DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Product: Thermostat Optimization - CO **Description:**		
Residential electric and combo customers can receive a rebate for installing an Energy Star certified smart thermostat. Additional savings may be claimed for seasonal savings from smart thermostat optimization.		
Program References:		
Measure "Smart Thermostat Optimization"	See "Programmable Thermostat" from 'Home Energy Squad - CO' for equations and variables with the exception of Cooling_Delta_T and Heating_Delta_T which are documented in the Variable ID table below.	
Equations:		
ENERGY STAR Smart Thermostat Demand Savings (Gross kW)	= Baseline kW * (1 - ES_Reduction_Cooling) * Cooling Scaling Factor	
ENERGY STAR Smart Thermostat Electrical Energy Savings (Gross Annual kWh)	= Baseline kW * (1 - ES_Reduction_Cooling) * EFLH * Cooling Scaling Factor	
ENERGY STAR Smart Thermostat Coincident Demand Savings (Gross PCkW)	= Baseline kW * (1 - ES_Reduction_Cooling) * EnergyStar_CF * Cooling Scaling Factor	
ENERGY STAR Smart Thermostat Gas Savings (Gross Dth/Yr)	= Baseline Dth * (1 - ES_Reduction_Heating) * Heating Scaling Factor	
Variable ID	**Value**	**Description**
ES_Reduction_Cooling	10%	Energy Star Connected Thermostat criteria for annual cooling equipment runtime reduction (Reference 1)
ES_Reduction_Heating	8%	Energy Star Connected Thermostat criteria for annual heating equipment runtime reduction (Reference 1)
Baseline kW	2.912	Forecasted High Efficiency Thermostat gas use from 'Home Energy Squad - CO'
EFLH	573	Forecasted High Efficiency Thermostat gas use from 'Home Energy Squad - CO'
Baseline Dth	60.2	Forecasted High Efficiency Thermostat gas use from 'Home Energy Squad - CO'
Heating_Delta_T	0.81	Average degrees of setback during heating season for seasonal thermostat savings
Cooling_Delta_T	0.38	Average degrees of setback during cooling season for seasonal thermostat savings (Reference 2)
EnergyStar_CF	76%	Coindicence Factor for High Efficiency Thermostat from 'Home Energy Squad - CO'

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Measure Life	10	Measure life for programmable thermostat (Reference 4)
Incremental Cost	$ 215.00	Incremental cost for ENERGY STAR smart thermostat.
NTG	100%	Net-to-gross factor. Assumed to be 100% for a new program.
Cooling Scaling Factor	Table 1	Cooling energy and demand percent adjustment for home types
Heating Scaling Factor	Table 1	Heating energy percent adjustment for home types

Table 1

Home type	Single Family	Multifamily	Townhome
Cooling Scaling Factor	100%	35%	64%
Heating Scaling Factor	100%	15%	52%

References:

1. ENERGY STAR Connected Thermostat Key Product Criteria - https://www.energystar.gov/products/heating_cooling/smart_thermostats/key_product_criteria
2. 2017 Seasonal Savings Evaluation, Navigant, 3/5/2018
3. Xcel Study of Winter Seasonal Savings, 2017-2018, Initial Estimates
4. Lifetime of 10 years for programmable T-Stats from "Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures", June 2007 by GDS Associates.

Changes from 2017 / 2018 Plan

1. New program
2. Incorporated load scaling factor for different home types (single family, multifamily, townhome).