MINNESOTA DEPARTMENT OF COMMERCE

85 7TH PLACE EAST, SUITE 500
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TRM Heat Pump and AC Meeting Notes

July 30, 2014

Golden Rule Building LL35, St. Paul

Attendees (in-person):

Kurt Hauser (MRES); Craig Kredowski, Tim Gallagher (MP); Joe Plummer, Laura Silver (Commerce); Bruce Boerner, Howard Hoffman (Xcel Energy); Mike Swanson (Energy Insight); Nick VanDuzee (Centerpoint); Dave Reinke (Dakota Electric)

Attendees (GoTo Meeting):

Lisa Pickard (Minnkota); George Roemer (Franklin Energy); Audrey Peer (CenterPoint); Joe Steffel (City of Buffalo); Mary Sue Lobenstein, Adam Zoet (Commerce); John O'Neil (SMMPA); Alexis Troschinetz (CERTs); Ben Schoenbauer (CEE); Bryce Dvorak (Michaels Energy); Travis Hinck (GDS Associates); Jeff Haase (GRE); Joe Rocco (Applied Energy Group); Kevin Disse, Jason Grenier (Otter Tail Power)

Presenter: Mark Garofano, MN Dept of Commerce

Notes

Agenda

- Commercial HP systems
- Residential AC/ASHP
- Residential AC/ASHP QI
- Residential AC/ASHP Tune-up
- Residential ECM Blowers
- Energy Star Dehumidifiers

Commercial HP systems

- No oversizing factor because heat pumps usually include auxillary heating backup and therefore are not oversized
- Correction factor of 0.7 accounts for using HDD base of 65F
- Same HDD as other heating measures?
  - Does HDD capture effect of heat pump becoming less efficient as temperature drops?
  - Captured to some extent with HSPF
    - Rated at 2 or 3 temperatures and take average
    - May or may not reflect operating conditions in MN
    - Travis Hinck will pass on Illinois heat pump measure – used a different methodology
    - Commercial unitary DX baselines are higher at these ranges. Why difference?
      - 11.4-19.9 tons
      - 20-63.3 tons
      - Answer: ASHRAE says to apply difference of 0.2 EER for electric heating systems
- Do full load heating hours include internal loads?

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    - Factored into correction factor which was derived from energy modeling
- Baseline is standard efficiency air source heat pump

Residential Central AC/ASHP

- Effective full load cooling hours
    - Hours for Zone 1 are based on Duluth
    - Otter Tail is significantly different from Duluth
    - They intend to use Zone 2 for Zone 1 as a result
    - We could look at using average of different cities rather than just Duluth
- Measure lifetime of 18 years should be shortened for early retirement
    - Xcel used 7 years. No savings after 7 years because can't say for certain that new federal standard will be lower than installed efficiency.
- For utilities that include an early retirement option, how do you verify?
    - In CO, Xcel asks on rebate app
    - Travis Hinck: Illinois program
        - In our specific program we're trying a method I came up with just for furnaces right now. When a contractor proposes to install a new unit, in order to qualify for early replacement (which has higher savings and we now offer a higher incentive too), they have to provide a quote to repair the existing unit AND a quote for replacing it. The repair has to be less than $500 for a furnace to qualify (or the unit can be fully functional with no repair needed).
        - The rationale is that if the customer has a viable repair option, they may choose that instead of replacement, so if they do choose to replace it, we know that it's early. And if the contractor isn't willing to repair the unit for under $500, then we know that they would've had to replace the unit anyways so it doesn't qualify for early replacement.
        - I think the real advantage to this is that the number of people who replace fully functional equipment with new efficient units is a small population. With this strategy, a contractor who is already on site to make a minor repair can sell the early replacement option to a whole new set of people who would never have otherwise considered it.
        - We just added it to our program in June; we haven't seen it in action through a heating season yet, so I can't vouch for its effectiveness, but the contractors we've described it to are excited about rolling it out this year.
- Baseline is standard efficiency air source heat pump
- QI savings are in separate measure
- Supplemental heating – electric or gas?
    - Commerce to verify and share with group
    - Commerce to provide breakout of heat pump versus aux hours, temperature threshold

Residential Central AC/ASHP Quality Installation

- Measure lifetime of 18 years

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- Comment from Xcel on draft measure that 18 years is too long
  - Longer life chosen because air gaps in duct work sealed
  - Xcel uses 7 for all RCx measures including QI
    - Could argue that sizing is more permanent, but QI components have to be addressed periodically
    - Xcel will provide breakout of percentages for each QI factor
  - Commerce will research/discuss and provide feedback
- Our TRM approach for equipment only is more conservative than Xcel – doesn't use non-QI factors
- Xcel: Colorado program includes extensive M&V
  - Program requires NATE-certified contractors
  - Surprising number of installations still fail QI during M&Vl
- Xcel: MN program uses on-line training program (HVACReducation.net)
  - Contractors must pass on-line test

Res Central AC/ASHP Tune-up

- Lifetime was decreased from 3 years in draft measure to 2 years based on utility feedback
- Savings factors
  - 5% kWh
  - 2% kW
- Elements of tune-up: inspection of mechanical/electrical components operation, refrigerant charge, airflow, and coils cleaning
- Does measure include required qualifications for contractors? No
  - Xcel recommends adding qualification requirement, same as QI
- Xcel tried measure in CO but dropped
  - Used FDSI tool for diagnostics: lot of squawking from vendors
  - Hard time making program cost-effective
  - Hard to get contractors to promote and fill out paperwork
- MP tried, but also fizzled, looking at adding again
- Dakota yes
- MRES results of potential study back show huge potential from QI and tune-ups
- QI program difficult because many installations done at same time as heating system in spring or fall
  - Requires trip back in summer to test AC, contractors don't like
  - Xcel has found lots of falsified paperwork

Residential HVAC ECM Blower Motors

- Measure does not take into account climate zone
  - Very similar savings across zones

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- Is measure allowed for retrofits?
  - Commerce to verify and fix wording to be clear
  - Xcel doesn't allow retrofits because of installation quality concerns, uncertainty around remaining life of furnace
  - Dakota does do retrofits
    - Leave to discretion of contractor to recommend
  - Good upsell opportunity (MP)
  - Recommend reducing measure life by half for retrofits
- Do other utilities allow for retrofits?
  - GRE yes, most applications are for new furnaces however
  - SMMPA yes, most applications are for new furnaces however
- OTP only on new furnaces
  - They thought they could not do them for retrofits

Energy Star Dehumidifiers

- Comment on draft measure that there should be limitations on run hours if central AC present
  - It was felt that because dehumids are usually used in basement where continuous drying may be needed, no limitations needed
- Xcel does not rebate because Energy Star units are bulk of market, so appears to be a freeridership issue
  - There was a similar comment on draft measure that there appears to be minimal difference in cost between ES and non-ES units
- SMMPA rebates, but requires turn in of working old unit
  - Partners with retailers to recycle

Question from small municipal if geothermal heat pumps will be added to TRM?

- We will discuss list of new measures in next TRMAC meeting, and consider adding

Follow up items (Commerce)

- Heat pumps
  - Look into hours compared to furnaces and boilers, how efficiency degradation at lower temperatures is factored in
  - Provide breakdown in hours for heat pump hours vs supplemental heating, temperature threshold assumed
- Consider lowering Res Central AC/ASHP QI lifetime
- Consider requiring contractor qualifications for tune-up measure
- Clarify whether ECMs allowed for retrofits