

DESIGN OF A ZNE / ADR SUPERMARKET

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PROJECT OVERVIEW

- Designed to be a flagship for Environmental Sustainability and Technology Development
- Commitment to Promote Energy Efficient Design and Evaluate New Technologies
- KEY Partnerships:
 - SUPERVALU Technology Development Team
 - Southern California Edison – Emerging Technologies Program
 - Southern California Edison - Sustainable Communities Program
 - NREL / DOE - Commercial Building Energy Alliance
 - OEM's - (Mayekawa, Hill-Phoenix, Lithonia/Acuity, etc.)

KEY PROJECT GOALS

- Provide 100% Natural Refrigerant Store - First NH₃ / CO₂ System in the US
- 100% LED Lighting with Day lighting
- Provide a minimum 30% Energy Reduction Compared to Code (goal of 50%)
- Evaluate Feasibility for NZE
 - On Site Power Generation
 - Renewable Energy Offsets
 - Technologies and Strategies to offset consumption

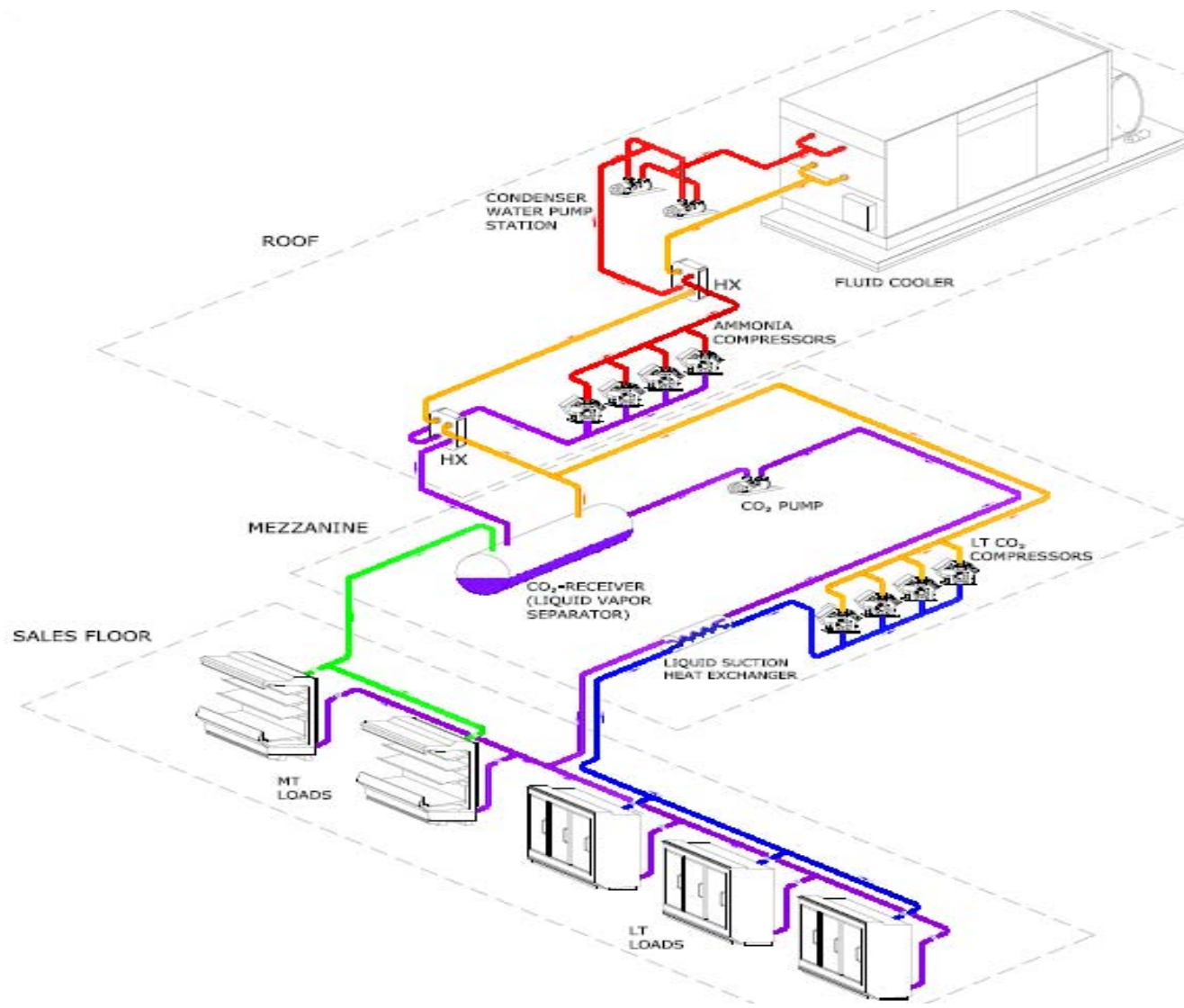
DESIGN PROCESS FOR NZE / ADR

- **Reduce Consumption First!**
 - Project Planning and Goals (Supervalu)
 - Design Kickoff - SCE Sponsored Charrette
 - Many Opportunities Reviewed:
 - KEMA Review of Natural Ventilation Opportunity
 - On-Site Power / NET Zero Energy
 - ADR
 - Alternative Refrigeration Systems
 - Thermal Storage
 - Best Technologies Selected:
 - NH3 / CO2 Refrigeration System
 - LED Lighting
 - Daylight Harvesting with Dimming
 - Medium Temperature Doors
 - High SEER RTU's

Ammonia Refrigeration System



NH3 – CO2 Cascade System



OBSTACLES FOR NET ZERO ENERGY

- Limited opportunity for on-site generation
- Rooftop PV is costly and only offsets a small portion of usage
- Challenges with Natural Ventilation (KEMA)
- Grocery Stores are energy intensive with limited alternatives on Refrigeration

Obstacles for ADR:

- Reluctance to include refrigeration systems with ADR. Product Safety Concerns
- Lighting ADR is diminished with the N-Light Day lighting system
- Integration with building management system components is complicated

KEY PROJECT RESULTS

- Tremendous Day lighting Results. Daytime dimming reductions of >90% of the lighting
- First Grocery Store with NH₃/CO₂ system greatly reducing the TEWI of the store
- Savings by Design Modeling Results
 - Reduction of KWH of ~ 750,000 (43%)

Questions:

