

ATMOSphereネットワーク東京

最新のグローバル市場・政策動向



東京, 2016年05月30日

ヤン・ドゥシェック

ビジネス・ディベロップメント・マネージャー

shecco Japan株式会社



プログラム AMERICA : <http://www.atmo.org/events.programme.php?eventid=44>

取材 AMERICA : <https://storify.com/sheccomedia/follow-the-atmosphere-america-conference-on-natura>



June 16 & 17, 2016 - Chicago

High Efficiency Store Designs Using Natural Refrigerants

Food Retail Panel

KEITH MILLIGAN

JTM Corporation
Piggly Wiggly



June 16 & 17, 2016 – Chicago

Piggly Wiggly Nationwide

- America's first self-service true grocery store founded in 1916
- Over 600 Piggly Wiggly stores serving communities in 17 states

Piggly Wiggly : JTM Corp

- JTM Corporation founded in 1966
- Third generation family business
- 19 stores and 9 neighborhood shopping centers



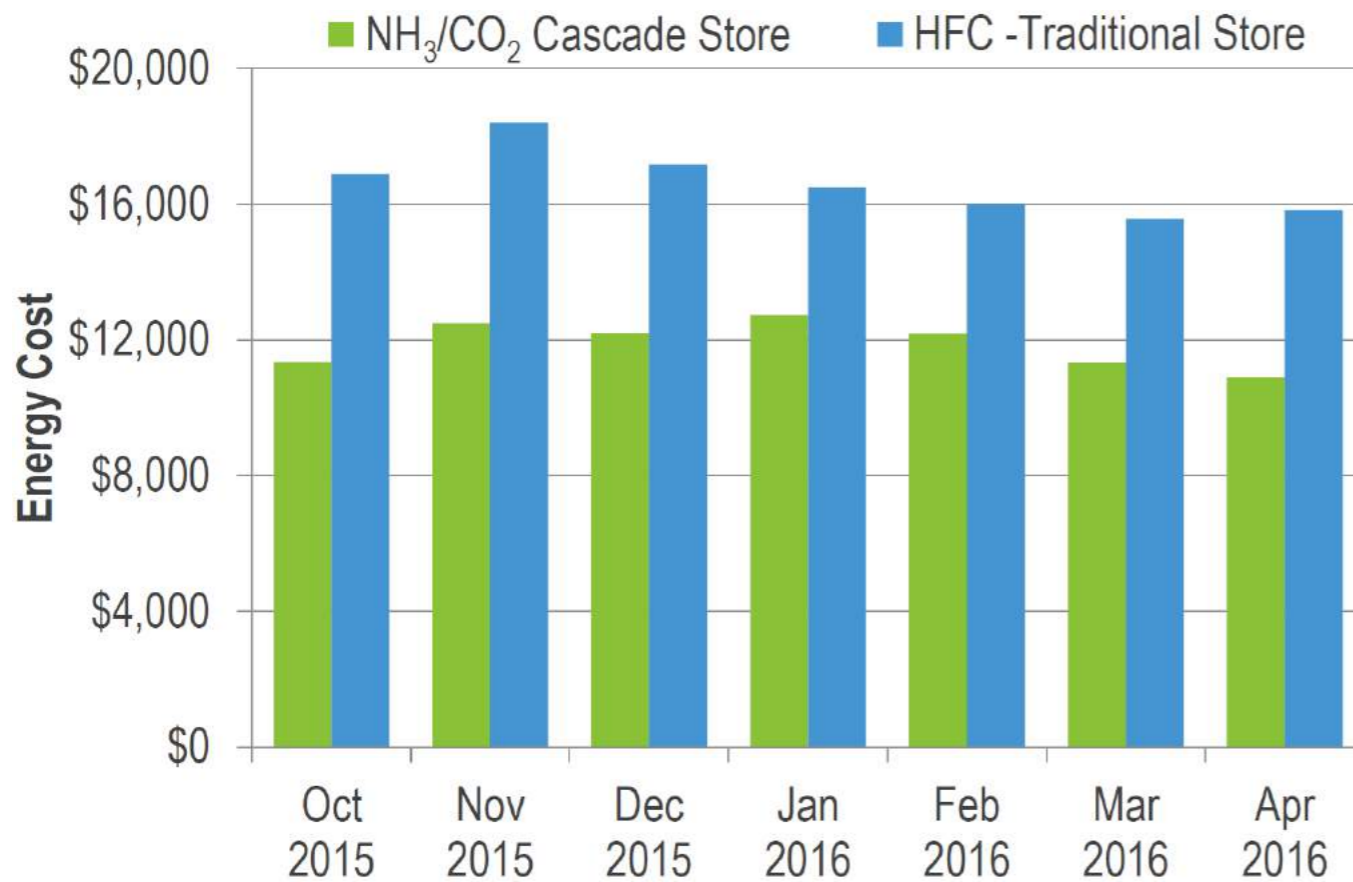
Piggly Wiggly : JTM Corporation





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Actual Data from Energy Bills*



Customer Name
J T M CORPORATION

*Traditional HFC store data normalized for store size

Store Level Energy Savings Achieved

Cumulative Savings to Date
\$33,170
Projected Annual Energy Savings
\$55,000-65,000

CUMULATIVE ENERGY SAVINGS
28.5 %

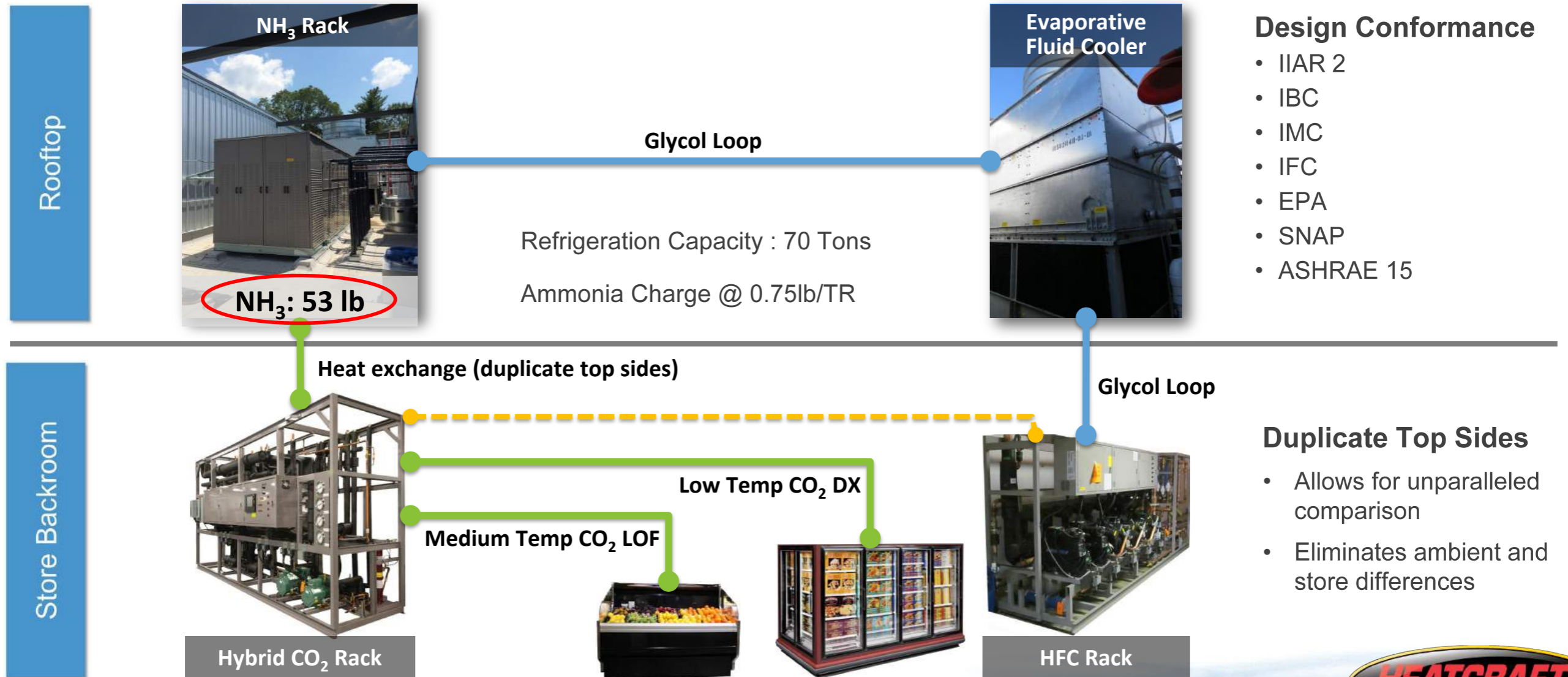
Prestigious EPA Greenchill Platinum
Award (Tenth store in USA)





ATMO business case
sphere natural refrigerants
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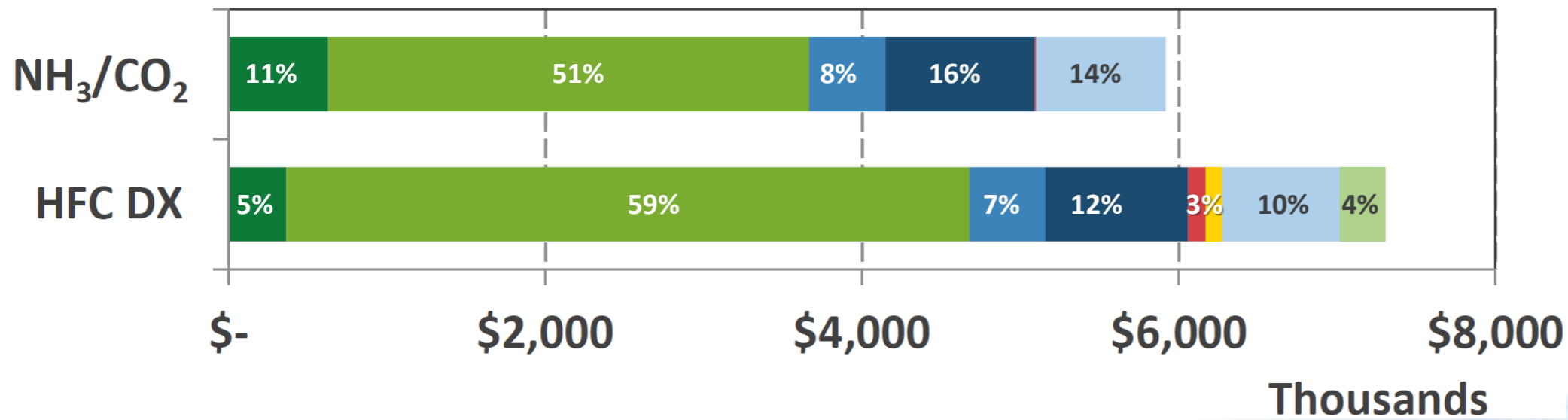
Ultra Low Charge NH₃/CO₂ Refrigeration System





Total Cost of Ownership – San Diego, CA

	Global Warming Impact	Energy Cost	First Cost	Maintenance Cost	Total Cost of Ownership
Traditional HFC	–	–	BASELINE	–	–
NH ₃ /CO ₂ Cascade	↓ 99%	↓ 15-23%	↑ 50-70 %	↑ 0-5%	↓ 15-20%



- Racks
- Energy
- Install
- Maintenance
- Refrigerant
- CA RMP cost
- Cases
- Extra Product Waste



Assumptions: refrigeration load 535 KW; 15 year life; energy costs (\$/kWh) - 0.15 (0-5y), 0.18 (6-10y), 0.26 (11-15y); refrigerant cost \$10/lb; leak rate 15%



CASE STUDY: WHOLE FOODS MARKET

Application: Retail Grocery, Refrigeration



- Supermarket Project
NH₃/CO₂ refrigeration
- Cascade system with
Very low TEWI





CASE STUDY: WHOLE FOODS MARKET

Application: Retail Grocery, Refrigeration



Business Case:

- Sustainable technology key to corporate culture.
- Eliminate synthetics to operate with zero ozone depletion, low TEWI and maximum life cycle performance.





CASE STUDY: Retail Grocery, Refrigeration

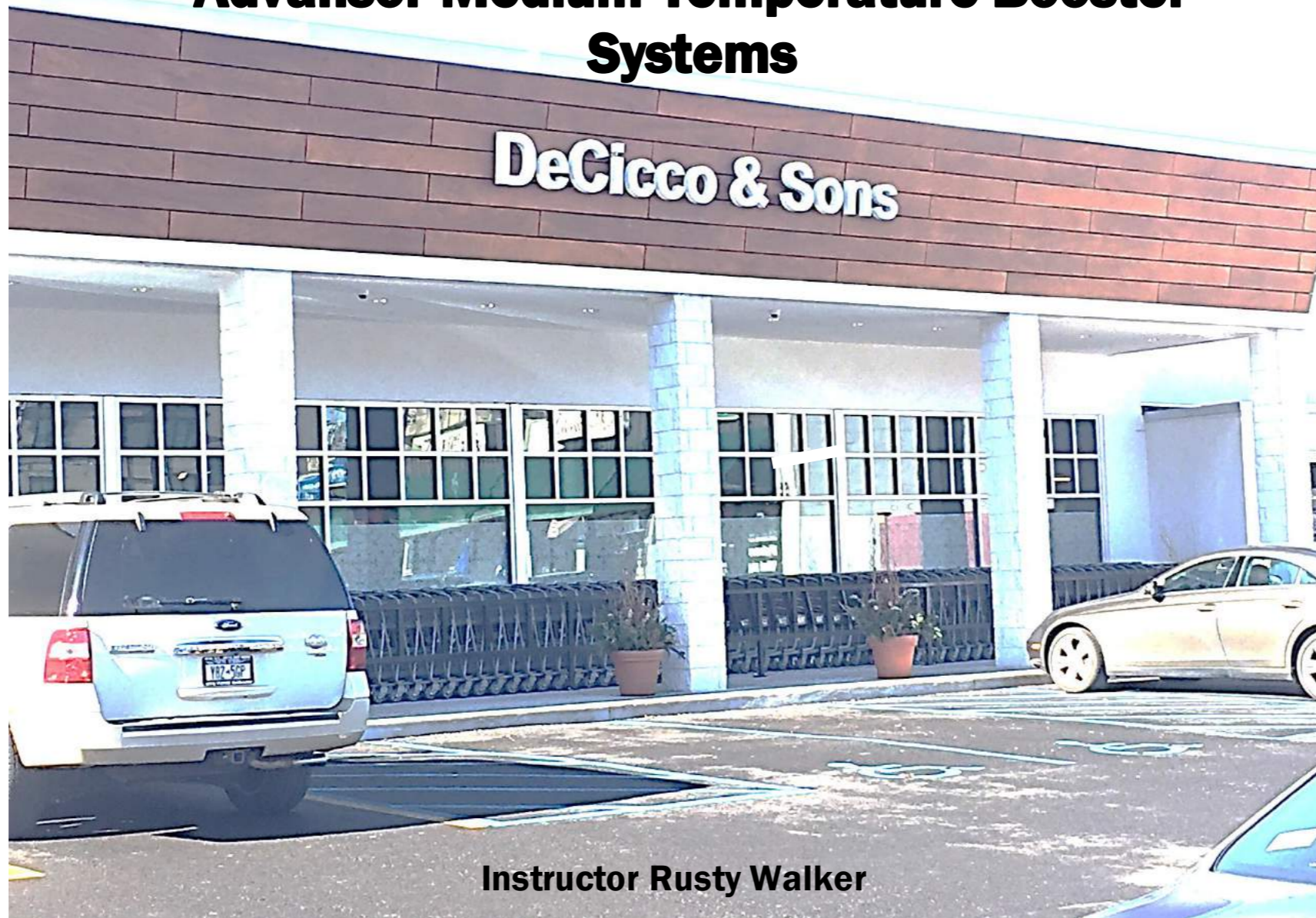
Major Features:

- Ammonia / CO₂ cascade refrigeration package
- CO₂ to the refrigerated cases in the retail areas





Advansor Medium Temperature Booster Systems

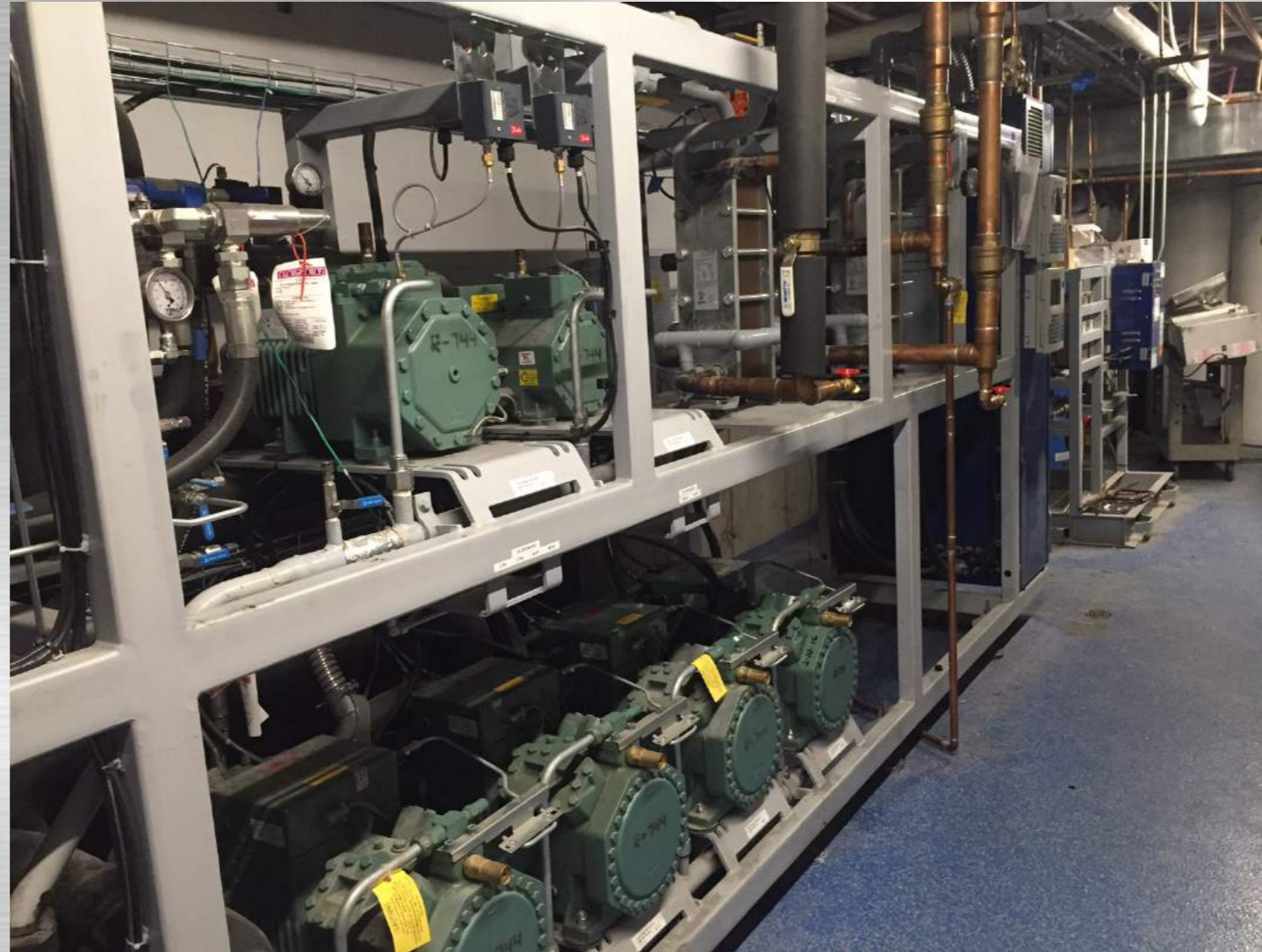


Instructor Rusty Walker





DeCicco Rack



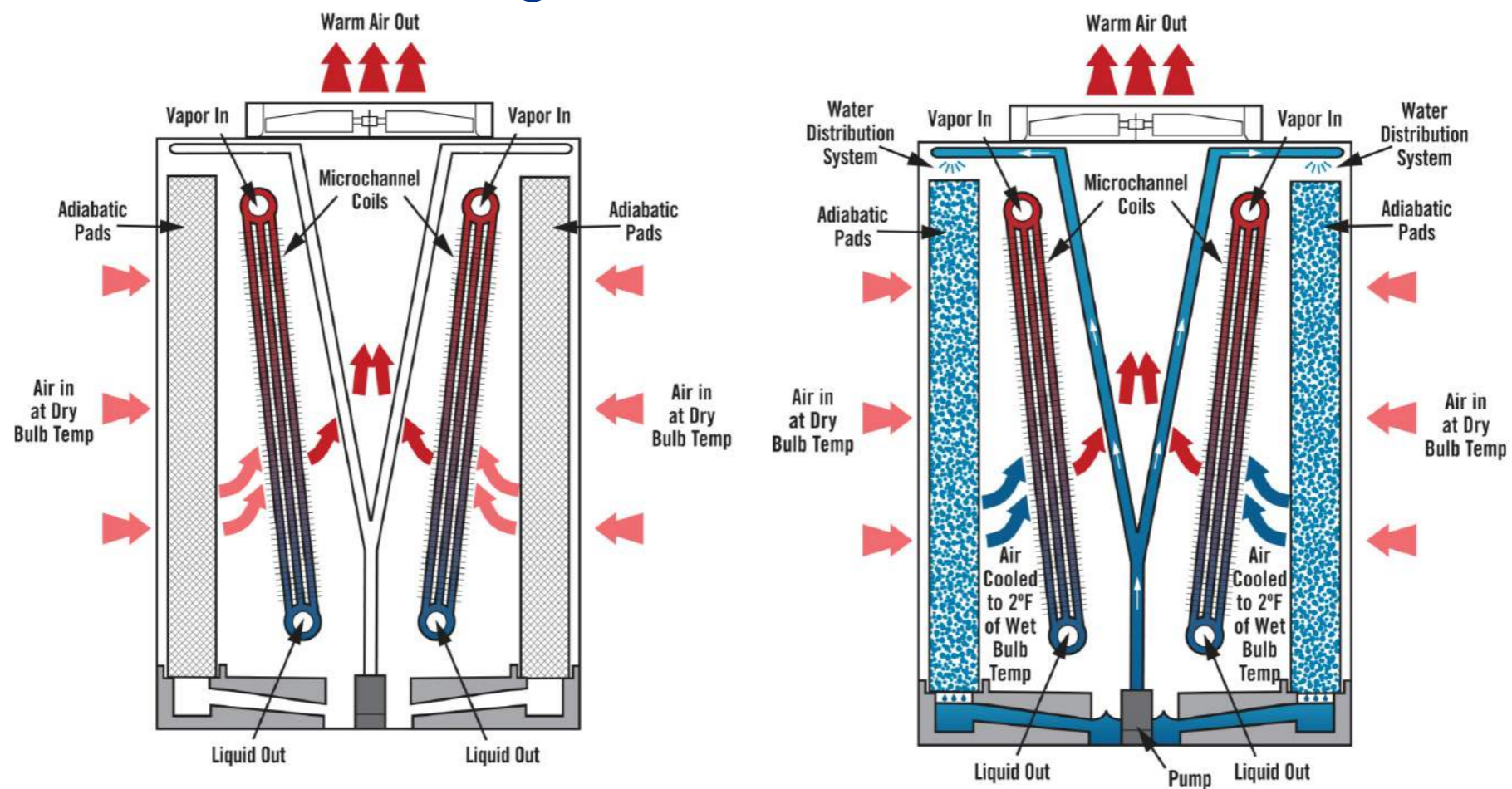
HPX
Learning Center

Hillphoenix
A DOVER COMPANY



Advansor CO2 Booster System Improvements

The Trillium can be used as a wet condenser in higher ambient climates

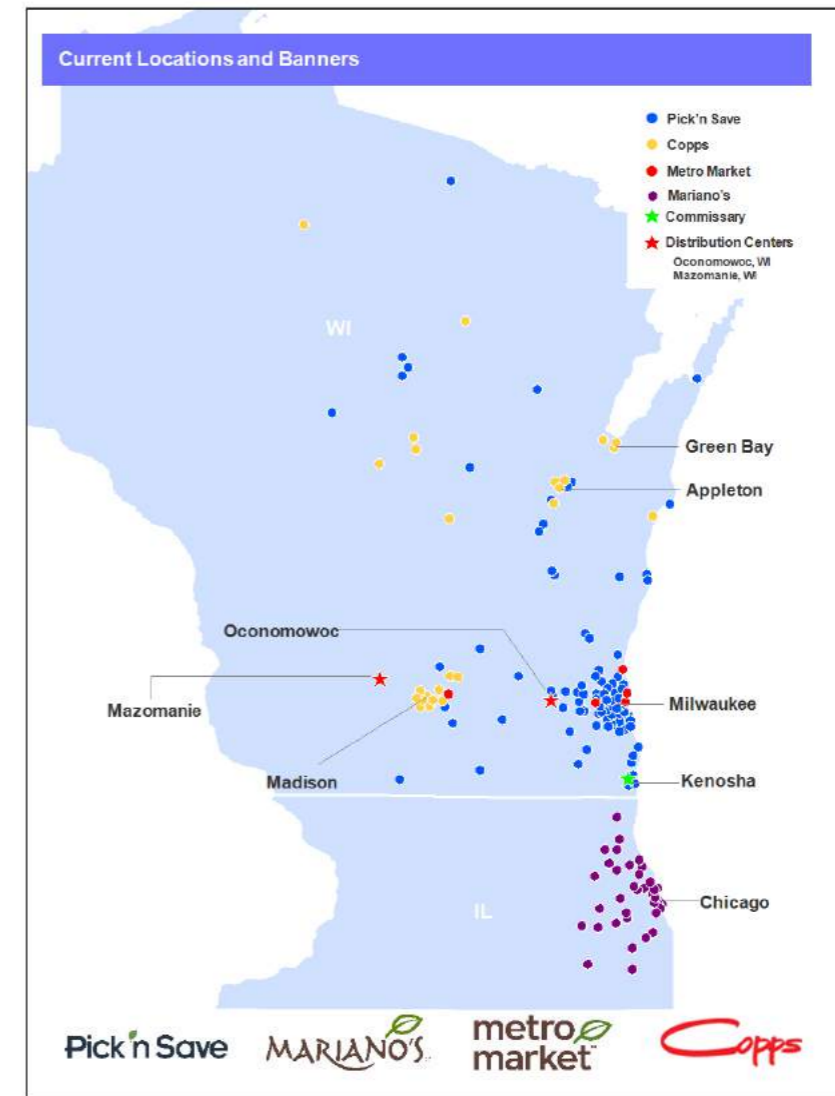




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ROUNDYS®

- **Founded in Milwaukee in 1872**
- **Leading grocer in Upper Midwest**
- **154 stores and 104 Pharmacies**
- **Approx. \$4.0 Billion 2015 Total Sales**
- **Merged with The Kroger Co. Dec. 2015**





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Roundy's Transcritical Co2 Installations

Location

Menomonee Falls WI
Orland Park, IL
Shorewood, WI
Westmont, IL
Naperville, IL
Chicago, IL
Chicago, IL
Chicagoland Area

Banner

Pick 'n Save
Mariano's
Metro Market
Mariano's
Mariano's
Mariano's
Mariano's
Mariano's

Date

January 2014
January 2016
February 2016
March 2016
May 2016
*August 2016**
*September 2016**
*2017***



* Not yet open

**5 Mariano's stores to open in 2017 will have TCo2 installed



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Advantage

- Global warming potential (GWP): 99% reduction compared to HFC
- Energy costs: 8% to 10% of reduction compared to HFC
- Cost of CO₂ much less expensive than HFC



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Mature technology

In North America, Sobeys has been the instigator with manufacturers to develop CO2 systems. Since the first store in 2009, refrigeration systems in transcritical CO2 evolved and are now mature.

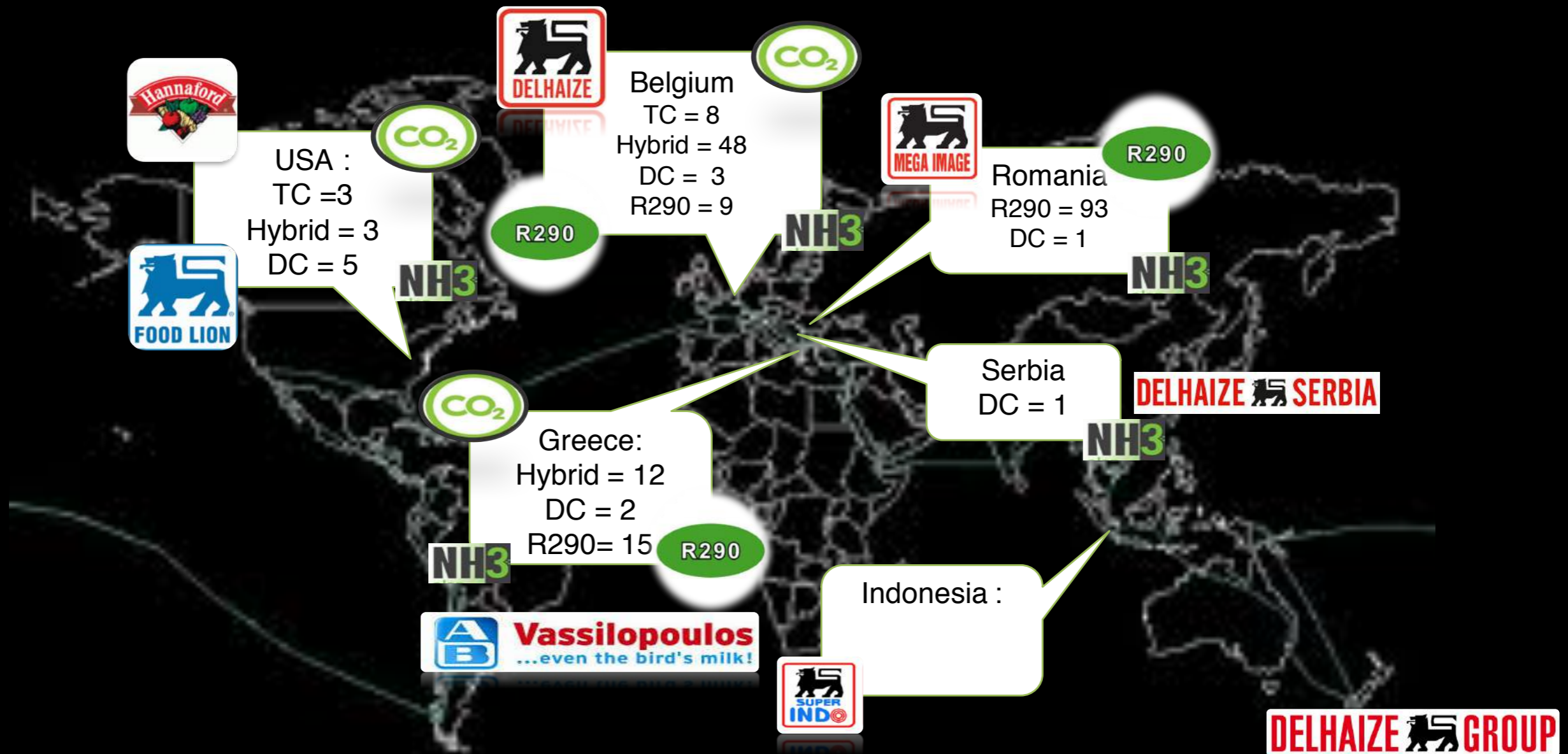
Since Sobeys completed 82 supermarkets operated with CO2 and 9 others stores are currently under construction for a total of 90 stores.



David Schalenbourg - Director Tech. Dept. & Store Format Delhaize Belux



WHERE ARE WE TODAY?





WHAT'S NEXT?

- » Efficiency optimization for CO2
- » integrated systems
- » Testing of Ejectors
- » Roll-out Plug-ins R290





HYDROCARBON
COOLERS





Red Bull

2016 HYDROCARBON HIGHLIGHTS



Annual Sales of +6 billion cans



Recognized by White House Council on Environmental Quality for Hydrocarbon Commitment



Global Cooler Fleet: approx. 1.100.000 units



100% HC Procurement for all countries where possible



Phase down of HFC refrigerant usage in partnership with Refrigerants, Naturally!



PROGRAM MANAGEMENT

- **Service Technician Training**
 - Mandated specialized training for all technicians
 - Training conducted in partnership with cooler suppliers
 - National Program
- **Commitment**
 - We remain committed to our goal of 100% procurement where technically and legally feasible
 - 2014 : 90%
 - 2015 : 95%
 - 2016 : 97%





NEWS >> EVENTS NEWS

[< back](#)

Coca-Cola to allow hydrocarbons in smaller cooler equipment

21 June 2016

0 comment | rating: ☆☆☆☆☆ Login or Register to vote

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forward via community Tweet Share Like

After establishing that carbon dioxide would be its standard refrigerant for new beverage coolers, vending machines and fountain equipment, the Coca-Cola Company "will open the door" to hydrocarbon refrigerants for smaller cooler equipment, said Antoine Azar, the company's global programme director.

Azar, who made the announcement at the ATMOsphere America conference last week in Chicago, defined smaller equipment as units that are 300 litres in volume or smaller, which accounts for about 10% of its equipment. "Everything above 300 litres must still be CO₂," he said. Below 300 you can go with either CO₂ or hydrocarbons [either propane or isobutane]."

The decision would be made at the local level by the company's bottlers. Coke will no longer allow R134a to be used in smaller units.



<http://www.hydrocarbons21.com/articles/7026/coca-cola-to-allow-hydrocarbons-in-smaller-cooler-equipment>



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State of the Industry

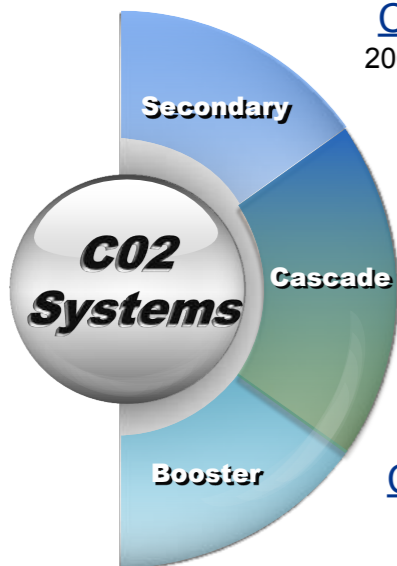
CO2 Booster as a Mainstream Technology

Presenter: Dustan Atkinson



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Evolution of CO₂ Technology Applications



CO₂ Secondary (pumped) Systems

2006 - Low (2007) and Medium (2010) Temperature
Over 200 Installation in North America

CO₂ Cascade (subcritical) Systems

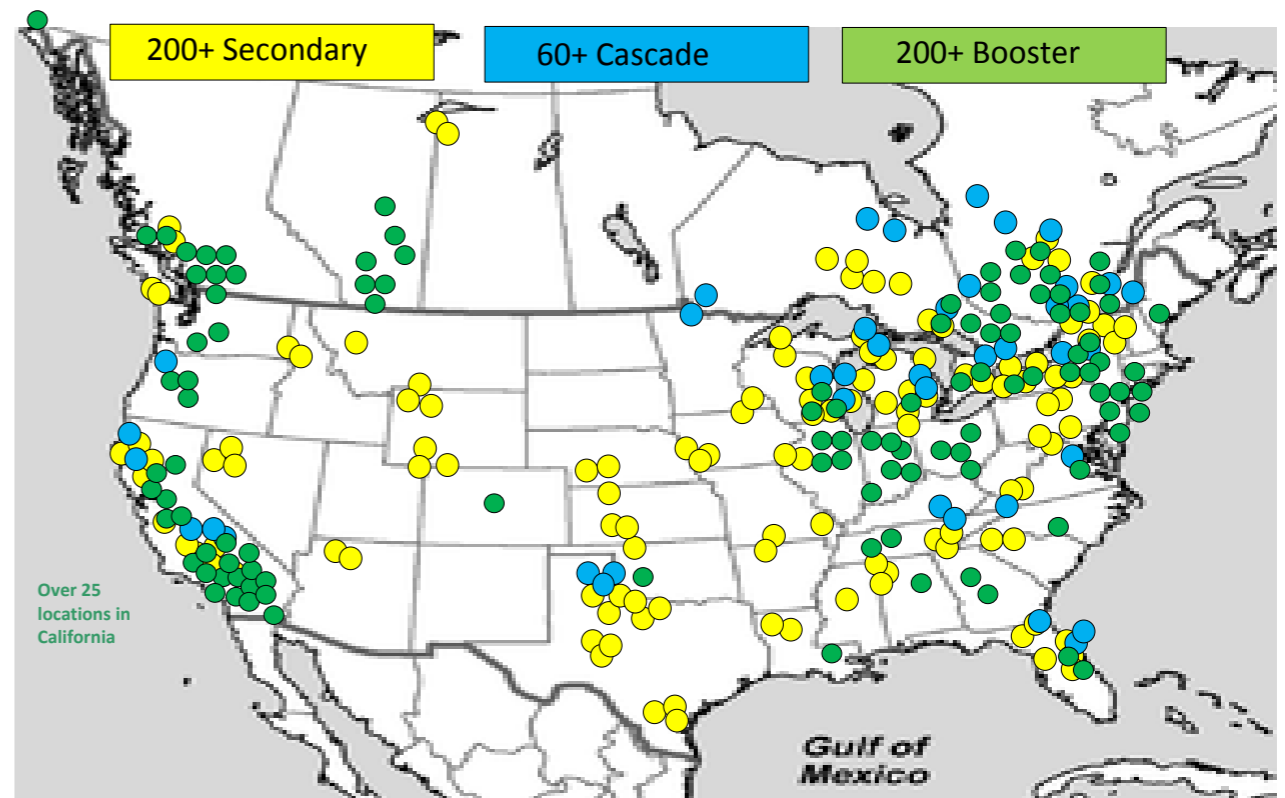
Low temperature (2008)
Over 60 Installation in North America

CO₂ Booster (transcritical) Systems

Low & Medium temperature (2012)
Over 200 Installations in North America
Over 1000 in Europe

Hillphoenix CO₂ Applications

CO₂ Booster Stores



Over 200 System Installations in North America - Approximately 150 Hillphoenix Applications



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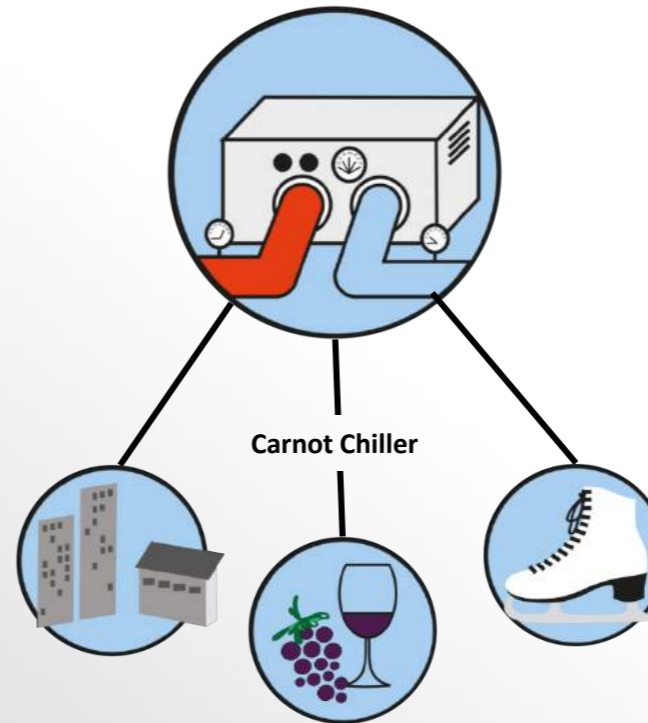
State of the Industry Session Carnot Refrigeration



Carnot
Supermarket



Carnot
Warehouse



Aquilon™
Data Center

« See the possible where the others see the impossible »

Carnotrefrigeration.com

3368, Bellefeuille Street, Trois-Rivieres, Quebec Canada G9A 3Z3 – Phone : 819 376-5958





SUPERMARKETS 65 PROJECTS / 15 RETROFITS

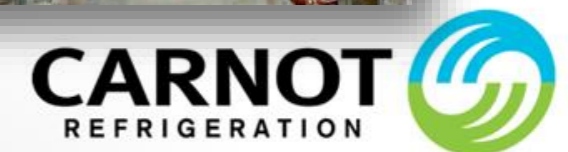




CO2 TC AND NH3/CO2 WAREHOUSES 8 PROJECTS



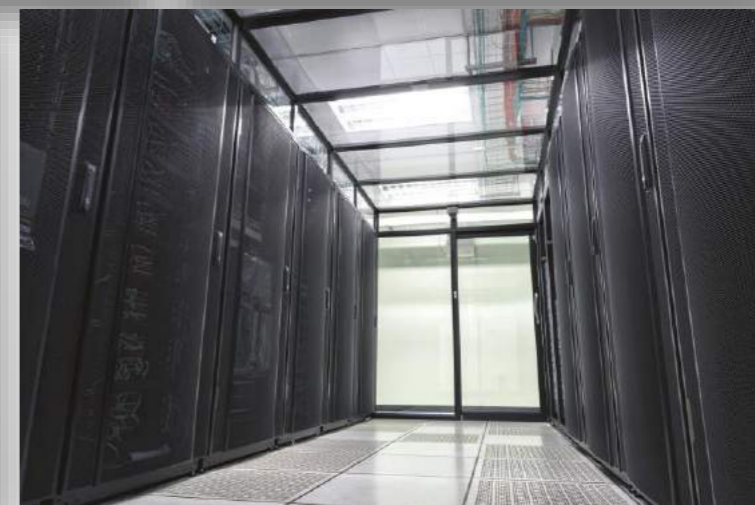
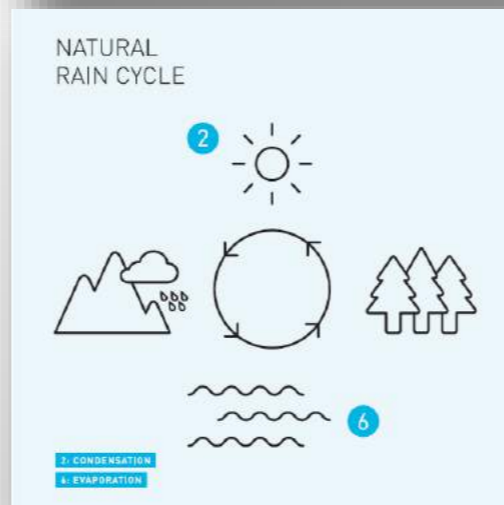
...as up to
1500TR...





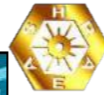
DATA CENTRES 18 PROJECTS

Rain Cycle Free
cooling!!!

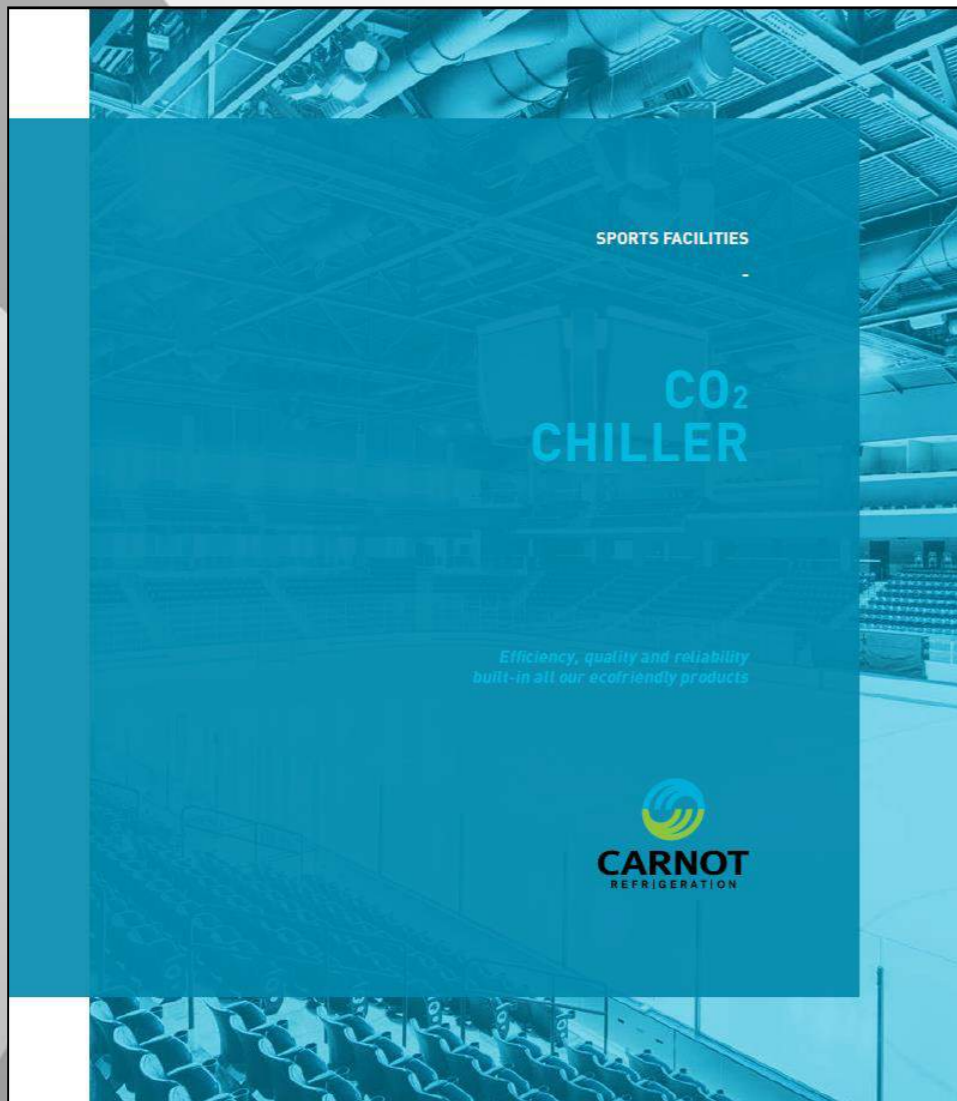




ICE RINKS ARENA 9 PROJECTS



“ASHRAE Best Technology Award” – Institutional Existing Building 2015





CO₂ CHILLER FOR WINERIES





Some of our Customers



VILLE DE
SAINT-GEORGES





ATMO sphere

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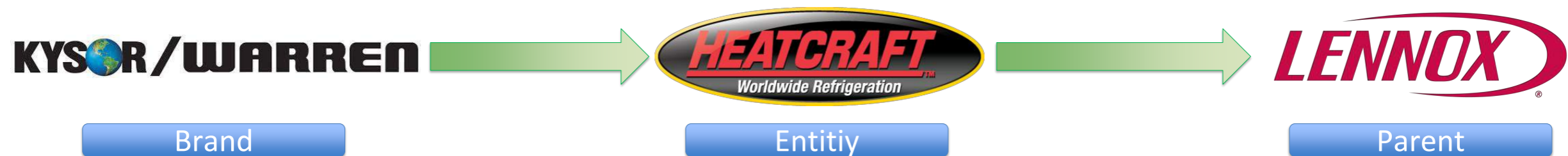
Natural Refrigerants in the Commercial Refrigeration Industry

*Insight from a Global Provider of:
Natural Refrigerant Solutions*



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Company overview



- Operations in North America, South America, Europe, Asia, and Australia / New Zealand



- Natural refrigerant system applications
 - Food Retail (Supermarkets, Hypermarkets, etc...)
 - Food Service (Convenience Stores, Fast Food, etc...)
- Natural refrigerant system Installations
 - 249 HFC/CO₂ hybrid systems and counting
 - 11 transcritical CO₂ systems (additional in process)
 - Europe, North America & Australia
 - 2 ultra-low-charge ammonia-CO₂ cascade installed in the U.S.



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Ammonia Cascade Supermarket

- Store Opening: September 2015
- GreenChill Platinum Certified
- 850 MBh of cooling capacity
- Ammonia (NH₃) top cycle (53lb charge)
- CO₂ low temperature, direct expansion

Benefits

Optimized LCCP

- HFC-free system
- Ultra-low ammonia charge
 - Typically 0.75 lbs./ton refrigeration
 - 45 to 100 lbs. per store
- Up to 20% reduction in total cost of ownership (TCO)

#2 Latest NR projects

Ammonia Cascade



Kysor/Warren Rooftop Ammonia Enclosure

First Practical Ammonia Design for Retail Environments

Based on the ultra low charge



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F-gas (E.U.), effective May 20, 2014



Commercial Application	GWP Limit	Date
Self-contained refrigeration	2,500	2020
Stationary refrigeration	2,500	2020
Self-contained refrigeration	150	2022
Centralized refrigeration	150	2022
– except top side of cascade	1,500	2022

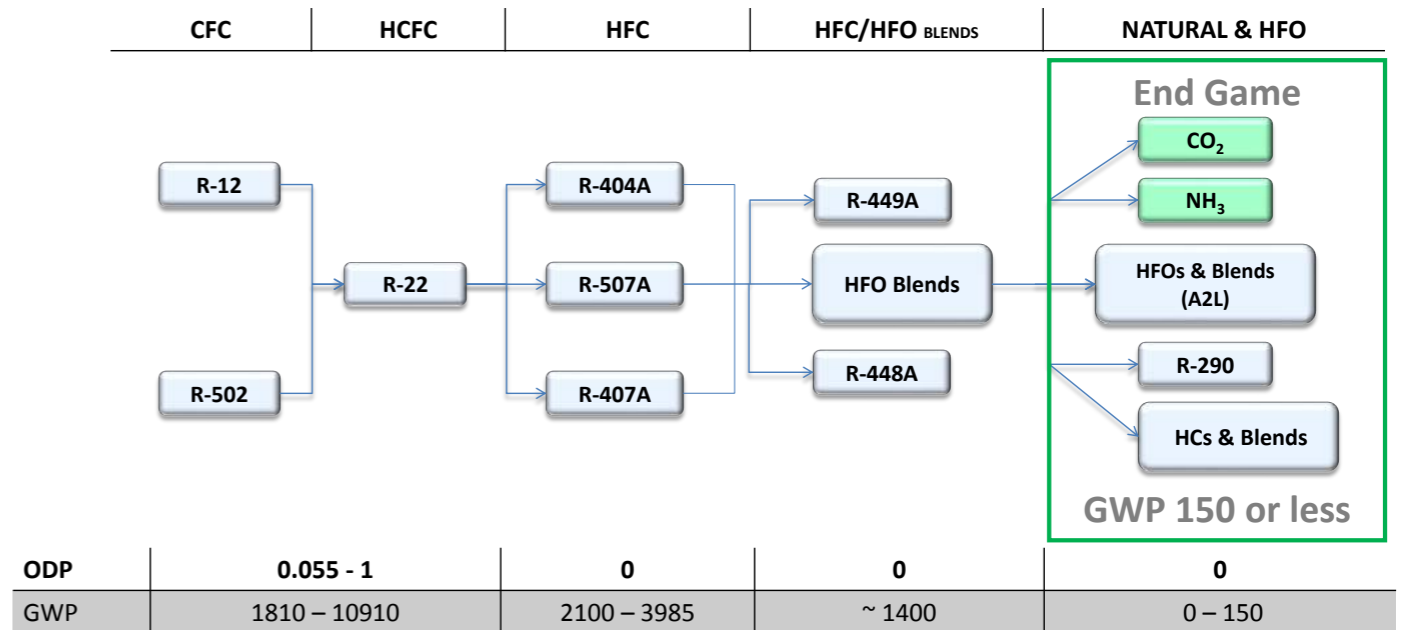
California Air Resources Board (CARB)
Short-lived Climate Pollutant Reduction
Strategy – Proposed April 2016



Commercial Application	GWP Limit	Date
Non-residential refrigeration	150	2020

#5 Future Plans

The Move Away from HFC's



Next Projects

- Additional transcritical CO₂ installations
- Transcritical CO₂ in cold storage application

New Technologies

- Ejector Cycle
- Non-Traditional Refrigeration Technologies

Natural refrigerants are immune to regulatory mandated GWP caps



ENGINEERING
TOMORROW



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DANFOSS

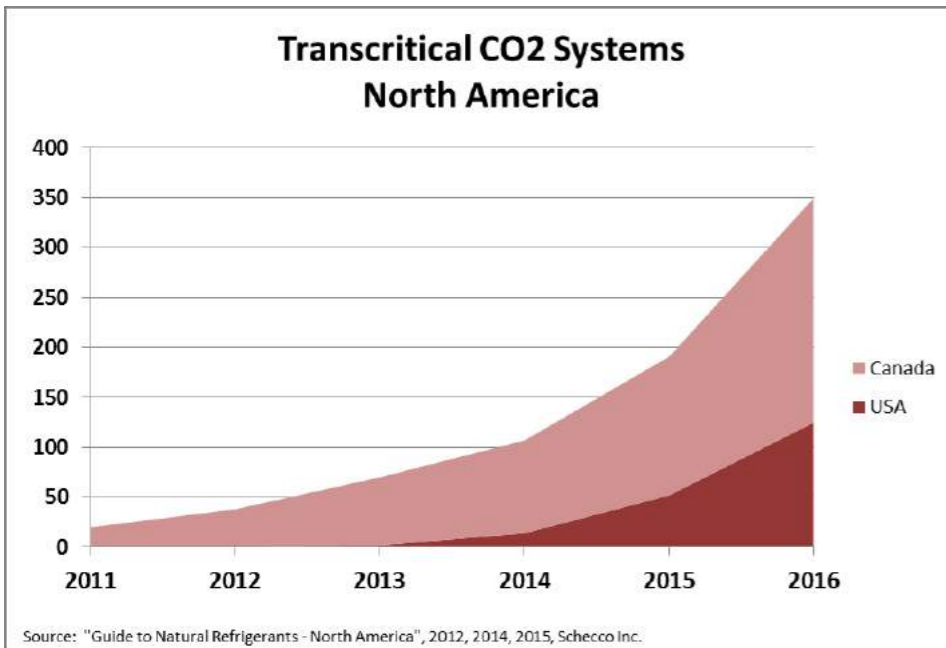
James K. Knudsen

North America Food Retail Segment Leader



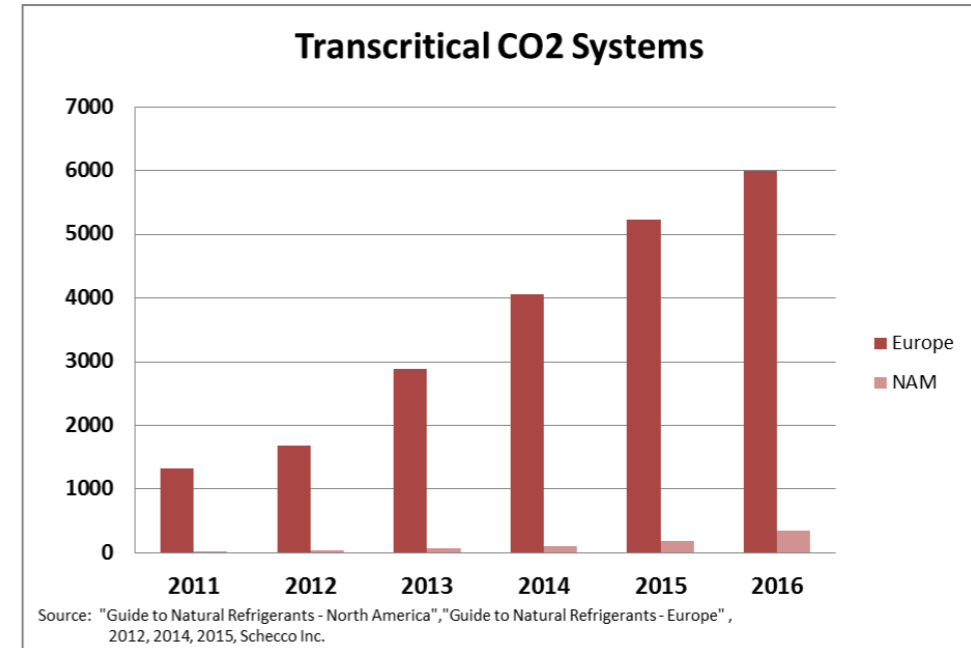
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#4 Grow with CO2 No. of Xcritical Systems 2011 – 2016e



North America
~300 Installations
~60,000 Outlets
~ 0.5%

Europe
~6000 Installations
~70,000 Outlets
~8.5%

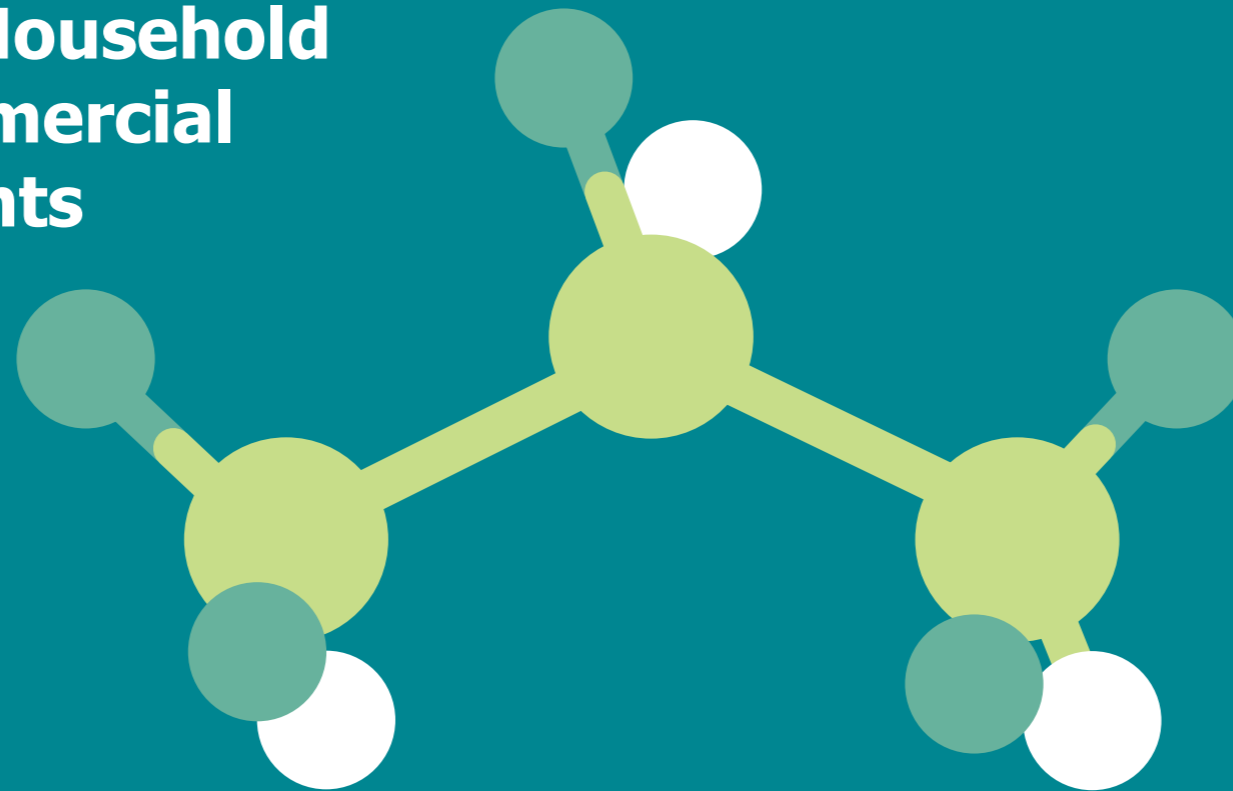


	2015 Units	Project 2016 Sales	2016 Units	% Growth
North America	190	160	350	84%
Europe	5225	775	6000	15%
NAM Compared to EUR	<4%	20.0%	6%	



Hydrocarbons

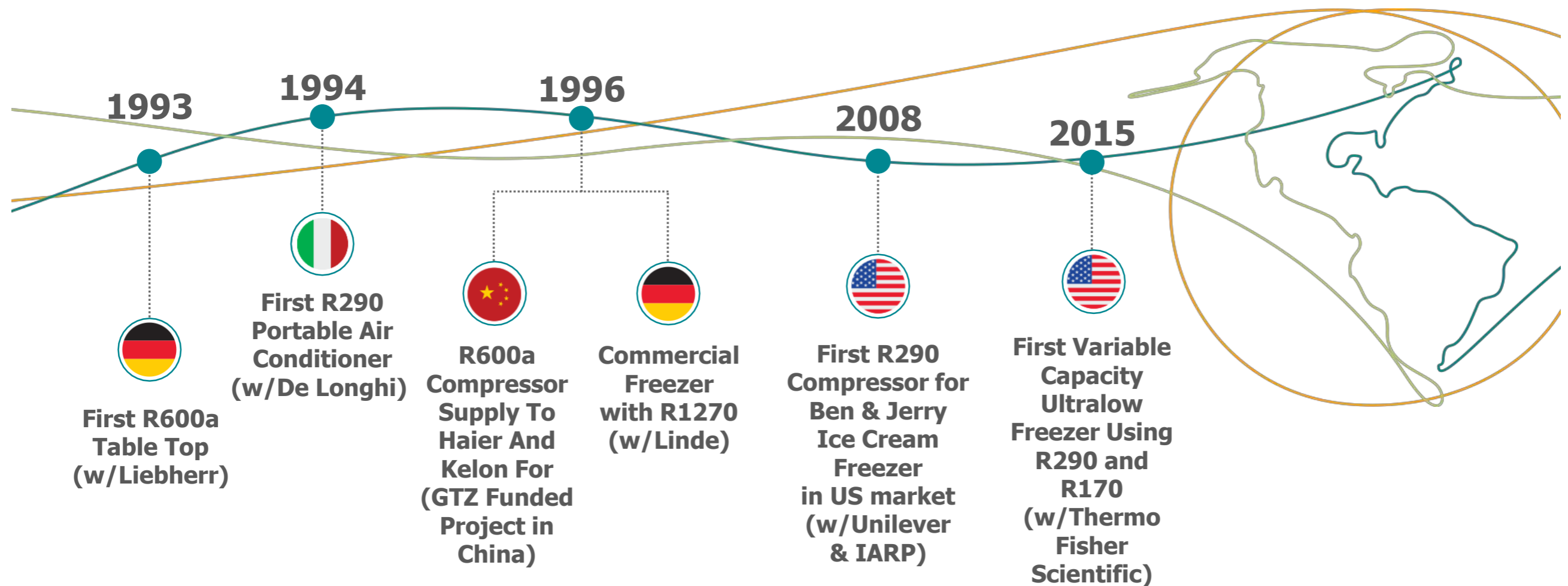
As Final Refrigerant For
The Future of Household
and Light Commercial
Market Segments





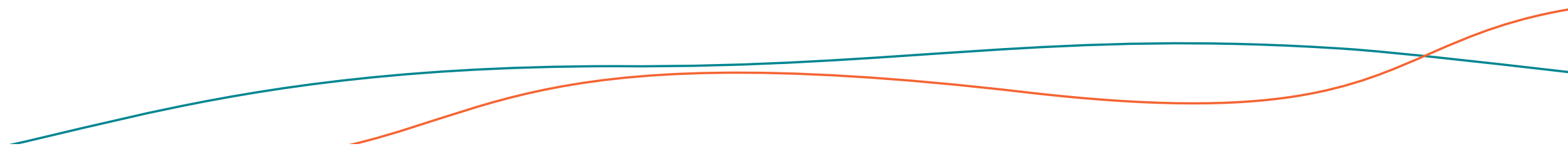
embraco

NR Projects





What is
the best option
for Household and Light Commercial
systems in low GWP future ?





embraco

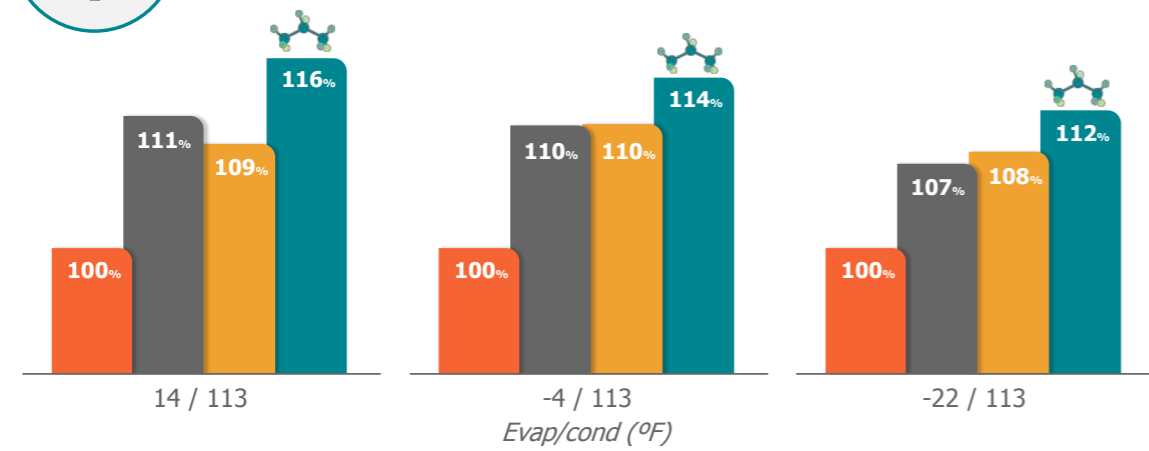


■ R404A ■ A2L #1 ■ A2L #2 ■ R290



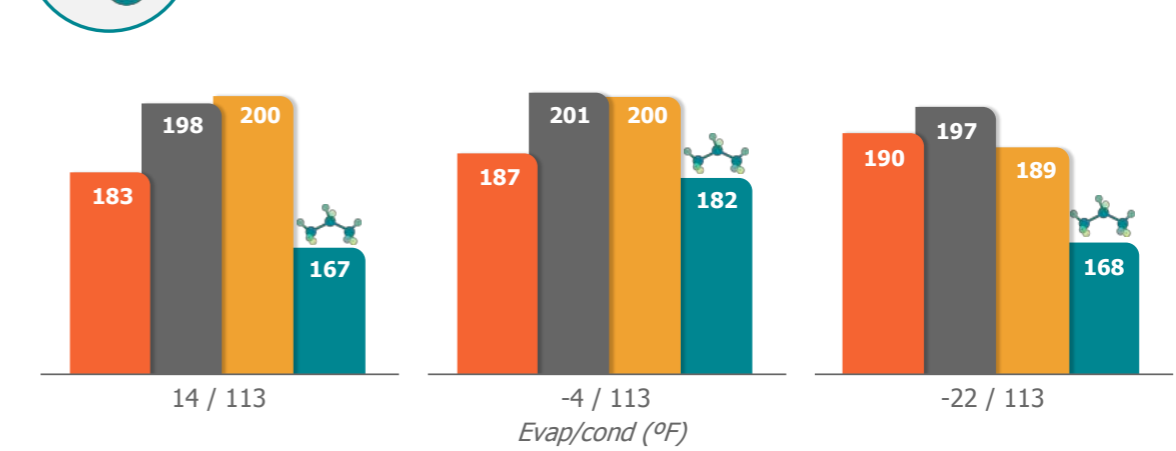
EFFICIENCY EVALUATION

Superheating 20 °R / Middle point based



DISCHARGE TEMPERATURE [°F]

Superheating 20°R / Dew point based





Hydrocarbons are the most sustainable choice for future





HYDROCARBONS

ENERGY SAVINGS, UTILITY
INCENTIVES, & VAST APPLICATIONS



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- A GLOBAL LEADER IN PLUG-IN MODULAR HC REFRIGERATION
- 1997 FIRST TEST INSTALL
- 2002 BEGAN SERIAL PRODUCTION
- OVER 500,000 INSTALLATIONS GLOBALLY
- THOUSANDS INSTALLED ALL OVER NORTH AMERICA

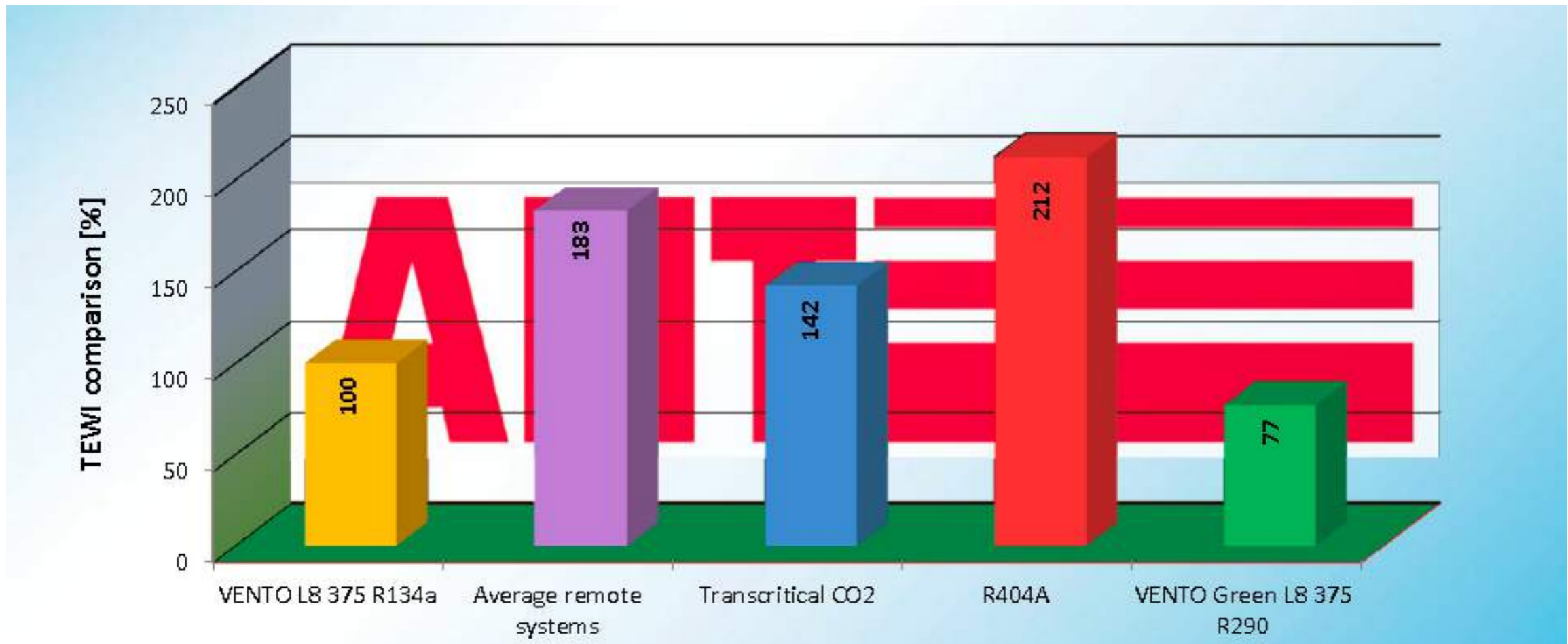




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WHY HYDROCARBON



FIGURES BASED ON AVERAGE AMBIENT TEMPERATURES IN GERMANY



▶ True Manufacturing

True

HYDROCARBON

12% More Energy Efficient
3 Global Warming Potential
Zero Ozone Depletion Potential



▶ The Industry's Most Complete Refrigeration Source





True Manufacturing - Ready for Hydrocarbon Refrigerants



- ▶ Why is True using Hydrocarbons?
- ▶ The Regulatory Maturation
- ▶ Is it safe to manufacture these products? Use them?
- ▶ Service and Training
- ▶ The Results

▶ The Industry's Most Complete Refrigeration Source





Technology Research and Development

▶ True Manufacturing

True

- System performance
 - R-290 vs R134a comparison gives 6-12% improvement in energy
 - R-290 vs R404A comparison gives 12% (+) improvement in energy
- Heat exchanger design technology:
 - New heat exchangers designs; smaller tubing, larger face areas to reduce internal volume
- Electronic controls = added features
- Fan motors -Spark free fans are required
 - Higher efficiency
 - Can control speed, more design flexibility

▶ The Industry's Most Complete Refrigeration Source





Training

▶ True Manufacturing



▶ The Industry's Most Complete Refrigeration Source





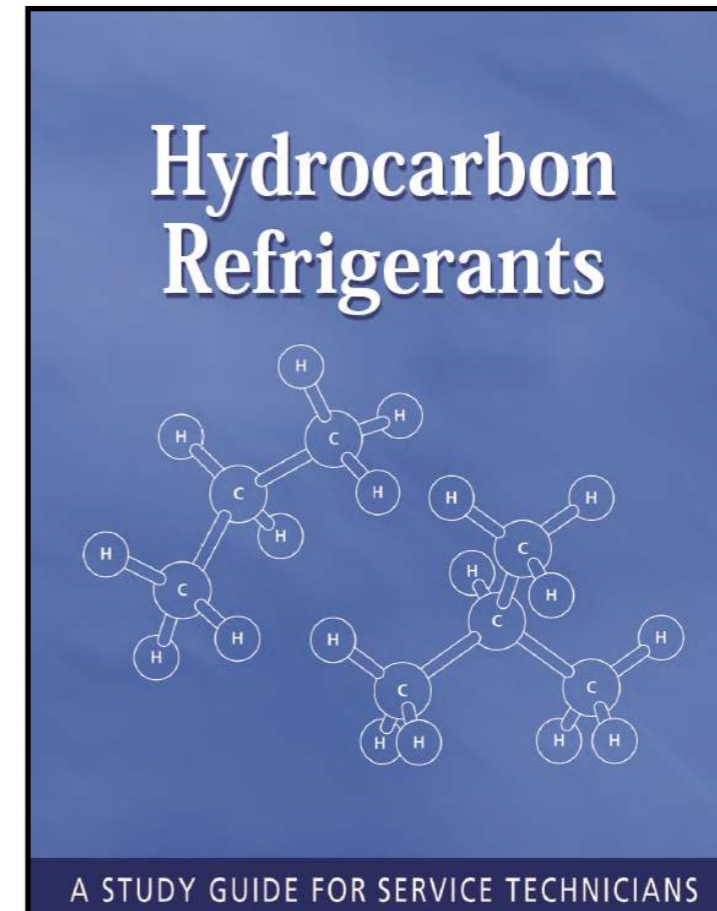
Education

▶ True Manufacturing



▶ True Manufacturing sponsored research and collaborative efforts with industry suppliers and training organizations to develop training programs and certification tests for refrigeration industry service technicians

▶ True sponsored many of our preferred service providers training by RSES's certification program for Hydrocarbon refrigerants



▶ The Industry's Most Complete Refrigeration Source





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R600a SolarChill Vaccine Coolers



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Spin-Off's



BD35K
R600a



BD80CN/100CN
R290





Conclusion

- ✓ Hydro Carbons offer an excellent solution to bring Safe, Reliable and Environmental friendly solutions to rural eareas.
- ✓ Applying the latest Variable Speed Technology improves the system stability.
- ✓ Today there are more than 40.000 SolarChill units installed under the UNEP – WHO – UNESCO programs



June 2016

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産業分野プラットフォーム：

<http://www.hydrocarbons21.com>

<http://www.R744.com>

<http://www.ammonia21.com>

<http://www.R718.com>

ATMOsphere イベント：

<http://www.ATMO.org>

shecco 発行物：

<http://publications.shecco.com>

Accelerate 雑誌：

<http://accelerateEU.com/>

<http://accelerateNA.com/>

<http://accelerateJapan.com/>

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- 市場開発&コンサルタント
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- 規制関連業務
- スペシャルプロジェクト

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