

TRM Hot Water Conservation Group Meeting Notes

July 28, 2014

Golden Rule Building LL35, St. Paul, MN

Prepared by Minnesota Department of Commerce

Attendees

Name	Organization	In-Person	GoTo Meeting
Joe Krekeler	Xcel Energy	X	
Bruce Boerner	Xcel Energy	X	
Eric Johansen	CenterPoint Energy	X	
Audrey Peer	CenterPoint Energy	X	
Jill Eide	Dakota Electric	X	
Joel Haskard	CERTs	X	
Alexis Troschinetz	CERTs	X	
Mark Garofano	Commerce	X	
Joe Plummer	Commerce	X	
Mary Sue Lobenstein	Commerce	X	
Jessica Burdette	Commerce		X
Adam Zoet	Commerce		X
Tim Gallagher	Minnesota Power		X
George Roemer	Franklin Energy		X
Bryce Dvorak	Michaels Energy		X
Jason Grenier	Otter Tail Power		X
Ben Schoenbauer	CEE		X
Jeremy Fischer	Great Plains Natural Gas		X
Jeff Haase	Great River Energy		X
Will Nissen	Fresh Energy		X
Travis Hinck	GDS Associates		X
Norma Elizondo	Shower Start		X
Kurt Hauser	MRES		X
Joe Rocco	AEG		X

Presenter: Joe Plummer, Minnesota Department of Commerce

NOTES

- AGENDA
 - Measure Review/Discussion
 - Groundwater Temperature
 - Individual Measures
 - Wrap-Up/Next Steps
- Measure Review/Discussion
 - Groundwater Temperature
 - Location/Temperature Table
 - Based on NREL algorithm implemented in Building America (BA) analysis spreadsheet
 - Link in presentation
 - Derivation of 4 cities in each zone to obtain zone averages table
 - CEE has reviewed NREL algorithm and has worked with researchers. There are some concerns with how snow depth impacts accuracy of model further north. NREL is trying to incorporate into the analysis. CEE will check to see timeline of updating this data.
 - Xcel used Denver's water temperatures for Colorado filing, which was higher than NREL data. Have used water utility data for this data. Temperature entering water heater will be slightly higher due to warming in space.
 - CEE has measured inlet to house and inlet to water heater temperature. Wide range due to uses in house. Variation in well temperature versus surface water temperature varied between winter and summer, but annual averages were very similar. Average inlet water temperature in Minneapolis is approximately 55 F versus 52 F from NREL. Average outdoor temperature was higher with actual data versus NREL modeled data.
 - George Roemer – does not know what weather set BA spreadsheet uses, believes it is a 30 year TMY weather average.
 - Joe Plummer will look up this information.
 - *Update (JP): It appears that the BA spreadsheet uses TMY3 weather set.*
 - Alexis Troschinetz (CERTS) suggests that could consider getting average ground water temperature from sources like MPCA. There will be changes after water treatment and entering the space.
 - Tim Gallagher – what is the impact of a degree or two difference in groundwater temperature?
 - 2% for showerheads, higher impact for aerators with setpoint around 80 degrees.
 - Alexis Troschinetz (CERTS) -If you have your temperature and proof of this temperature, are you allowed to use your own temperature? Will discuss shortly
 - Joe Plummer – All measures discussed today have both electric and gas versions, only difference is the conversion factors
 - Commercial Hot Water Faucet Aerator
 - Required Inputs Listed
 - Current Standard is 2.2 gpm (was 2.5 gpm when measure was designed) – needs to be adjusted in future version

- Both gpm base and gpm low are throttled back due to the fact that faucets typically don't flow full bore (1.2 & 0.94 gpm for base and efficient)
- 90 F faucet temperature – obtained from field, mixture of hot and cold water in faucets
- Uses Recovery Efficiency for Efficiency of Water Heater – higher than energy factor of water heater which includes standby losses
- DF – Drain Factor, uses that are volumetric in nature and aren't affected by flow rates (generated by Illinois TRM work group)
- GPMFactor – variation between Kitchen and Bath aerators
- Days Per Year deemed by Building Type
- Measure Life of 10 years based on 2008 DEER value
- Questions
 - 9.85 minutes per day from what source?
 - 2.5 – 1.2 gpm, 1.5 – 0.94 gpm, why the different amounts of throttling? Evaluation study was from actual rates in the field. Illinois' latest TRM has updated the base to 1.39 gpm.
 - How many people are rebating aerators in commercial buildings? Centerpoint has a custom rebate, Xcel doesn't have a prescriptive rebates, Minnesota Power does not have prescriptive.
 - Could we deem the values conservatively (for people, fixture type, and number of faucets).
 - Why we need the number of faucets?
 - Deemed usage by facility type? Usages vary a lot based on the type of building.
 - Xcel has not been getting the applications in for this measure. This measure would have the most traction in a direct install program.
 - Centerpoint – Deemed 90 F temperature, said ASHRAE temperature is 105 F. Says that this value should be closer to 105 F.
 - People might not wait for the temperature to reach 105 F.
 - CERTS – Days per Year for sit down restaurants, should this be lower?
- Residential Hot Water Faucet Aerator
 - Customer Inputs
 - Faucet Temperature of 80 F
 - Flow differential of 1.0 (2.5 gpm to 1.5 gpm aerator) – no throttling
 - Hot water measures have been a moving target in a number of states
 - Illinois had used throttling in its res aerator measure at the time MN's was developed but this resulted in lower savings compared to most other TRMs, therefore Franklin chose to use no throttling
 - Measure Lifetime of 10 years
 - Days Per Year – 365 days/year
 - Questions
 - Centerpoint – Tfaucet of 80 F, hard value to measure, could this be higher? ASHRAE reference of 105 F at times. 80 F is more realistic for bathrooms, 105 F for kitchen.
 - CERTS used 2.2 gpm base due to federal standards

- Xcel differentiates temperatures between kitchen and lavatory faucets. Also assume lower flow rate for aerator faucets (1.0 gpm).
- Existing Rebates
 - Xcel – Prescriptive Rebate, send kitchen aerator (1.5 gpm) and bathroom aerator (1.0 gpm) with showerhead. Mail in and Direct Install
 - Centerpoint – Prescriptive Rebate, work with Xcel on Home Energy Squad – just checks type of water heater (gas/electric)
- Savings is low enough that gathering additional data is not worth it, so more deemed values would be helpful.
- Centerpoint assumes the most conservative zone for all customers instead of assigned zone by county. Xcel does the same thing (Zone 3 temperature).
- Centerpoint – Recovery Efficiency for multifamily should be higher. Currently 0.75 efficiency for all building types
- Does a tank less water heater lead to a different efficiency? Yes it does, especially if they are condensing water heaters.
- Is the 1.125 minutes per faucet a low number? Michigan study shows 4.5 minutes/person/day for kitchen and 1.6 m/p/d for bathroom.
- Commercial Hot Water – Pre Rinse Sprayers
 - Customer Inputs
 - Water Heater Type
 - Building Type
 - Location
 - Uses throttled flows (2.23 gpm base, 1.12 gpm eff). Hours base is 0.44 hr/day, eff is 0.60 hr/day.
 - T mix is 105 F
 - Recovery Efficiency of 0.75
 - Measure Life of 5 years
 - Questions/Concerns
 - Water Temperature could go as high as 135/140 F.
 - Xcel: in practice 140F would make the sprayer too hot to hold
 - Higher temperatures remove food particles from pans and plates more efficiently
 - Xcel likes that there are more hours for efficient equipment due to lower flow
 - Centerpoint – CEE (eastern, not local) document mentions 120 F optimal temperature.
 - CERTS – lifetime of 5 years seems too long. Have heard anecdotally that valves often break, or get clogged due to scaling.
 - Federal Energy Management Program study mentions 5 years.
 - Who is currently rebating sprayers?
 - Centerpoint – Prescriptive Rebate, \$15/unit, do at most 20 units per year
 - Xcel is currently not offering any prescriptive rebates

- Low incremental cost between replacing with standard efficiency unit and efficient unit.
- Some customers do not want low flow because reduced pressure does not work as well to remove particles
- MERC – prescriptive rebates, small percentage of use
- MP – no real work in this area outside of pilots
- Add congregation as facility type, senior living as a category?
 - Could be large variations in congregations – i.e., large ones have a lot of events like weddings and funerals, smaller ones fewer, impacts hot water usage
- Residential Showerheads
 - Water Saved ratio based on no throttling, 2.5 gpm to 1.5 gpm from base case to efficient
 - Shower Temperature of 105 F, ASHRAE uses 110 F.
 - Customer Inputs
 - Water Heater Type
 - Type of Facility
 - Location
 - Rebate Programs
 - Xcel – give out one showerhead unless you indicate there are 4 people in the household, then a second be given to the same household, deem the savings per household
 - Centerpoint – can give out to 3 showerheads, deem the savings per household
 - Concern by CPE that trying to obtain too much information like # of showerheads and people in the home could deter people from filling out rebate form
 - Question: what is the coincidence factor for these measures?
 - Average demand savings (kWh savings divided by 8,760)
- Residential Water Heater Setback
 - Intended for Direct Install Program where utility representative is on site and dials down the temperature
 - Starting temperature deemed at 130 F, efficient temperature at 120 F
 - Gallons of hot water consumed per person based on building type, num. of people per household based on building type
 - Minimum energy factor 0.92 assuming a 40 gal tank (electric), 0.59 (gas)
 - Savings factor of 4% assumed, based on Energy Star figure
 - Xcel – savings are purely from reduced standby losses, hot water flow rate will increase when temperature is 120 F because faucet temperatures are set by occupants and will remain the same. This ignores uses such as dishwashers that heat the water up to a certain set point.
 - Mark Garafano: CT TRM factors dishwashers into setback measure
 - Centerpoint – our thinking was savings are from energy balance of heating the water up 10 fewer degrees

- Joe Plummer: savings of 4% is between the original MN measure which used energy balance approach (higher savings) and IL TRM which ignored standby losses (lower savings) and was consistent with Efficiency Vermont TRM
 - Xcel & Centerpoint – only do it through Home Energy Squad, Direct Install
 - Dakota Electric – Does the size of the tank affect this?
 - Standby losses would be proportional to area of tank, so a larger tank could have higher losses
 - Joe Plummer: given the small impact of this measure, is the group OK with the current algorithm? Yes.
- Wrap Up
 - Summary
 - Temperatures used for each measure questioned
 - Simplify measures for inputs used due to low savings for each measure
 - Pre Rinse Spray Valve use higher temp
 - Pre Rinse Spray Valve too high of a measure life
 - Pre Rinse Spray Valve additional facilities (congregation, senior living)
 - Multiple Showerheads in a house a potential issue
 - Water Heater Setback – Just look at standby losses or other factors
 - Key recommendations
 - Raise temperature of Pre Rinse Spray Valve
 - Simplify commercial aerator measure to use more deemed inputs
 - Next Steps
 - Commerce to consider whether to make changes to current TRM or implement in a future iteration, will follow up with group
 - An additional meeting of this group does not seem necessary in the near term
 - Could meet in the future to discuss a new measure that has been presented to Joe Plummer for consideration in the TRM, thermostatic shower head
 - Bruce Boerner: I've used this device and it works great. The problem is how to quantify the savings. The savings occur from the time when the shower water reaches high temperature until when the person steps in the shower. This is behavior-dependent and varies from person to person. Also rather expensive, about \$30.