



Food Retail Panel

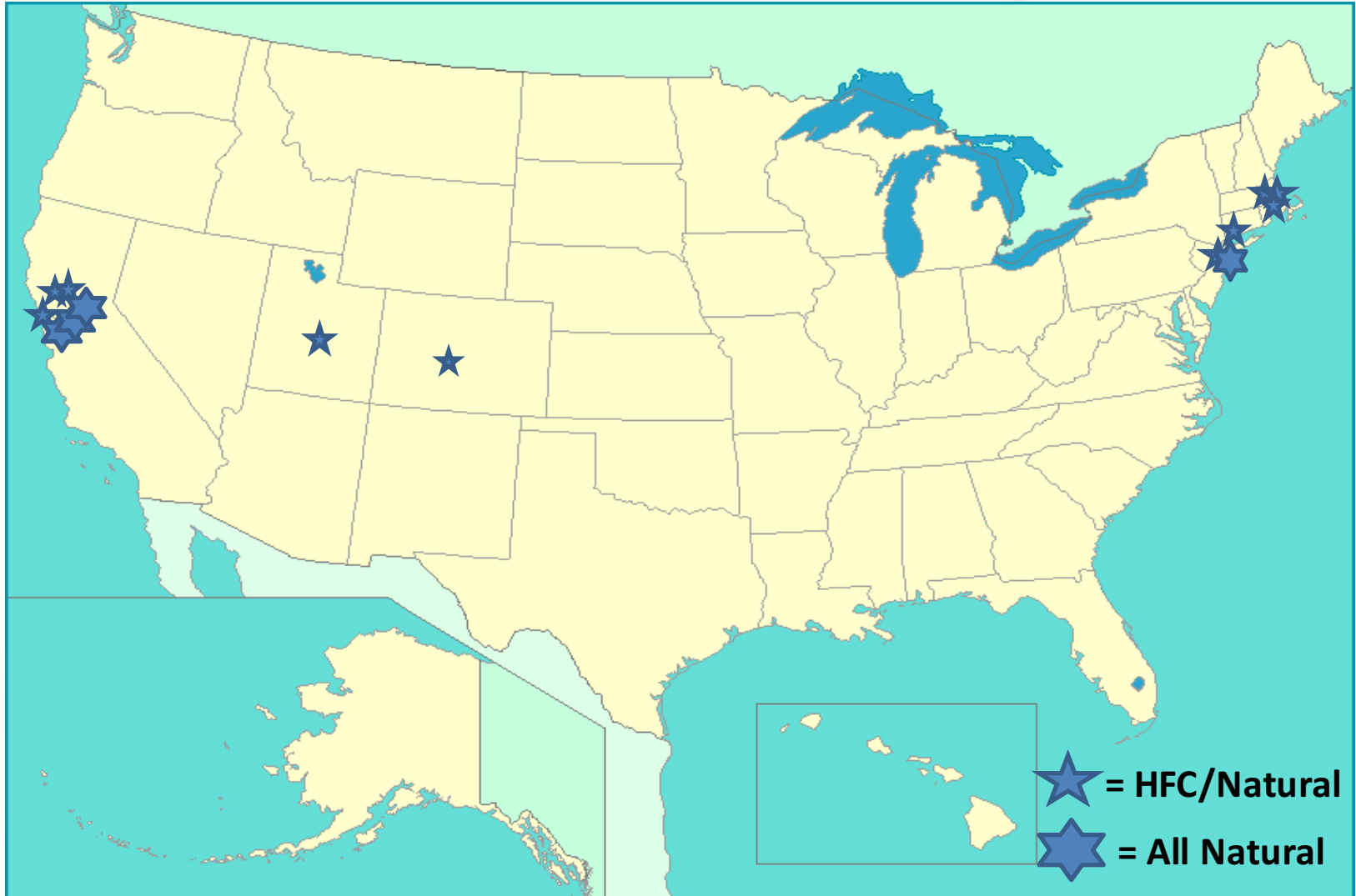
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Natural Refrigerant Stores

- ❖ 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)

Natural Refrigerant Store Map



What We Are Learning

- ❖ Higher initial system costs compared to HFC DX, but prices are quickly dropping
- ❖ Install costs are artificially high due to contractors' lack of comfort; industry needs training
- ❖ Maintenance is comparable to HFC DX system, but leak rates are higher
- ❖ Energy data is very promising

- ❖ 1st synthetic refrigerant-free supermarket in U.S. (3rd & Third, Brooklyn NY)
 - ❖ zero ozone depletion
 - ❖ low global warming potential
- ❖ 3 GreenChill Platinum Certifications
- ❖ Collaboration between rack OEM, control vendors, CxA, and maintenance partners formed valuable synergies
- ❖ Opportunity for further data analysis

- ❖ Energy and refrigerant reduction are very high priorities 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
 - ❖ Commissioning Agent
- ❖ Repeat, compare, evaluate
- ❖ Eventually Streamline