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TETRA TECH

Heat Pump Working Group
Biweekly meeting Agenda
Date: 06/04/2024 @ 11:00 CDT

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Access	PUC – Interchange Filing: Case 56510 Interchange - Documents (texas.gov) Teams site: https://tetratechinc.sharepoint.com/:f:/r/teams/PUCTHeatPumpWorkinggroup/Shared%20Documents/General?csf=1&web=1&e=mCHkEh Past Meeting recordings: https://vimeo.com/channels/HPWG
Review of Residential Measure Barriers	Residential Measure 2.2.2 (Review) • Load Calculations (Manual J & S) • Consumption hours • Right-sizing calculations (limitations to different capacities) • Winter savings for gas heat replacement – Baseline as std. heat pump • Winter savings for HP replacement – Pre and post are both equal amount of supplemental heat (77%) • Current ID of VSHP is based on SEER being greater than 15.2 • VSHP do not have the mismatched equipment concern seen with units a few years ago. • New Construction baseline = 115% of summer load • Summer and Winter Peak Coincident demand factors need to adjust based on summer peak capacity and winter supplemental heat. • EFLH is multiplied times SEER/HSPF to determine consumption. • EUL is 15 years for heat pumps.
Identification of Commercial Barriers that vary from Residential	Commercial Measure 2.2.2 • Replacement capacity limited to 20% adjustment • New Construction baseline capacity = Installed capacity • Baseline efficiencies per DOE standards or IECC2015
Discussion Schedule	○ May 7: Identification of VSHP, Load Calculation requirements, Consumption calculation (EFLH), EUL ○ May 21: Summer Peak & Consumption ○ **June 4: Winter Peak & Consumption** ○ June 18: Baseline Equipment and Right sizing calculation ○ July 02: Envelope incorporation ○ July 16: Draft measure
Illinois TRM savings calculation approach	ASHPSiteCoolingImpact = ((CoolingLoad/DuctlessSave * (1/(SEER2_base * (1 – $DeratingCool_{Base}$)))) MINUS (CoolingLoad * 1/(SEER2_ee * (1 – $DeratingCool_{Eff}$))))/1000

	ASHPSiteHeatingImpact = ((HeatLoad_Disp/DuctlessSave * (1/(HSPF2_base * HSPF2_ClimateAdj * (1 – $DeratingHeat_{Base}$)))) MINUS (HeatLoad_Disp * 1/(HSPF2_ee * HSPF2_ClimateAdj * (1 – $DeratingHeat_{Eff}$)))) / 1000
Winter Consumption	$Heating\ Energy\ Savings\ [kWh_H] = \left(\frac{Cap_{H,pre}}{\eta_{baseline,H}} - \frac{Cap_{H,post}}{\eta_{installed,H}}\right) \times EFLH_H \times \frac{1\ kW}{1{,}000\ W}$ • $Cap_{C,pre}$ = Existing Equip. (ER) or match $Cap_{C,post}$ (ROB/NC) Upsizing/Downsizing rules apply. • $\eta_{baseline,H}$ = HSPF of Heat Pump (6.7-7.5) or Electric Resistance (3.4) • $\eta_{installed,H}$ = HSPF • $EFLH_H$ = Effective Consumption Hours at full load **Climate zone** / **$EFLH_H$** Zone 1: Amarillo — 1,880 Zone 2: Dallas — 1,343 Zone 3: Houston — 1,127 Zone 4: Corpus Christi — 776 Zone 5: El Paso — 1,559
Winter Peak	$Winter\ Peak\ Demand\ Savings\ [\Delta kW] = \left(\frac{Cap_{H,pre}}{\eta_{baseline,H}} - \frac{Cap_{H,post}}{\eta_{installed,H}}\right) \times CF_W \times \frac{1\ kW}{1{,}000\ W}$ • Coincident Factor current calc: Air Conditioning Contractors of America (ACCA) Manual S recommends that residential heat pumps be sized at 115 percent of the maximum cooling requirement of the residence (for cooling-dominated climates). Based on AHRI data for 1.5–5 ton HVAC systems, the average ratio of rated heating capacity to cooling capacity is 0.96. Assuming that maximum heating occurs during the peak period and adjusting for the average ratio of heating to cooling capacity, the guideline leads to a coincidence factor of 0.96 / 1.15 = 0.83.
Summer Peak	Tetra Tech provided a background on the coincident factor currently used in the peak demand savings calculation. The current factor incorporates the assumption that the capacity is a 15% oversize. With time available, Tetra

	Tech provided guidance that the coincident factor is expected to be adjusted in the calculation to manage the capacities to load variation. $Summer\ Peak\ Demand\ Savings\ [\Delta kW] = \left(\frac{Cap_{C,pre}}{\eta_{baseline,C}} - \frac{Cap_{C,post}}{\eta_{installed,C}}\right) \times CF_S \times \frac{1\ kl}{1{,}000}$ • Coincident Factor current calc: Air Conditioning Contractors of America (ACCA) Manual S recommends that residential heat pumps be sized at 115 percent of the maximum cooling requirement of the residence (for cooling-dominated climates). Assuming that maximum cooling occurs during the peak period, the guideline leads to a coincidence factor of 1 / 1.15 = 0.87.
Next Meeting	June 18 at 11:00 Topic – Baseline Equipment and Right sizing calculation