Up and Operations Program Evaluation which suggests a savings between 2-5% for boiler tune-ups. Recommendation to list both the CT Evaluation and the Energy Trust of Oregon paper as citations for savings and to include the language "Bothe references support 2% savings for this measure" in the PSD. The inclusion of both citations will corroborate the derated efficiency findings in CT homes in addition to the potential efficiency increase as supported by the Energy Trust of Oregon paper.
Parameter update	Based on measures 4.2.10 and 4.2.11 in the CT PSD, the existing heating system efficiencies should be adjusted to the proposed values. The efficiencies are based on an evaluation study conducted by Cadmus in 2015 in MA titled '“High Efficiency Heating Equipment Impact Evaluation Final Report'. In addition to being based on evaluations, these values will also help align the existing heating system efficiency values with other TRMs.

Parameter update	See Tab in TRC MF Review Table: DU Clean, Tune, Test
Parameter update	See Tab in TRC MF Review Table: DU Clean, Tune, Test
Parameter update	See Tab in TRC MF Review Table: DU Clean, Tune, Test
No change	Aligns with other TRMs
No change	Aligns with other TRMs
Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values. Upcoming MA Baseline study evaluation to update EUL of clothes dryer.
Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values. Upcoming MA Baseline study evaluation to update EUL of clothes dryer.

Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values. Upcoming MA Baseline study evaluation to update EUL of clothes dryer.
No change	Could not find the quoted reference. The savings is reasonable and within expected magnitude. Upcoming MA Baseline study evaluation to update EUL of Room AC.
Awaiting Evaluation Results	Could not find the quoted reference. The savings is reasonable and within expected magnitude. Upcoming MA Baseline study evaluation to update savings for Room Air Cleaner.
Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values. Upcoming MA Baseline study evaluation to update EUL of clothes dryer.
Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values. Upcoming MA Baseline study evaluation to update EUL of clothes dryer.
Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values. Upcoming MA Baseline study evaluation to update EUL of clothes dryer.

Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values.
Parameter update	Values originally referenced from the 2017 VT TRM are propsoed to be updated with 2018 VT TRM values.
Parameter update	Could not find quoted reference. We recommend updating the savings based on the 2018 VT TRM - Pg 194. Upcoming MA Baseline study evaluation to update multiple parameters for dehumidifier.
Updated reference	Could not find quoted reference
Updated reference	Link not valid and could not find quoted reference
Updated reference	Link not valid and could not find quoted reference
Parameter update	See Tab in TRC MF Review Table: DU Appliances

Proposed Further Secondary Research	Referenced calculators are not available to verify or update savings values further. Further secondary research is needed to explore resources for deemed savings values. The Energy Star deemed savings values are to be verified for all the listed appliances except Sound bars and power strips. Recommend updating advanced power strips savings based on RLPNC 17-3: Advanced Power Strip Metering Study, 2018 and Soundbar savings based on NY TRM. Stakeholder inteviews mentioned possibility of adding residential energy kits to programs.
Parameter update	Savings table is incorrectly referenced
Proposed Further Secondary Research	Referenced calculators are not available to verify or update savings values further. Further secondary research is needed to explore resources for deemed savings values. The Energy Star deemed savings values are to be verified for all the listed appliances except Sound bars and power strips. Recommend updating advanced power strips savings based on RLPNC 17-3: Advanced Power Strip Metering Study, 2018 and Soundbar savings based on NY TRM. Stakeholder inteviews mentioned possibility of adding residential energy kits to programs.
Proposed Further Secondary Research	Based on other TRMs, demand savings are achievable for electronics measures like APS and Soundbars.

Updated reference	References are not functional
Updated reference	References are not functional
Parameter update	Typo error. Table 4-SSS related to 4.4.5 Install Storm Window measure
Parameter update	Typo error. Table 4-SSS related to 4.4.5 Install Storm Window measure
Parameter update	Typo error. Table 4-TTT related to 4.4.5 Install Storm Window measure
Parameter update	Typo error. Table 4-TTT related to 4.4.5 Install Storm Window measure
Parameter update	Typo error. Table 4-TTT related to 4.4.5 Install Storm Window measure
Parameter update	Other TRMs used simple savings algorithms that incorporated the deemed values developed using simulation models. The deemed values were calculated using RESFEN 5 software in 2005. The primary change between RESFEN 5 and RESFEN 6 was that some of the underlying modeling assumptions were changed to be consistent with the Energy Star 2008 analysis done by LBNL. The RESFEN 6 should be run to ensure that the deemed values reflect the changes to the model.

No change	Other TRMs used simple savings algorithms that incorporated the deemed values developed using simulation models. These calculations depends on the annual electric energy savings values estimated using the deemed energy usage values developed using the RESFEN model.
No change	Residential measure
No change	N/A
Parameter update	Latest evaluation study report from R1602 is available and the baseline should be updated accordingly.

Parameter update	Latest evaluation study report from R1602 is available and the baseline should be updated accordingly.
Parameter update	Reference that is listed in the supporting info tab for RESNET standards should be added to measure write up
Parameter update	It is not specified when the REM/Rate simulation was performed. Re-run the simulation with updated baseline home values to ensure that the savings values are up to date. Update the 'Energy Savings' in Table 4-PPP & Table 4-QQQ based on updated REM/Rate output.
Parameter update	It is not specified when the REM/Rate simulation was performed. Re-run the simulation with updated baseline home values to ensure that the savings values are up to date. Update REMSKW values based on updated REM/Rate output.
Parameter update	Editorial update
Parameter update	Editorial update
Parameter update	It is not specified when the REM/Rate simulation was performed. Re-run the simulation with updated baseline home values to ensure that the savings values are up to date. Update the 'Energy Savings' in Table 4-PPP based on updated REM/Rate output.

Parameter update	It is not specified when the REM/Rate simulation was performed. Re-run the simulation with updated baseline home values to ensure that the savings values are up to date. Update the 'Energy Savings' in Table 4-QQQ based on updated REM/Rate output.
Parameter update	It is not specified when the REM/Rate simulation was performed. Re-run the simulation with updated baseline home values to ensure that the savings values are up to date. Update REMWKW and REMSKW values based on updated REM/Rate output.
Updated reference	Latest evaluation study report from 2017 is available and the reference should be updated accordingly.
Parameter update	GDS Associates, Inc., Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures, June 2007, Table 1 – Residential Measures
New parameter update	See Tab in TRC MF Review Table: Thermal Enclosure

Proposed Further Secondary Research	We recommend the program look into redefining the high efficiency options based on further research on the low-E and window glazing types on both interior and exterior of the existing window. MO TRM - savings depends on storm window location (interior or exterior) and glazing type (clear or Low-E). MN TRM considers low-E storm windows on the interior or exterior of the existing window. CT PSD does not consider the cooling savings - this can be accounted if low-E windows are installed.
Parameter update	Make editorial changes to differentiate between the "Windows" measure and "Storm Windows" measure savings. Currently the savings factor tables and the window types mentioned are the same across both measures. The referenced model simulation using RESFEN 5 was performed in 2005. Run the simulations in RESFEN 6 to ensure that the savings are reflective of changes to the most recent values for input variables, namely typical building sizes, HVAC systems, sizing and efficiencies, that affect the savings from this measure.
Awaiting Evaluation Results	Baseline assumptions included no insulation. Description of measure should specify that this is for uninsulated attic hatch, attic stairs, or whole house fan. Result of MA Baseline study forthcoming for insulation.

Parameter update	As stated in the review of measure 4.4.2, the deemed values are based on a REM/Rate model that was run in 2008. Changes to the model or to the input variables, especially the efficiency of the heating or cooling systems for projects in 2020 compared to 2008, could change the deemed savings factor values. The REM/rate model should be run every 3 years to ensure that the deemed values reflect changes to the model.
Updated reference	Infiltration Reduction Testing (Blower Door Test) is measure 4.4.2 and not measure 4.4.4.
Parameter update	Add to nomenclature for consistency.
Parameter update	No references were provided for the estimated efficiency. Based on measures 4.2.10 and 4.2.11 in the CT PSD, the existing heating system efficiencies should be adjusted to the proposed values. The efficiencies are based on an evaluation study conducted by Cadmus in 2015 in MA titled '“High Efficiency Heating Equipment Impact Evaluation Final Report'. In addition to being based on evaluations, these values will also help align the existing heating system efficiency values with other TRMs.

Parameter update	Region specific HDD will be more accurate than state average. Additionally, there is an Upcoming MA Baseline Study Evaluation that is slated to wrap up at the end of the 2020 summer season. The results of this study should be incorporated into the PSD if possible. Also, R91 - Review of Impact Evaluation Best Practices (pg 73) included that some areas in the state have notably lower HDDs than reflected by the statewide average or Hartford weather profiles and recommended to consider whether additional weather and location assumptions can improve savings estimates.
Parameter update	Table title is addressed wrong and should be updated
Parameter update	Table title is addressed wrong and should be updated
Editorial update	Table title is addressed wrong and should be updated
Editorial update	Table title is addressed wrong and should be updated
Parameter update	Calculation error found in this value as shown in supporting info tab and should be updated.
Parameter update	Standard algorithm
No longer offered	See Tab in TRC MF Review Table: Insulate Attic Openings

Who	Comment
Dakers	C1635 EO Impact recommends CFs by building type, season. Based on analysis of multi-year, multi-program logger files.
Dakers	C1635 EO Impact results are now available, including lighting HOU.
Utilities (Jim WIlliamson)	Broader comment (MI) Please ensure any factors here that change will remain compatible with the C1635 RRs we will be applying.
Utilities (Jim WIlliamson)	The current PSD version reference both building area method and space by space area method options. - JW
Utilities (Jim WIlliamson)	need to review NMR study before commenting on this. - JW
Utilities (Jim WIlliamson)	need to review NMR study before commenting on this. - JW
Utilities (Jim WIlliamson)	We may want to keep different CFs based on buildling type rather than simplifying to a single value. -JW
Utilities (Jim WIlliamson)	We may want to keep different CFs based on buildling type rather than simplifying to a single value. -JW
Utilities (Jim WIlliamson)	We may want to keep different CFs based on buildling type rather than simplifying to a single value, unless we are convinced that we will not lose savings calc accuracy. -JW

Utilities (Jim WIlliamson)	will update values based on 2018 IECC
Utilities (Jim WIlliamson)	need to understand why we are recommending separate occ sensor measure before comment here. In general, I think that it is better to keep occ inlcuded in lighting section. - JW
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	this term can be added to PSD table definitions - JW
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	will update values based on 2018 IECC
Utilities (Jim WIlliamson)	ok with revising variable name to clarify - JW
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	since MA TRM was previously referenced, we can update values and reference with current version
Utilities (Jim WIlliamson)	since MA TRM was previously referenced, we can update values and reference with current version

Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	ok to update refrence so that it is cited directly - JW
Utilities (Jim WIlliamson)	ok to update refrence so that it is cited directly - JW
Utilities (Jim WIlliamson)	ok to update refrence so that it is cited directly - JW

Utilities (Jim WIlliamson)	We may want to keep different CFs based on buildling type rather than simplifying to a single value. -JW
Utilities (Jim WIlliamson)	see previous occ sensor comment
Utilities (Jim WIlliamson)	hours update will be in appendix
Dakers Gowans	C1635 EO Impact results are now available, includes recommended delta W for LED linear, LED hi/low bay.
Dakers Gowans	C1635 EO Impact results are now available, including upstream lighting HOU.
Dakers Gowans	C1635 EO Impact results include ISR recommendations by lighting category not facility. Rates are generally higher than MA.
Dakers Gowans	C1635 EO Impact results include IFs for kWh, kW by 4 LED lighting categories.
Utilities (Ghani Ramdani)	No comment
Utilities (Ghani Ramdani)	we just had EO impact study C1635 which addressed the Upstream would like to Know if ERS had reviewed the Study recommendation and how it is planning to incorporate them, we used the Mass Delta watt but we using CT hou based on facility type this was a recommendation from CT upstream evaluation

Utilities (Ghani Ramdani)	hou varies facility type
Utilities (Ghani Ramdani)	CF are based on facilty type
Utilities (Ghani Ramdani)	CF are based on facilty type
Utilities (Ghani Ramdani)	would like to know if the recommendation were based on C1635
Utilities (Ghani Ramdani)	would like to know if the recommendation were based on C1635
Utilities (Ghani Ramdani)	would like to know if the recommendation were based on C1635
Utilities (Ghani Ramdani)	can you elaborate more
Utilities (Ghani Ramdani)	No comment

Utilities (Ghani Ramdani)	No comment
Utilities (Ghani Ramdani)	No comment
Utilities (Ghani Ramdani)	No comment
Utilities (Ghani Ramdani)	No comment
George Lawrence	Delta watts is dependent on technology, level of DLC qualification, and inclusion of controls. The increase due to the presence of controls appears to be a 30% increase. However, fixtures with integrated controls typically include multiple control capability including initial tuning, daylight dimming and occupancy. A DLC study found 47% average savings across all building types from the use of mutiple controls: https://www.designlights.org/lighting-controls/reports-tools-resources/nlc-energy-savings-report/ There is a note on row 66 of the PSD2.1.2 Supporting Info that discusses adding 15% for dimming, but is this actually being applied in practice?

Pete Jacobs	Investigate source of heating EFLH data. This will determine what value for CAPH should be used. What is the source of the 0.9 multiplier for non cold climate heat pumps?
Pete Jacobs	Winter demand algorithm contingent on unit being able to meet the load at winter design conditions. If unit is sized for winter peak rather than summer peak, then the CAPC will be incompatible with the cooling EFLH data.

Utilities (Jim Williamson)	We can add this clarification in the description. -JW
Utilities (Jim Williamson)	I think it is ok to update the conicendence factor if we can trace it back to a good reference. The change is significant. I wonder why studies are ranging from 33 to 82?-JW
Utilities (Jim Williamson)	need to look into this further, did not realize that there were situations where state code was less stringent than federal standard. - JW
Utilities (Jim Williamson)	need to look into this further, did not realize that there were situations where state code was less stringent than federal standard. - JW
Utilities (Jim Williamson)	we can better clarify baselines. -JW

Utilities (Jim Williamson)	HSPF is better metric if we have it. We should give some direction on whether we are using COP @ 17 or COP @ 47, or maybe we should use some type of weight avg of both that aligns with CT's avg winter temp? Where is the 90% from? will need to verify with engineering group- JW
Utilities (Jim Williamson)	I agree that ccASHP will have wKW savings. we will need to develop a methodology and criteria for when it is applicale
Utilities (Jim Williamson)	same comment as above CF suggestion - JW

Utilities (Jim Williamson)	need to review this refrence first, do not have access to reference of MF study
Dakers Gowans	CFh = WINTER heating CF, cell B22
Utilities (Jim Williamson)	ok to provide clarification for use of SEER and IEER - JW
Utilities (Jim Williamson)	need to understand why decrease so much. I think it is ok to change the current 82% as long as we can find references that show why 45% is more accurate - JW
Utilities (Jim Williamson)	need to understand why decrease so much. I think it is ok to change the current 82% as long as we can find references that show why 45% is more accurate - JW
Utilities (Jim Williamson)	references will be updated to 2018 IECC. we can clarify use of EER terminology. -JW

Utilities (Jim Williamson)	references will be updated to 2018 IECC.
Utilities (Jim Williamson)	this shows kWh equation, which I think might be a typo. I agree that if there is a boiler, it will be operating during peak times and savings should be 0. - JW
Utilities (Jim Williamson)	do not have access to this study, but ok to change parameters if study supports that proposed values are more accurate - JW
Utilities (Jim Williamson)	do not have access to this study, but ok with updating this reference if appropriate. - JW
Utilities (Jim Williamson)	such a rare situation here that we can probably plan for custom calcs when these come in - JW
George Lawrence	What is the assumed measure life? Is it the same as an air source heat pump? If so, I suggest reconsidering as the ground loop is buried and the critical equipment is typically inside, as opposed to outside for air source.

George Lawrence	Are ground source heat pumps industry standard practice for C&I Lost Opportunity heating and cooling installations? If not, then why wouldn't we use a common practice such as furnace/central AC as baseline?
Dakers	C1634 recommends removing dual enthalpy economizer measure from PSD. Recommendation based on eQuest models for 3 buildings types run with CT weather. Simulations found no/minimal savings for dual enthalpy vs dry bulb controls.
Pete Jacobs	The last two ECB evaluations recommended removing this measure due to code requirements for a single point drybulb temperature economizer. The incremental savings for a dual enthalpy economizer are minimal. The NY TRM measure is based on a "no economizer" baseline and is not comparable to this measure. Recommend removing.
Utilities (JW)	I think it would be more appropriate to re-run the model with CT weather instead of adopting NY specific model - JW

Utilities (JW)	I think it would be more appropriate to re-run the model with CT weather instead of adopting NY specific model - JW
Utilities (JW)	per decision made on boiler measure, we have decide to use one weather location for analysis.
Dakers Gowans	ASHRAE is recommending disabling DCV controls during pandemic. Suggest language suspending measure eligibility until C19 is resolved.
Utilities (Jim WIlliamson)	I think this is ok as long as code doesnt already require - will check this. - JW

Utilities (Jim WIlliamson)	I agree that we will need to model water cooled condensers differently than air cooled. I haven't seen any of these installed yet. Maybe its better to leave this as a custom measure until water cooled vrf started getting adopted more frequently? - JW
Utilities (Jim WIlliamson)	I agree with consistant use of same tool - JW
Utilities (Jim WIlliamson)	I agree that we should described the methodology in the PSD. - JW
Utilities (Jim WIlliamson)	If IECC lists separate code minimums for cooling-only and cooling/heating units, then it is appropriate to have two minimum efficiency values in the PSD - JW

Utilities (Jim WIlliamson)	Table refrence will be updated. - JW
Utilities (Jim WIlliamson)	typo to be corrected in 2021 PSD. - JW
Utilities (Jim WIlliamson)	Table reference will be updated to reflect current code versions. -JW
Utilities (Jim WIlliamson)	VRF can be added to EUL appendix. - JW
Utilities (Jim WIlliamson)	Does this exclusion exist to keep residential and C&I projects separate? -JW
Dakers Gowans	C1635 EO recommends site-specific HOU for downstream.
Dakers Gowans	C1635 EO recommends seasonal CFs by building type.
Dakers Gowans	I assume you mean Sc not Sos in the algorithm since you recommend Sos as a separate measure.
Dakers Gowans	Specify interior common areas, or other assumption.

Utilities (Ghani)	Broader comment (MI) Please ensure any factors here that change will remain compatible with the C1635 RRs we will be applying.
Utilities (Ghani)	Can you share the 2017 DNVGL study
Utilities (Ghani)	Can you share the 2017 DNVGL study
Utilities (Ghani)	no comment
George Lawrence	Why is occupancy the only control included in the PSD? The EO program is actively promoting fixtures with multple integrated controls, including demand response capabilities. Please include values that reflect multiple controls such as initial tuning, scheduling, daylight dimming. A DLC study found 47% average savings across all building types from the use of mutiple controls: https://www.designlights.org/lighting-controls/reports-tools-resources/nlc-energy-savings-report/

Glenn Reed	Likely to be some Retail (Lost Opp) in 2021, though may be lamp type and/or channel restricted. DI likley to continue to in 2021
Glenn Reed	Double check given lower NY and M-A TRM values. And these are for interior lighting. What about exterior DI lighting?
Glenn Reed	I don't think that MA has the same summer and winter kW/kWh ratios
Glenn Reed	Supporting info is for commercial lighting
Glenn Reed	What about FF heating interactive effects?
Utilities (Glen Eigo)	Keep both paths (retrofit and LO) till we get the NMR retail lighting study report and then take a decesion on removing LO path from the measure.
Utilities (Glen Eigo)	Based on NMR evaluaation report, PSD values will be updated.
Utilities (Glen Eigo, Miles Ingram)	Current code in CT is IECC2015 and is not expected to change until next year. Will update since no effect on savings only refrenced code.

Utilities (Glen Eigo, Miles Ingram)	Awaiting approval from DEEP as to whether we can claim additional savings from a fossil fuel baseline. Previously this would be considered "fuel switching" which was not allowed.
Utilities (Glen Eigo, Miles Ingram)	Please provide recommendation on baselines for "Cold Climate" heat pumps. Cureently NEEP and Vermont have QPLs.
Utilities (Glen Eigo, Miles Ingram)	Please provide full reference. Will dicuss updating EFLH with Engineering teams. This is a significant decrease, so pls vet it carefully. Does the source evaluation include ductless units, or is that EFLH values based solely on central ASHP?? MA uses 1200. 862 is very low compared to all other sources. .
Utilities (Glen Eigo, Miles Ingram)	Current code in CT is IECC2015 and is not expected to change until next year. Will update since no effect on savings only refrenced code.

Utilities (Glen Eigo, Miles Ingram)	Please provide full reference. Will dicuss updating EFLH with Engineering teams.
Utilities (Glen Eigo, Miles Ingram)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets.

Utilities (Glen Eigo, Miles Ingram)	Will accept recommendation if regualtory body allows for claiming of savings. Previous rules did not allow for "fuel switching" in these scenarios.
Utilities (Glen Eigo, Miles Ingram)	Will accept recommendation if regualtory body allows for claiming of savings. Previous rules did not allow for "fuel switching" in these scenarios.

Utilities (Glen Eigo, Miles Ingram)	Please clarify if WkW should always be zero or should only be applied to NEEP ccASHP only.
Utilities (Glen Eigo, Miles Ingram)	Please provide links to the DEER 14 report.
George Lawrence	What about claiming fossi fuel savings from partial displacement of furnace/boiler use in cases where the furnace/boiler is not removed? Massachusetts is working on determining these values.

Glenn Reed	While policy/regulatory approval for fuel switching is unclear, I would recommend taking advantage of this measure update to address fuel switching.
Glenn Reed	For Lost opp, does Code Compliant reflect the current industry standard practice? Or are baseline COPs defined below (Row 29)?
Glenn Reed	Is any COP derating needed? My less than perfect understanding of actual vs. rated GSHP performance is that rated COPs tend to overestimate system efficiencies. I think prior CT evaluation supported this conclusion. May be an equipment vs. system performance issue
Glenn Reed	For pre-existing cooling system, should EER or SEER be used for modeling energy use?
Utilities (Glen Eigo)	Historically "fuel switching" was not allowed will need regulatory approval to use fossil fuel baseline if we are claiming additional savings.
Utilities (Glen Eigo)	Historically "fuel switching" was not allowed will need regulatory approval to use fossil fuel baseline if we are claiming additional savings.

Utilities (Glen Eigo)	Please provide details on "baseline" update.
Utilities (Glen Eigo)	Will remove if updated algorithm is approved.
Utilities (Glen Eigo)	Will remove if updated algorithm is approved.
Utilities (Glen Eigo)	Will remove if updated algorithm is approved.
Utilities (Glen Eigo)	Will remove if updated algorithm is approved.
Utilities (Glen Eigo)	Will remove if updated algorithm is approved.
Utilities (Glen Eigo)	Will remove if updated algorithm is approved.
Utilities (Glen Eigo)	Please provide reference information for parameter and we can update. Does this parameter update only apply to GSHP?
Utilities (Glen Eigo)	Need to confer with Engineering Teams to see if using Poughkeepsie will be accptable.
Utilities (Glen Eigo)	Need to confer with Engineering Teams to see if using Poughkeepsie will be accptable.

Utilities (Glen Eigo)	IECC 2018 is not current CT Code. IECC 2015 is still building code and new code may not be adopted until late next year (2021.)
Utilities (Glen Eigo)	If new recommendation is adopted this will be removed.
Utilities (Glen Eigo)	If new recommendation is adopted this will be removed.
Utilities (Glen Eigo)	IECC 2018 is not current CT Code. IECC 2015 is still building code and new code may not be adopted until late next year (2021.)
Utilities (Glen Eigo)	If new recommendation is adopted this will be removed.
Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.
Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets.
Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.

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Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.
Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.
Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.

Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.
Utilities (Glen Eigo)	Recommendation makes sense. Will work with engineering teams for advsing of updating tracking systems and spreadsheets. May need to redefine retrofit vs. EOL replacement.
Glenn Reed	Does an 8.2 HSPF federal standard compliant unit accurately reflect ISP for HP efficiencies? Probably too low.
Glenn Reed	Yes, fed. standard, but the distribution of actual units will be, by definition, above the standard.
Glenn Reed	If fed. standard, the distribution of actual units will be, by definition, above this value. Is this ISP?
Glenn Reed	How are declining COPs addressed as well as possible prescence of back up heating, which might be fossil fuel fired?

Glenn Reed	I do not believe that the Companies currently track NEEP certification of program supported DHPs, though would support acknowledging the better performance of NEEP ccHPs
Glenn Reed	I'm not sure that the assumption of no back up for a ccHP unit is correct (though it might be for the purposes of this calculation). This might require some further conversation. While NEEP cold climate COP (but not capacity?) is tied to 5 degrees, is this the design temp for CT?

Glenn Reed	See comment above in row 34
Utilities (Ghani)	no comment
Utilities (Ghani)	would like to keep generic description of new unit as High efficienct DHP rather than if it is Cold climate or Estar this are more implementation nuances

Utilities (Ghani)	CT uses the Seasonal peak demand wehre the cadmus study was for Mass on Peak
Utilities (Ghani)	CT uses the Seasonal peak demand wehre the cadmus study was for Mass on Peak
Utilities (Ghani)	would like to have one algorithm calc rather than by type of DHP also would like the source for two factors as from implementation we are not distinguishing between CC and non CC

Utilities (Ghani)	no comment
Utilities (Ghani)	would like to have one algorithm calc rather than by type of DHP also would like the source for two factors as from implementation we are not distinguishing between CC and non CC

Utilities (JW)	we will updated ref list to show Table 4-DD also - JW
Utilities (JW)	we will updated ref list to show Table 4-DD also - JW
Glenn Reed	Citing of NY 2012 study: seems pretty dated for this technology
Glenn Reed	heating capacity values seems high
Glenn Reed	For population of existing equipment, is defaulting to fed minimum correct? Might be.
Glenn Reed	For population of existing equipment, is defaulting to fed minimum correct? Might be.

Glenn Reed	Implied FF savings of 1-4% seem low.
Glenn Reed	Implied FF savings of 1-4% seem low.
Glenn Reed	Implied FF savings of 1-4% seem low.
Glenn Reed	What are these values? Include in Supporting info
Utilities (Glen Eigo)	Why not use "Smart Thermostat"
Utilities (Glen Eigo)	Recommendation makes sense.

Utilities (Glen Eigo)	Recommendation makes sense to use National program guidelines
Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
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Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.

Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
Utilities (Glen Eigo)	Need to review with Engineering teams to accept recommendation.
Utilities (Glen Eigo)	Will update reference and ise updated algorithm with enginering approval.
Utilities (Glen Eigo)	Will update reference and ise updated algorithm with enginering approval.
Utilities (Glen Eigo)	Will update reference and ise updated algorithm with enginering approval.
Utilities (Glen Eigo)	Will update reference and ise updated algorithm with enginering approval.
Utilities (Glen Eigo)	Will update reference and ise updated algorithm with enginering approval.
Glenn Reed	Much lower assumed heating capacity than in Wifi thermostat measure

Utilities	Will add updated references.
Utilities	Agree with the parameter update. It will help align the heating efficiency values in accordance with measures (4.2.10 an d 4.2.11)

Utilities	Could not find the TAB for TRC MF review table to add comments on parameter update.
Utilities	Could not find the TAB for TRC MF review table to add comments on parameter update.
Utilities	Could not find the TAB for TRC MF review table to add comments on parameter update.
Glenn Reed	No fossil fuel savings provided below for any measures
Glenn Reed	No fossil fuel savings provided below for any measures
Glenn Reed	What is driving the near doubling of savings?
Glenn Reed	What is driving the near doubling of savings?

Glenn Reed	Similar question as above (though increase is not as large)
Glenn Reed	I believe that there was a semi-recent Fed std update. Please verify that savings are not overstated given typical size and run hrs for CT
Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.
Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.
Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.
Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.

Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.
Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.
Utilites	Shall wait for upcoming MA Baseline studies to make changes to the PSD value.
Utilites	Reviewing files for updated references. If values change based on MA Baseline study then references will be updated as appropriate.
Utilites	Reviewing files for updated references. If values change based on MA Baseline study then references will be updated as appropriate.
Utilites	Reviewing files for updated references. If values change based on MA Baseline study then references will be updated as appropriate.
Utilites	Reviewing files for updated references. If values change based on MA Baseline study then references will be updated as appropriate.

Glenn Reed	Most of these measures are not program supported and unlikely that they will be. Revisit need to characterize these. Delete (some?) from PSD?
Utilities	Agrreed to the recommendation. Reference table should be corrected to 4-BBB.
Utilities	Agreed. Both references need to be updated as they are not available to verify as given in link for Ref.(1) & (2). PSD needs to be updated with valid references.
Utilities	Will add demand savings based on referenced study from MA TRM.

Utilities	Agreed. Reference (1) needs to be updated as it is not available to verify as given in link for Ref.(1) . PSD should be updated with valid references.
Utilities	Agreed. Reference (1) needs to be updated as it is not available to verify as given in link for Ref.(2) . PSD should be updated with valid references.
Utilities	No Comment
Utilities	No Comment
Utilities	No Comment
Utilities	No Comment
Utilities	No Comment
Utilities	will ERS re run the Resfen?

Utilities	will ERS re run the Resfen?
Glenn Reed	CT now has an all-electric package. THe PSD should speak to this as to baseline considerations. It's primarily targeted to what otherwise would be propane heated homes
Glenn Reed	CT now has an all-electric package. THe PSD should speak to this as to baseline considerations. It's primarily targeted to what otherwise would be propane heated homes
Glenn Reed	CT now has an all-electric package. THe PSD should speak to this as to baseline considerations. It's primarily targeted to what otherwise would be propane heated homes

Utilities	this measure is not being used but will review
Utilities	this measure is not being used but will review
Utilities	this measure is not being used but will review
Utilities	this measure is not being used but will review
Utilities	this measure is not being used but will review
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Utilities	this measure is not being used but will review
Utilities	this measure is not being used but will review

Glenn Reed	Concur with recommendation to investigate low-e storms as the measure definition
Glenn Reed	Might also need to distinguish between conventional and low-e storms
Utilites	This is considered a retrofit measure and no insulation would be added to any attic openings if any insulation was pre-installed.

Utilites	Will consider running model again. However, impact evaluation may already support current values.
Utilites	WIll correct reference typo.
Utilites	WIll update nomenclature.
Utilites	Will consider parameter update. Will require procedural changes for implementers.

Utilites	Update will add complexity for HES contractors. WIll consider update with input from implementation team.
Utilites	Will update table title
Utilites	Will update table title
Utilites	Will update table title
Utilites	Will update table title
Utilites	Looks like a typo. WIll correct.
Utilites	Will include algorithm in text
Utilites	Not included in MF measures.

ERS Response	ERS Response Category
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will update language earlier in the measure to clarify that space-by-space is an option.	Action required/Resolved
Utilities reviewing recommendation pending forthcoming evaluation results from NMR.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming evaluation results from NMR.	Action required/Under Review
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Under Review
Will require follow-up: new measure is recommended. C1635 is not applicable as this is for occupancy sensors specifically.	Action required/Under Review
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Under Review

No further action	No further action
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
No further action	No further action
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
No further action	No further action
No further action	No further action
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
No further action	No further action
No further action	No further action

ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion
No further action	No further action
No further action	No further action
No further action	No further action

ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Under Review
Addressed by TRC x1941 multifamily study	Further Discussion
Addressed by TRC x1941 multifamily study	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
No further action	No further action
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved

ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
The previous methodology used in the PSD included a correction factor for cooling interactive effects baked into the delta watt value for each fixture. MA methodology informed by CT evaluation results, which we are recommending, will incorporate an ISR (which we can pull from C1635) and newer delta watt values based on observed fixture wattages, but will also require a cooling interactive effects multiplier.	Action required/Under Review
No further action	No further action

No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
We are recommending controls as a separate sub-measure within lighting (proposed as 2.1.3, see above), because of interactivity between lighting controls savings and fixture operating wattage savings. Different control types offer different savings percentages. Presumably a dimming correction factor can be included as well in this new lighting control measure.	Further Discussion

Under review	Action required/Under Review
Under review	Action required/Under Review

No further action	No further action
Under review	Action required/Under Review
Under review	Action required/Under Review
Under review	Action required/Under Review
No further action	No further action

Under review	Action required/Under Review
Under review	Action required/Under Review
Under review	Action required/Under Review

Addressed by TRC x1941 multifamily study	Action required/Resolved
ERS will update editorial recommendation.	Action required/Resolved
No further action	No further action
Under review	Action required/Under Review
Under review	Action required/Under Review
No further action	No further action

No further action	No further action
Under review	Action required/Under Review
No further action	No further action
Addressed by TRC x1941 multifamily study	Action required/Resolved
Addressed by TRC x1941 multifamily study	Action required/Resolved
Under review	Action required/Under Review

Under review	Action required/Under Review
Noted and we agree that if the models were run based on CT weather and showed no/minimal savings, this measure can be removed.	Action required/Resolved
Noted and we agree that if the models were run based on CT weather and showed no/minimal savings, this measure can be removed.	Action required/Resolved
As noted in the comments above and C1634 evaluation, these models were run with CT weather and the savings were minimal. Hence we agree that it would be appropriate to remove this measure.	Action required/Resolved

As noted in the comments above and C1634 evaluation, these models were run with CT weather and the savings were minimal. Hence we agree that it would be appropriate to remove this measure.	Action required/Resolved
This topic falls under a broader in-progress discussion between all stakeholders. Once an agreement is reached, we'll update the measure reviews accordingly.	Further Discussion
Great point! Considering the airborne transmission of COVID-19 virus, ASHRAE suggested some HVAC-related actions. One of them is to increase outdoor air ventilation by disabling DCV and opening outdoor air dampers to 100% as indoor and outdoor conditions permit in the buildings that remained open. (https://www.ashrae.org/file%20library/about/position%20documents/pd_infectiousaerosols_2020.pdf)". As this could be a non-permanent action, we will recommend adding a note to the DCV measure in the PSD to examine the ASHRAE suggestions in the future related to spread of viruses such as COVID-19.	Action required/Resolved
Utilities reviewing recommendation	Action required/Under Review

Utilities reviewing recommendation	Action required/Under Review
No further action	No further action
Utilities reviewing recommendation	Action required/Under Review
The minimum efficiencies listed in this measure were taken from ASHRAE 90.1 2016, which separates air-conditioner cooling-only systems (Table 6.8.1-9) and cooling/heating systems (Table 6.8.1-10).	Action required/Resolved

No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
Addressed by TRC x1941 multifamily study	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
ERS will update editorial recommendation.	Action required/Resolved
Addressed by TRC x1941 multifamily study	Action required/Resolved

ERS will review and incorporate recommendations of recent evaluations (C1635)	Action required/Resolved
https://api-plus.anbetrack.com/etrm-gateway/etrm/api/v1/etrm/documents/5ee4884c6996f21cdf7df6f9/view?authToken=e30fe17c0dc07757af70d99be27d201b7dc72bfc07bb38eca6bddc2319d5f8bca719f7188ecdad62b4d316095d88c9591d9942a9d6667d9c1eda71037743a97312c8e5680e2808	Action required/Resolved
https://api-plus.anbetrack.com/etrm-gateway/etrm/api/v1/etrm/documents/5ee4884c6996f21cdf7df6f9/view?authToken=e30fe17c0dc07757af70d99be27d201b7dc72bfc07bb38eca6bddc2319d5f8bca719f7188ecdad62b4d316095d88c9591d9942a9d6667d9c1eda71037743a97312c8e5680e2808	Action required/Resolved
No further action	No further action
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion

Awaiting NMR evalution results	Action required/Under Review
Coincidence factors are based on a CT-specific evaluation result, so the NY and MA TRM values are less relevant. The exterior direct install CFs may be zero or nearly zero, but we would need to confirm.	Action required/Resolved
MA kW to kWh ratios in 2019 report TRM is listed as 0.00025 kW/kWh, though summer and winter CFs are different.	Action required/Under Review
ERS will update supporting info	Action required/Under Review
This is not currently addressed in the CT PSD for residential systems. MA uses a fixed heat impact of 2,295 Btu/kWh. A similar interactive penalty for residential systems could be inserted, using the same factors shown for commercial buildings in PSD2.1.2, but further research would need to be undertaken to develop a residential-specific factor.	Action required/Under Review
Awaiting NMR evalution results	Action required/Under Review
Utilities reviewing recommendation pending forthcoming evaluation results from NMR.	Action required/Under Review
No further action	No further action

Utilities reviewing recommendation	Action required/Under Review
Under review	Action required/Under Review
Under review	Action required/Under Review
No further action	No further action

Will provide reference	Action required/Under Review
No further action	No further action

No further action	No further action
No further action	No further action

Under review	Action required/Under Review
Under review	Action required/Under Review
Under review	Action required/Under Review

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No further action	No further action
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Under review	Action required/Under Review
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion

No further action	No further action
ERS to discuss at 7/15/2020 meeting with stakeholders	Further Discussion

No further action	No further action
No further action	No further action
Agreed. 2012 NY study was mentioned to clarify the weakness of that particular measure in the NY TRM.	Action required/Resolved
Value is based on CT specific 2018 study. Added table on the 4.2.14 supporting info tab to show work.	Action required/Resolved
Value is based on CT specific 2018 study. Added table on the 4.2.14 supporting info tab to show work.	Action required/Resolved
Would need a CT specific baseline study to confirm.	Action required/Under Review

Not necessarily. Recent ERS study of a limited sample in NY indicated relatively low, or even negative, savings per site depending on behavioral factors. We are currently working on a follow-up study of AMI data in NY and would recommend a similar study in CT if possible.	Action required/Under Review
Not necessarily. Recent ERS study of a limited sample in NY indicated relatively low, or even negative, savings per site depending on behavioral factors. We are currently working on a follow-up study of AMI data in NY and would recommend a similar study in CT if possible.	Action required/Under Review
Not necessarily. Recent ERS study of a limited sample in NY indicated relatively low, or even negative, savings per site depending on behavioral factors. We are currently working on a follow-up study of AMI data in NY and would recommend a similar study in CT if possible.	Action required/Under Review
Added in 4.2.14 Supporting Info tab.	Action required/Resolved
Agreed- changed from "Learning thermostat" to "Smart thermostat"	Action required/Resolved
No further action	No further action

No further action	No further action
Utilities reviewing recommendation	Action required/Under Review
Utilities reviewing recommendation	Action required/Under Review
Utilities reviewing recommendation	Action required/Under Review
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Utilities reviewing recommendation	Action required/Under Review
Utilities reviewing recommendation	Action required/Under Review
We have updated the HF recommended to the values recommended in the 2018 CT R1614/1613 evaluation study: 38,750 Btu/sf for furnaces and 42,600 Btu/sf for boilers. The Wi-Fi thermostat also referenced the same study.	Action required/Resolved

No further action	No further action
No further action	No further action

Addressed by TRC x1941 multifamily study	Action required/Resolved
Addressed by TRC x1941 multifamily study	Action required/Resolved
Addressed by TRC x1941 multifamily study	Action required/Resolved
We will include fossil fuel savings for the Clothes washer (Tier I & II) and Dishwasher.	Action required/Resolved
We will include fossil fuel savings for the Clothes washer (Tier I & II) and Dishwasher.	Action required/Resolved
We revisited the measure review and looked back at the 2017 VT TRM and found that the value in the 2017 TRM was the same as the 2018 TRM. It doesn't look like the savings have dramatically increased between the two sources, so it looks like the reference for these values may be incorrect in the CT PSD. We also looked at the 2016 VT TRM, and the savings values matched the 2017 and 2018 TRMs.	Action required/Resolved
We revisited the measure review and looked back at the 2017 VT TRM and found that the value in the 2017 TRM was the same as the 2018 TRM. It doesn't look like the savings have dramatically increased between the two sources, so it looks like the reference for these values may be incorrect in the CT PSD. We also looked at the 2016 VT TRM, and the savings values matched the 2017 and 2018 TRMs.	Action required/Resolved

We revisited the measure review and looked back at the 2017 VT TRM and found that the value in the 2017 TRM was the same as the 2018 TRM. It doesn't look like the savings have dramatically increased between the two sources, so it looks like the reference for these values may be incorrect in the CT PSD. We also looked at the 2016 VT TRM, and the savings values matched the 2017 and 2018 TRMs.	Action required/Resolved
We revised the savings for this measure to 10.7 kWh based on the R1973 Retail Non-Lighting evaluation study findings.	Action required/Resolved
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review

Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
Addressed by TRC x1941 multifamily study	Action required/Resolved

Under review	Action required/Under Review
No further action	No further action
No further action	No further action
No further action	No further action

No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
Propose Further Secondary Research	Action required/Under Review

Propose Further Secondary Research	Action required/Under Review
Agreed that the basline home referenced in the measure was predominantly fossil fuel-based heating (only one GSHP in NRM's study sample), while the transformation of the market to electric heating (heat pumps) may necessitate the inclusion of an additional baseline home type. We will add a note accordingly in the review.	Action required/Under Review
Agreed that the basline home referenced in the measure was predominantly fossil fuel-based heating (only one GSHP in NRM's study sample), while the transformation of the market to electric heating (heat pumps) may necessitate the inclusion of an additional baseline home type. We will add a note accordingly in the review.	Action required/Resolved
Agreed that the basline home referenced in the measure was predominantly fossil fuel-based heating (only one GSHP in NRM's study sample), while the transformation of the market to electric heating (heat pumps) may necessitate the inclusion of an additional baseline home type. We will add a note accordingly in the review.	Action required/Under Review

No further action	No further action
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No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
Addressed by TRC x1941 multifamily study	Action required/Resolved

No further action	No further action
No further action	No further action
Since the savings are based on uninsulated attic openings rather than old deteriorated existing insulation, we thought it would make it clearer to specify uninsulated attic openings.	Action required/Under Review

Utilities reviewing recommendation pending forthcoming MA evaluation.	Action required/Under Review
No further action	No further action
No further action	No further action
No further action	No further action

No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
No further action	No further action
Addressed by TRC x1941 multifamily study	Action required/Resolved