



# Business Case for Natural Refrigerants

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June 12-14, 2018 – Long Beach



## Utility Incentives and Natural Refrigerants

*Paul Delaney*

*Technology Area Lead*

*Emerging Products*

*Southern California Edison*

## Need

- To create an outcome-based, long-term vision for Emerging Technology (ET) efforts at SCE

## Goals

- Strategically guide SCE's ET research efforts in the most efficient manner over the next 10 years
- Align our ET focus with key SCE priorities such as GHG reduction
- Increase the effectiveness of SCE's development of new technologies into viable measures
- Optimize internal resources and identify opportunities for strategic partnerships

**TECHNOLOGY AREA**  
Plug loads remain a challenging area because of the large number of diffuse

**TECHNOLOGY AREA**  
In California, legislative initiatives including AB 802 and SB 350 along with residential

**TECHNOLOGY AREA**  
Indoor agriculture is beginning to emerge as an area of interest, driven by advances in lighting technologies, water shortages, and the passage of California Prop 64 previously industrial technologies entering the commercial market. Elsewhere, some low-global warming potential (GWP) refrigerants are emerging as safer and more efficient choices compared with incumbent refrigerants. Also, advanced controls, variable speed compressors and fans, and hybrid condensing units provide flexibility and load management opportunities that have not previously been available. At a higher level, across all sectors, there is a move toward more cross-cutting adoption of technologies that had previously only been available within a narrower subset of commercial applications.

**EDISON'S STRATEGY**  
Edison is pioneering research in low-GWP refrigerants by working with local refrigerant startups, maintaining a presence on regional and national expert groups, and undertaking pilots.

PRIORITY AREAS	TIME HORIZON	ET FOCUS	TECHNICAL POTENTIAL
CENTRALIZED COMMERCIAL REFRIGERATION SYSTEMS	5 years	Lead Collaborate	HIGH
INDUSTRIAL REFRIGERATION	5 years to 10-20% adoption rate	Collaborate	HIGH
MUNICIPAL WATER-ENERGY MANAGEMENT	5 years to 10% adoption rate	Lead Collaborate	MEDIUM

**SOUTHERN CALIFORNIA EDISON**  
Energy for What's Ahead™

*Agriculture & Water Technical Area Lead: David Rivers  
Emerging Technologies Program Manager: Edwin Hornquist  
Emerging Products Senior Manager: Gary Barsley*

*Process Loads Technical Area Lead: Paul Delaney  
Emerging Technologies Program Manager: Edwin Hornquist  
Emerging Products Senior Manager: Gary Barsley*

**For each of the 200+ technologies, the ET team outlined:**




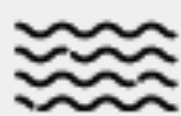




- Current state of the technology
- Marketplace drivers
- Barriers to widespread adoption
- Desired end state and time to achieve end state
- Technology milestones and specific ETP interventions to achieve those milestones
- Strategic SCE alignment
- Technical potential
- Collaboration strategy

## TPM drivers...

- . Lay out actions and milestones that can help achieve California state goals
  - . Senate Bill 350
  - . Assembly Bill 793
  - . Assembly Bill 802
  - . California Long-Term Energy Efficiency Strategic Plan (CLTEESP)
  - . Zero Net Energy (ZNE)
  - . SB 1013 – California Cooling Act (SB 1383 – SLCP)
  - . AB 109 – Greenhouse Gas Reduction Fund
  
- . Identify long-term strategy, as well as tactical path to success
  - . Components include technology barriers, milestones, prescriptive Emerging Technology Program (ETP) actions
- . Chart custom paths for each type of technology

## PROCESS LOADS

### TECHNOLOGY FAMILIES

-  FOOD SERVICE
-  HOSPITALS
-  DATA ROOMS & DATA CLOSETS
-  WATER-ENERGY MANAGEMENT (MUNICIPAL)
-  WATER-ENERGY MANAGEMENT (INDUSTRIAL)
-  REFRIGERATION (INDUSTRIAL)
-  REFRIGERATION (COMMERCIAL)
-  LABORATORIES



Process Loads Technical Area Lead: Paul Delaney  
 Emerging Technologies Program Manager: Edwin Homquist  
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### TECHNOLOGY AREA

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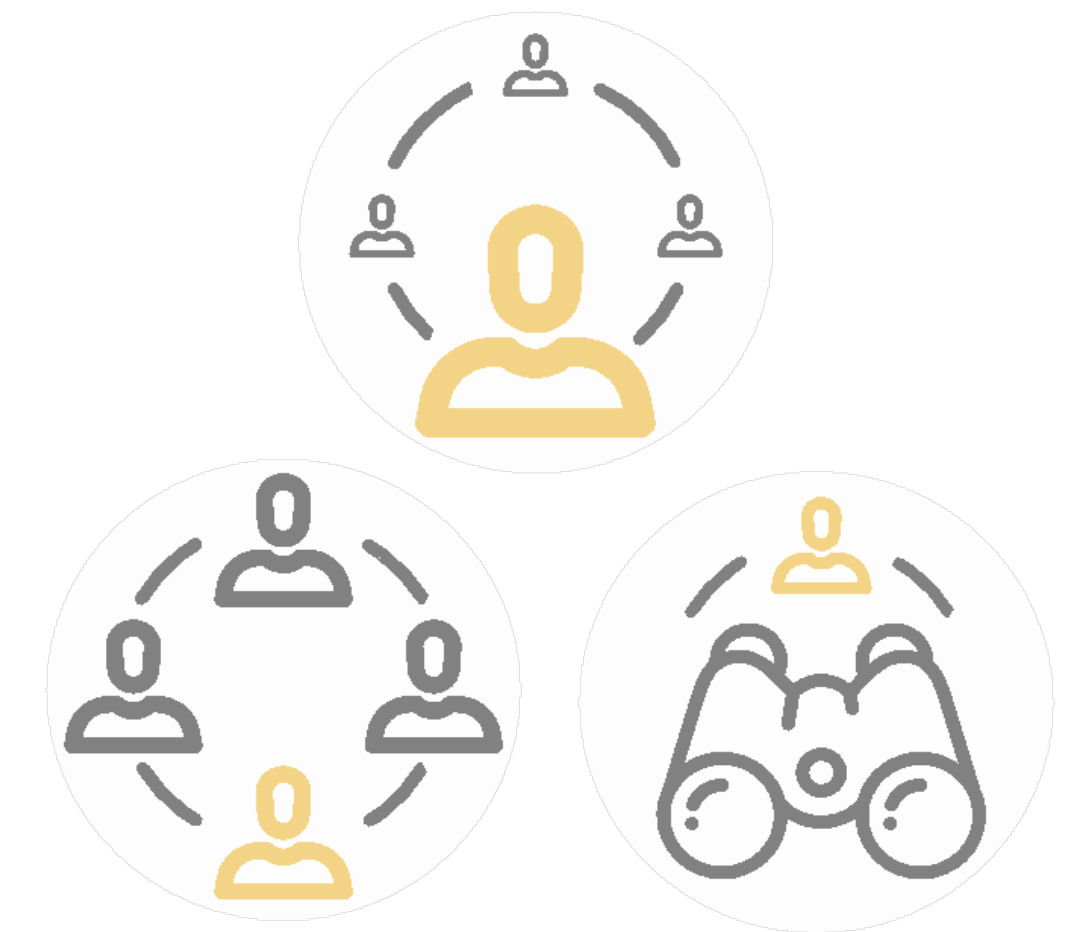
### PRIORITY AREAS

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# Collaboration and Considerations

## Statewide implementation of ET programs

- TPM designed to serve as a template for statewide technology planning
- Effective for external communication and synchronization with
  - ✓ Other California investor-owned utilities (IOUs)
  - ✓ CPUC Energy Division (ED)
  - ✓ Research partners such as *CTS, EPRI, UCoP, CESMII, DOE*
  - ✓ California Energy Commission (CEC)
  - ✓ Other technology stakeholders



# Examples...





# Examples cont'd...

The unit was placed in the environmental chamber, ...

cts



## Examples cont'd...



# Reaching Near-Zero GWP With Packaged Ammonia/Carbon Dioxide Systems

BY JOHN BUSH, P.E., ASSOCIATE MEMBER ASHRAE; SCOTT MITCHELL, J.D., P.E., ASSOCIATE MEMBER ASHRAE

Changing rules around the use of high global warming potential (GWP) refrigerants have been one of the hottest topics in the HVAC&R industry in the last few years. Following the phaseout of ozone-depleting refrigerants starting in the 1990s, the U.S. EPA, acting under the Significant New Alternatives Policy (SNAP) program, has recently changed the status of certain high GWP refrigerants. In the next several

# Examples cont'd...

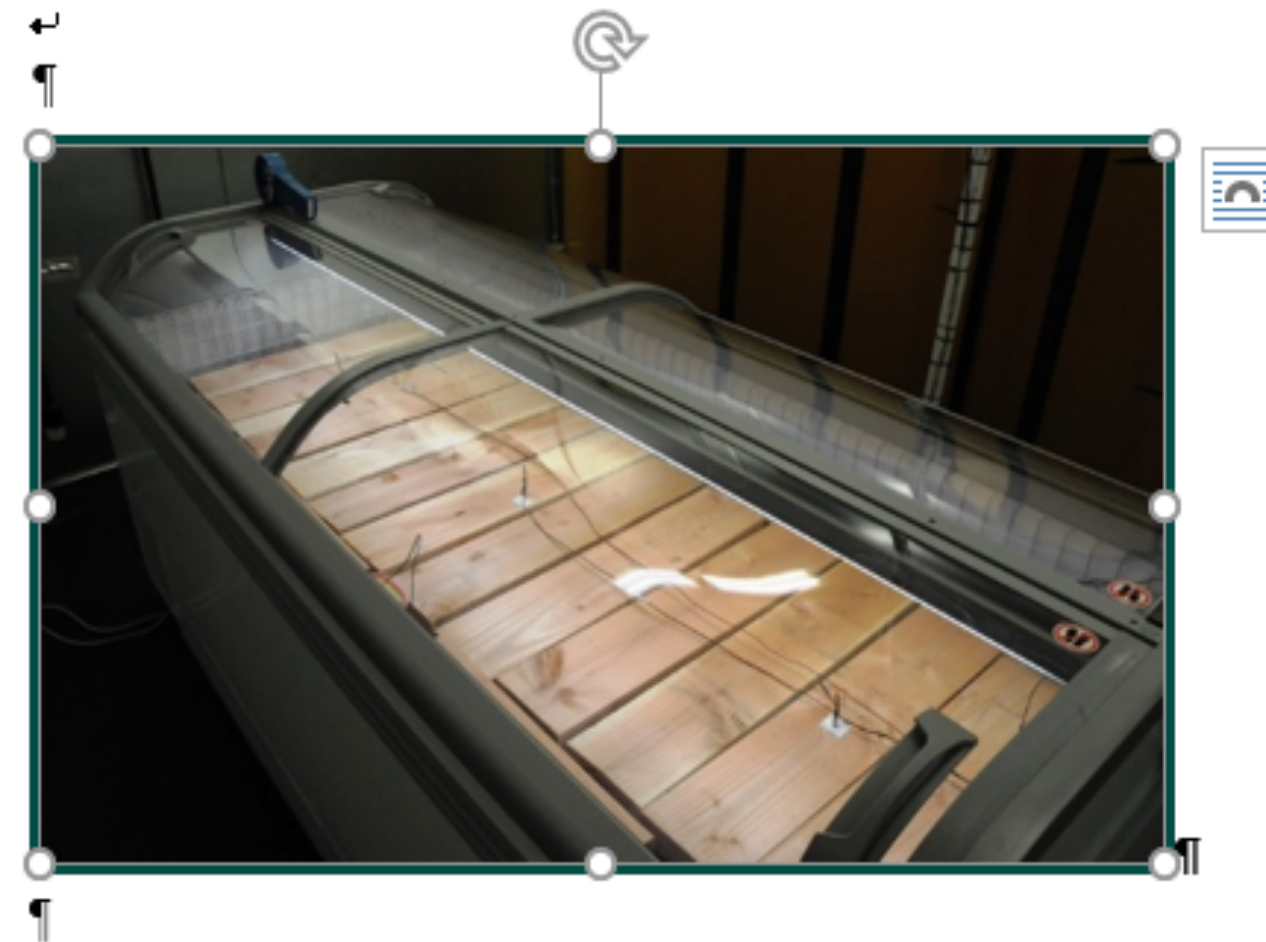


# Examples cont'd...

Emerging Technologies

## Laboratory Assessment of Propane Type Horizontal Self-Contained Display Cases

ET15SCE1030







Prepared by:

Emerging Products  
Customer Service  
Southern California Edison

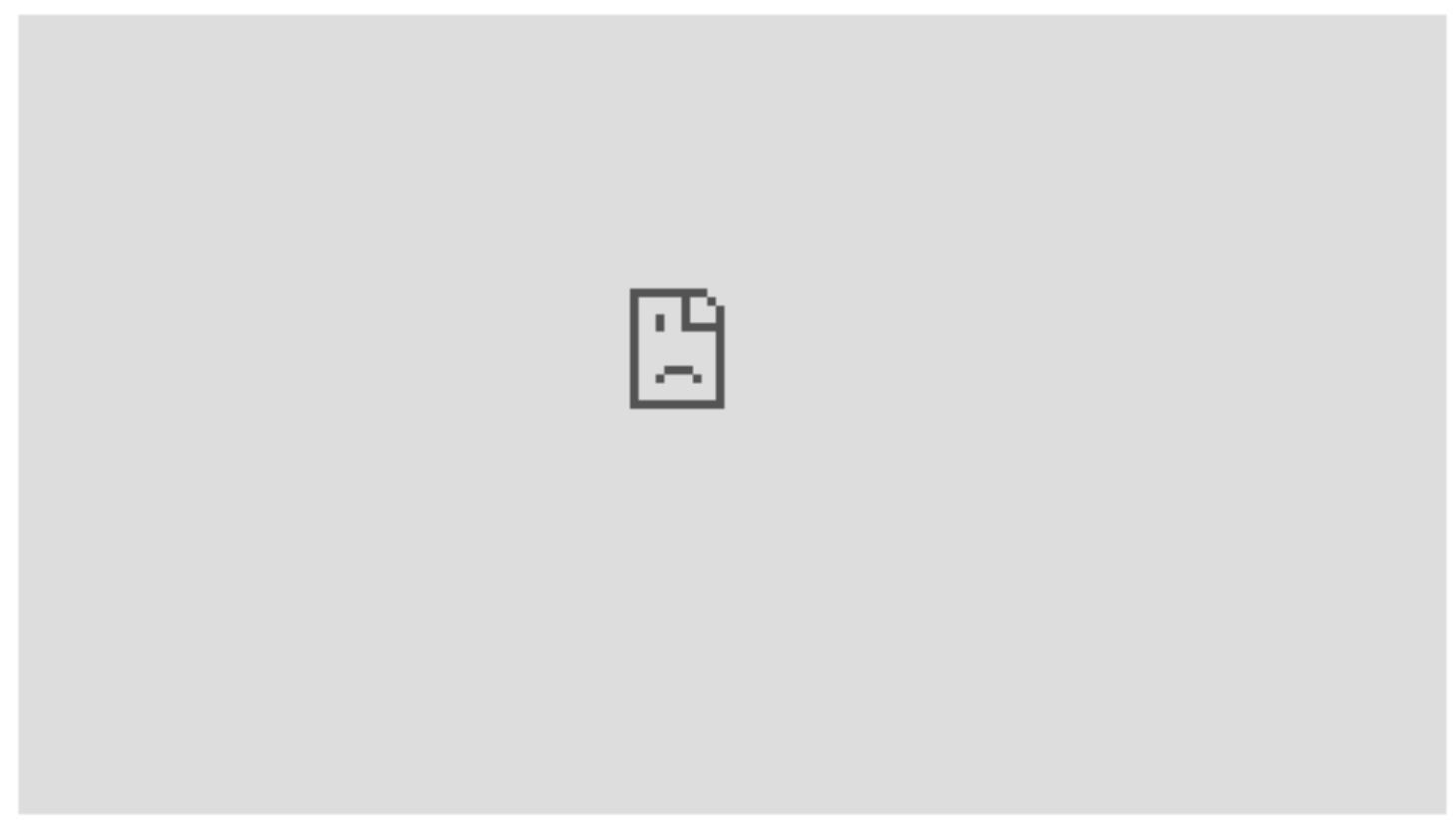
February 2016



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-  [Linear LED Lamps - Laboratory Performance Assessment](#)
-  [Zero Loss Drains for Air Compressors](#)
-  [Energy Channel 2.0](#)

**Highlights from ET Summit Spring 2018**



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## Incentives Going Forward....

- Traditional DSM programs may continue to offer incentives for energy savings from refrigerant change outs.
- Regulatory changes in traditional DSM programs make it challenging for customers to make the case for such projects solely on utility incentives.
- We continue to scan for partner agencies that can support these projects through additional incentives, grants, etc.
- Looking for multiple sources of funding to offset the costs, considering benefits beyond electricity/gas can help make the case for customer to consider these upgrades. Non-energy benefits...safety, demand response...etc.



ATMO  
sphere

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Thank you very much!

