



**NASRC COMMERCIAL & FOOD RETAIL PROGRAM**  
**2019 IAR NATURAL REFRIGERANT CONFERENCE & EXPO**  
 PHOENIX, AZ (MARCH 3-6)  
 PHOENIX CONVENTION CENTER

**AT A GLANCE**

Monday, March 4	1:45PM - 3:30PM	Panel Discussion	The Future Of Commercial Standards
	1:45PM - 2:35PM	Workshop	The Advancement of CO2 in Systems Architecture
	2:40PM - 3:30PM	Technical Paper Presentation	Natural Refrigerant System Selection Comparisons in Commercial Systems
	2:40PM - 3:30PM	Technical Paper Presentation	Evaluation of the Fire Hazard of ASHRAE Class A3 Refrigerants in Commercial Refrigeration Applications
	4:00PM - 4:50PM	Workshop	GreenChill 10 Year Trends in Refrigeration
	4:00PM - 4:50PM	Workshop	Commercial Applications With Ammonia Using ARM-LC
	4:55PM - 5:45PM	Technical Paper Presentation	Case Study: The First Commercial Propane/Carbon Dioxide Cascade Refrigeration System in North America
	4:55PM - 5:45PM	Workshop	Emerging Trends in Commercial Refrigeration – What Stakeholders Think
Tuesday, March 5	1:10PM - 2:00PM	Workshop	An Examination of Trends Influencing the Future of Commercial Refrigeration
	1:10PM - 2:00PM	Workshop	Commercial Heat Exchangers: Commercial Applications of Evaporators and Gas Coolers for CO2
	2:05PM - 2:55PM	Technical Paper Presentation	Case Study: The First Commercial Propane/Carbon Dioxide Cascade Refrigeration System in North America
	2:05PM - 2:55PM	Technical Paper Presentation	Evaluation of the Fire Hazard of ASHRAE Class A3 Refrigerants in Commercial Refrigeration Applications
	3:25PM - 4:15PM	Technical Paper Presentation	Natural Refrigerant System Selection Comparisons in Commercial Systems
	3:25PM - 5:10PM	Panel Discussion	Supermarket Experiences With Low-Charge Ammonia
Wednesday, March 6	9:00AM - 10:50AM	Panel Discussion	Ready Or Not: Is Commercial Service Readiness A Barrier To Adoption?

## TECHNICAL PAPERS

### **NATURAL REFRIGERANT SYSTEM SELECTION COMPARISONS IN COMMERCIAL SYSTEMS**

When natural refrigerants were new to commercial refrigeration, the landscape for system selection was either traditional systems using synthetic refrigerants or natural refrigerant technologies. Now that natural refrigerant technologies are mainstream, we've begun to see the system selection process shift to comparisons between natural refrigerants. How do carbon dioxide, ammonia, and propane compare to each other in terms of market penetration, cost, energy efficiency, and performance? This session will provide insights from an engineering consultants perspective.

**Dustin Lilya**, DC Engineering

*Monday, March 4, 2019 | 2:40 PM - 3:30 PM*  
*Room 126 A-C*

*Tuesday, March 5, 2019 | 3:25 PM - 4:15 PM*  
*Room 126 A-C*

### **CASE STUDY: THE FIRST COMMERCIAL PROPANE/CARBON DIOXIDE CASCADE REFRIGERATION SYSTEM IN NORTH AMERICA**

In 2016, Whole Foods Market opened the first (and so far, only) U.S. installation of a supermarket that uses a propane/CO2 cascade rack system. This session will outline the regulatory approval processes, the journey from system concept to final product installation, and the operations and maintenance performance to date. In addition, we will include details on the multiple safety features built into the system, leak rate history, energy use, refrigerant cost, and service technician experience.

**Tristam Coffin**, Whole Foods Market; **Keilly Witman**, KW Refrigerant Management Strategy; and **Tom Wolgamot**, DC Engineering

*Monday, March 4, 2019 | 4:55 PM - 5:45 PM*  
*Room 126 A-C*

*Tuesday, March 5, 2019 | 2:05 PM - 2:55 PM*  
*Room 126 A-C*  
*126 A-C*

### **EVALUATION OF THE FIRE HAZARD OF ASHRAE CLASS A3 REFRIGERANTS IN COMMERCIAL REFRIGERATION APPLICATIONS**

Propane is a viable refrigerant working fluid with zero ozone depleting potential and minimal global warming potential. The current barrier to more widespread application of A3 refrigerants is their inherent flammability. This session will examine options for assessing the risks associated with their use as refrigerants and evaluate methods to mitigate such risks, specifically when charge sizes are larger than the currently mandated limits.

**Scott Davis, PhD**, Gexcon, U.S.

*Monday, March 4, 2019 | 2:40 PM - 3:30 PM*  
*Room 127 A-C*

*Tuesday, March 5, 2019 | 2:05 PM - 2:55 PM*  
*Room 127 A-C*

## WORKSHOPS

### **USING ARM-LC TO APPLY AMMONIA TO COMMERCIAL APPLICATIONS**

IIAR's new *ARM-LC (Low Charge) Guidelines and Reference Manual* is a great resource to assist owners, contractors and manufacturers in applying low-charge ammonia refrigeration systems and packages to many different commercial applications. The ARM-LC program is intended to be a user-friendly tool facilitate use of low-charge system to an expanding array of commercial applications including supermarkets, small distribution and food preparation facilities, HVAC chilled water systems, pharmaceutical & bioscience, data centers, ice rinks and more. The presentation will provide an overview of the ARM-LC program sections and illustrate how it can assist commercial users in applying ammonia refrigeration to their facilities.

**Kurt Liebendorfer**, EVAPCO, Inc.

*Monday, March 4, 2019 | 4:00 PM - 4:50 PM*  
*Room 126 A-C*

### **GREENHILL 10 YEAR TRENDS IN REFRIGERATION**

GreenChill's Store Certification Program has existed for ten years, and ten years of data can provide significant insights about the environmental performance of various types of refrigeration systems. Which refrigerants and technologies are more likely to achieve the nation's highest award from the EPA? How likely is each type of system to achieve re-certification? Which types have been able to maintain certification for the longest time periods? How have natural refrigerants changed the program? This workshop will provide insights and discussion around those questions.

**Speaker TBD**, U.S. Environmental Protection Agency

*Monday, March 4, 2019 | 4:00 PM - 4:50 PM*  
*Room 127 A-C*

### **THE ADVANCEMENT OF CO2 IN SYSTEMS ARCHITECTURE**

CO2 as a natural refrigerant has been around since the 1920's and with the growth and acceptance in Europe, the trend has moved to North America for commercial end-users seeking low-GWP refrigerant alternatives. Despite its long history of use, CO2 technologies have faced pressures to improve energy performance, leak rates, cost, and technician training. In recent years, technological advances have led to significant improvements in its value proposition and impact on total cost of ownership allowing for an increase in adoption. This presentation will provide data from over 400 CO2 installations and as well as specific case studies to answer the questions of where CO2 technology stands and what the future holds.

**Derek Gosselin**, Hillphoenix

*Monday, March 4, 2019 | 1:45 PM - 2:35 PM*  
*Room 127 A-C*

**COMMERCIAL HEAT EXCHANGERS: COMMERCIAL APPLICATIONS OF EVAPORATORS AND GAS COOLERS FOR CO2**

As the applications for CO2 systems in the commercial refrigeration market become more popular, heat exchanger modifications to suite CO2 trans-critical applications is very important. During this workshop, the principles for design and manufacturing and application of evaporators and gas coolers for long term, reliable usage will be discussed.

**John Gallaher**, Guntner U.S.

*Tuesday, March 5, 2019 | 1:10 - 2:00 PM  
Room 126 A-C*

**EMERGING TRENDS IN COMMERCIAL REFRIGERATION - WHAT STAKEHOLDERS THINK**

With the impending phase out of HFC's in California, supermarket operators now exploring refrigerant choices and developing demonstration stores to test their options. End-users now face tough questions such as how to design a cost-effective, energy-efficient system; whether to consider low GWP refrigerants or go all natural; and the role hydrocarbons can play to fill gaps. This session will present the results of a market survey intended to gauge how system efficiencies might be impacted by those choices.

**Jim Kelsey**, kW Engineering

*Monday, March 4, 2019 | 4:55 - 5:45 PM  
Room 127 A-C*

**THE EXPANDING ROLE OF NATURAL REFRIGERANTS: EXAMINING APPLICATIONS OF NATURAL REFRIGERANTS IN COMMERCIAL AND INDUSTRIAL REFRIGERATION**

The dynamics of the commercial food retail industry are changing, and it is becoming an increasingly murky picture. Technological advances, energy demands, regulatory pressures, environmental considerations, and the rise of online shopping are influencing the future of both the commercial and industrial refrigeration industries. This presentation will examine new opportunities to advance natural refrigerants in commercial and industrial settings, calling on data and statistics from real-world examples.

**Andre Patenaude**, Emerson Commercial & Residential Solutions

*Tuesday, March 5, 2019 | 1:10 - 2:00 PM, Room 127 A-C*

## PANEL DISCUSSIONS

### **THE FUTURE OF COMMERCIAL STANDARDS**

Traditional commercial refrigeration standards bodies and building codes have struggled to keep up with the fast rate of natural refrigerant technology development. As standards are updated to reflect new technology options, the industry has begun to ask, "What does the future hold for natural refrigerant standards?" This panel will provide answers to that question with a discussion that includes an overview and status update of the standards that will impact commercial natural refrigerant technologies, and where the standards world is heading.

**Keilly Wittman**, KW RMS (moderator); **John Collins**, Zero Zone; **Kurt Liebendorfer**, EVAPCO; **Bruce Nelson**, IAR/Colmac Coil; **Marek Zgliczynski**, Embraco

*Monday, March 4, 1:45 - 3:30 PM, Room 129 A-B*

### **READY OR NOT: IS COMMERCIAL SERVICE READINESS A BARRIER TO ADOPTION?**

Service readiness is often cited as a barrier preventing the adoption of natural refrigerant technologies, and includes factors such as lack of training resources, workforce decline, lack of certification programs, and missed connections between trained service contractors and end-users. Is service readiness truly a barrier to the adoption of natural refrigerant-based technologies? Or is it a symptom caused by low adoption rates? This panel, composed of end users and service contractors, seeks to answer that question and identify opportunities for improvement.

**Nick Doherty**, CTA Architects Engineers (moderator); **Ryan Welty**, South-Town Refrigeration & Mechanical; **Todd Ernest**, Climate Pros; **Mike Ellinger**, Whole Foods Market; **Pete Marotta**, Grocery Outlet

*Wednesday, March 6, 9:00 AM - 10:50 AM, Room 129 A-B*

### **SUPERMARKET EXPERIENCES WITH LOW-CHARGE AMMONIA**

Though ammonia has been used as a refrigerant for centuries and is known to have incredible energy efficiency, it has traditionally not been used in supermarket applications. This panel of end-users will provide data-driven insights from real-world experiences with ammonia applications in supermarkets, including energy use, cost, leak rates, and safety features. Panelists will answer questions around the challenges industrial stakeholders have faced in trying to break into the commercial market, how commercial systems differ from industrial systems, and the barriers preventing ammonia from becoming a more common choice in supermarkets.

**Keilly Wittman**, KW RMS (moderator), **Richard T. Heath**, Insight Sourcing; **Ed Estberg**, Raley's; **Tristram Coffin**, Whole Foods; **Rob Arthur**, CTA Architects Engineers (on behalf of the Department of Defense Commissary Agency)

*Tuesday, March 5, 3:25-5:10 PM, Room 129 A-B*