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Food Retail Panel

June 6, 2017

Natural Refrigerant Stores

- ❖ Pearl-Boulder, CO pumped CO2 (low-temp)
- ❖ Trolley Sq.-Salt Lake City, UT, pumped CO2 (low-temp)
- ❖ Dedham, MA pumped CO2 (low-temp)
- ❖ Wellesley, MA low-temp DX CO2/medium temp liquid overfeed CO2, cascaded to 407A
- ❖ Lynnfield, MA low-temp DX CO2/medium temp liquid overfeed CO2, cascaded to 407A
- ❖ Fairfield, CT low-temp DX CO2 in a cascade system
- ❖ Yonkers, NY low-temp DX CO2 in a cascade system
- ❖ 3rd & Third-Brooklyn, NY Transcritical CO2
- ❖ Folsom, CA low-temp DX CO2 in a cascade system
- ❖ Castro- San Francisco, CA, low temp DX CO2/medium temp liquid overfeed CO2, cascaded to 407A
- ❖ Arden Way-Sacramento, CA low-temp DX CO2 in a cascade system (conversion from HFC)
- ❖ Gilman-Berkley, CA Transcritical CO2
- ❖ Alameda-San Jose, CA, Transcritical CO2
- ❖ Dublin, CA, low temp DX CO2/medium temp liquid overfeed CO2, cascaded to R717 (NH3)
- ❖ North Bournaby, BC Transcritical CO2
- ❖ 365 Bellevue Square, Bellevue WA Transcritical CO2
- ❖ Closter, NJ Transcritical CO2
- ❖ 365 Lake Oswego, OR Transcritical CO2
- ❖ Santa Clara, CA low temp DX CO2/medium temp liquid overfeed CO2, cascaded to R290 (Air Cooled Modular Chillers)
- ❖ 365 Silver Lake Los Angeles, CA Transcritical CO2
- ❖ Victoria, BC Transcritical CO2
- ❖ Yganacio Valley Road Walnut Creek, CA Transcritical CO2

Breakdown

- ❖ 465 stores total
- ❖ 22 stores utilizing naturals
- ❖ 12 stores utilizing all natural refrigeration systems
- ❖ 1 store all natural – synthetic free (R/HVAC)
- ❖ 1 store retrofit to natural (low-temp DX CO2)
- ❖ 50+ stores with self-contained R290 cases
- ❖ 15 – 30 stores/year in development

Opportunities

- ❖ Retrofits
- ❖ HVAC
- ❖ Higher initial system costs compared to HFC & HFO DX, but prices are quickly dropping
- ❖ Industry needs training, especially in areas outside of CA and the Northeast
- ❖ Leak rates
- ❖ Concrete energy data/studies
- ❖ CO2 Transcritical add-ons
 - ❖ Adiabatic
 - ❖ Parallell compression
 - ❖ Ejectors
 - ❖ What's next?
- ❖ Hydrocarbons and Ammonia

Victories

- ❖ 1st synthetic refrigerant-free supermarket in U.S. (3rd & Third, Brooklyn NY)
- ❖ 1 of a handful of R717/R744 Cascade Systems in U.S. (Dublin, CA)
- ❖ 1st R290/R744 Cascade System in U.S. (Santa Clara, CA)
- ❖ 10 EPA GreenChill Platinum Certifications
- ❖ Collaboration between rack OEMs, control vendors, EoR, CxAs, and installing/maintenance partners formed valuable synergies
- ❖ Partner exposure to natural systems driven by end user

- ❖ TEWI is a high priority for Whole Foods Market
- ❖ Continue to pinpoint technology options with focus on natural refrigerant solutions
 - ❖ There is no silver bullet low GWP system
 - ❖ Climate and building-type specific design
- ❖ Continue to explore off-the-shelf and custom natural refrigerant systems through collaboration with various partners
- ❖ Identify partners early
 - ❖ System (rack) OEM
 - ❖ Engineers
 - ❖ Control Vendor
 - ❖ Installing Contractor
 - ❖ Authority Having Jurisdiction (AHJ)
- ❖ Repeat, compare, evaluate
- ❖ Eventually Streamline



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Thank you very much!

