



Changing with the Times

BITZER US
State of the Industry

Joe Sanchez
Engineering Manager



BITZER designs, manufactures, and markets

/ Refrigerant Compressors

/ Natural Solutions Include: CO₂, NH₃,
Hydrocarbons

/ Pressure Vessels

/ NH₃ Oil Separators, High Pressure CO₂ Vessels

/ Ammonia Compressor Packages

BITZER Statistics

/ Founded in 1934

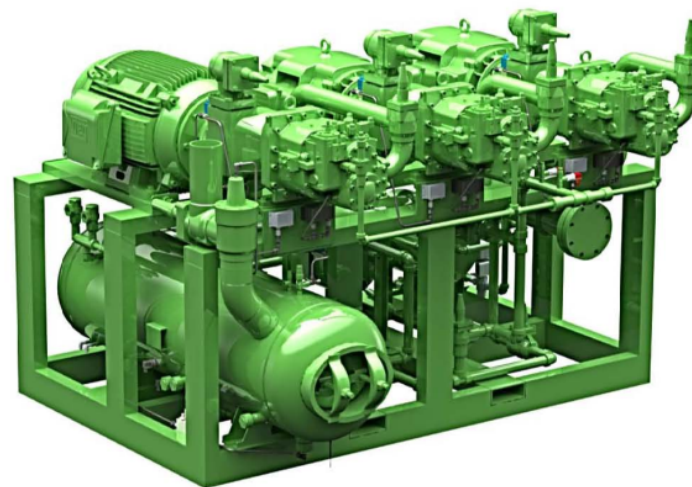
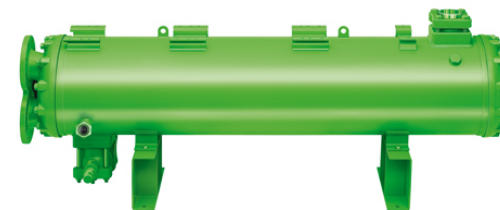
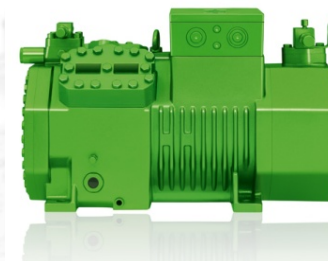
/ 3,400 Employees

/ 42 Locations

/ 14 Manufacturing Facilities

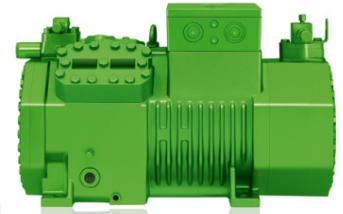
/ Producing 500,000 pieces/year

/ Chose the color green way before
“going green” was cool

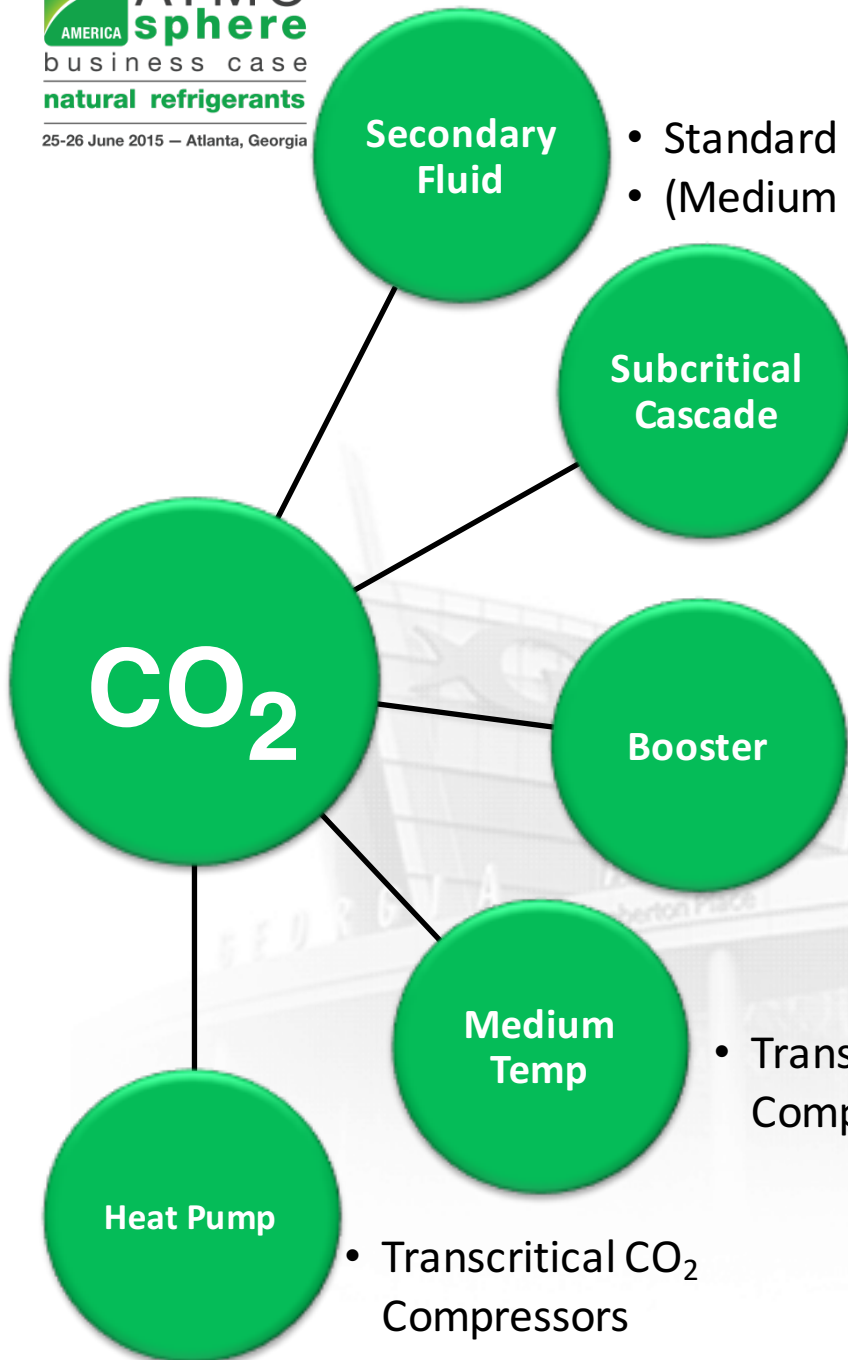


#2 Competency

CO₂ Compressors



**Over 10,000
Transcritical
Compressors Sold!**



Secondary Fluid

- Standard Compressors
- (Medium and Low Temp)

Subcritical Cascade

- Subcritical CO₂ Compressors (Low Temp)
- Standard Compressors (Medium Temp)

Booster

- Subcritical CO₂ Compressors (Low Temp)
- Transcritical CO₂ Compressors (Medium Temp)

Medium Temp

- Transcritical CO₂ Compressors

Heat Pump

- Transcritical CO₂ Compressors

BITZER Compressors →
Max Pressures

- **Standard (Non CO₂) → 400 psi**
- **Subcritical CO₂ → 768 psi**
- **Transcritical CO₂ → 2320 psi**



CO₂

/ Commercial (Supermarkets)

/ First USA Subcritical Cascade (2008)

/ First USA Transcritical Booster (2013)

/ Industrial

/ Ice Rink with Transcritical Compressor (2014)

/ Blast Freezer (360 Tons) with Semi-Hermetic Subcritical Compressor (2015)

NH₃

/ Compressors / Motor Skids

/ Packages (Cold Storage and Processing)

/ Low Charge Systems – Screws (Industrial and Supermarket)

/ Low Charge Systems – Recip (Supermarket)

Hydrocarbons

/ R-1270 Liquid Chillers (150 Ton)



CO₂

- / Wider Range of Transcritical Compressors
 - / Smaller and Larger Sizes
 - / Inverter driven
- / Wider Range of Subcritical Compressors
 - / Smaller and Larger Sizes
 - / Higher Standstill Pressures

NH₃

- / Larger Screw Compressors
- / Wider Range of Packages

Hydrocarbons

- / Special Recips for Propane/Propylene
- / New Compact Screws for Propane/Propylene

- Reducing cost of commercial systems
- More industrial application potential
- Simplify systems

- Global harmonization for large end users
- Continued support of low charge market (USA)

- Ready for industry changes

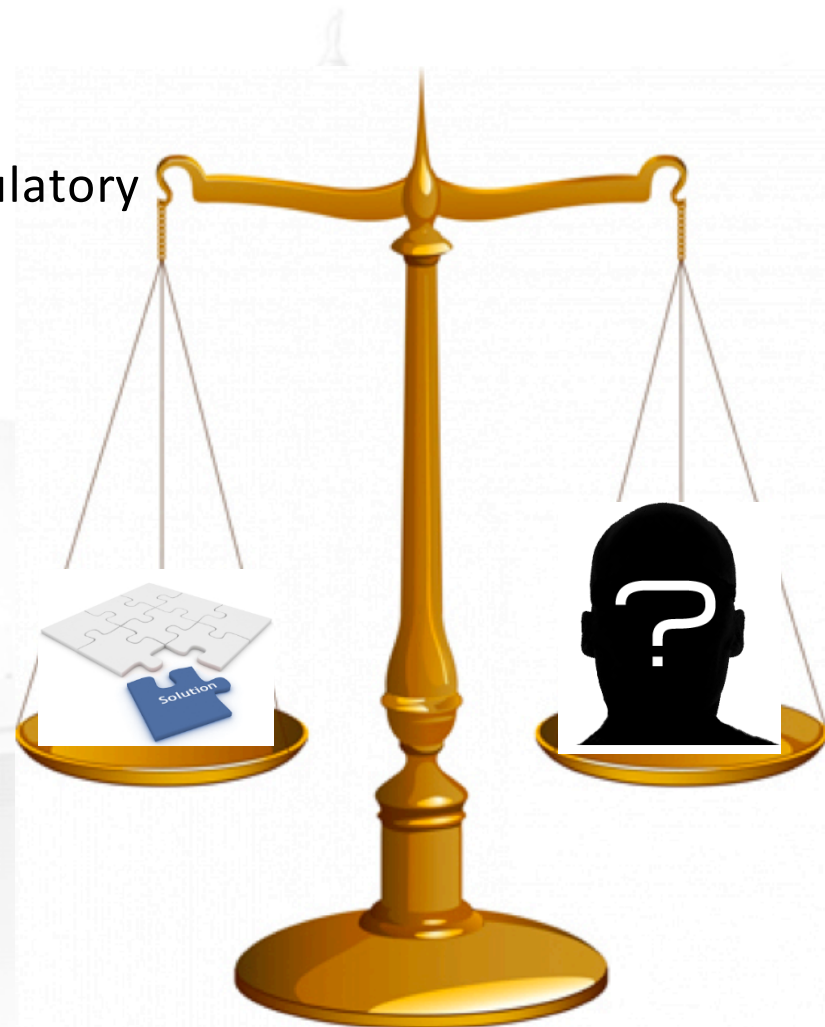


Industry Status

- / Commercial is focused on carbon footprint
- / Industrial world is focused on reducing regulatory impact (without lowering carbon footprint)

Major Challenges Facing the Entire Industry

- / Flammability vs. GWP
- / CO₂:
 - / High Pressure vs. Cost
 - / Energy vs. Climate
- / NH₃:
 - / Toxicity vs. Legal Restrictions
- / HFO and HFO Blends:
 - / Potential Solution vs. The Unknown
- / EPA vs. DOE





The Future of Our Industry is Easy to Predict!



CHANGE

But the *GOALS* of Compressor Manufacturing Remain **constant**:

/ Low cost, efficient, reliable, available, quiet, smooth, wide range

Company Strategy:

Listen, Learn, Adapt



As the Industry Changes, We Will Change with It



business case

natural refrigerants

25-26 June 2015 — Atlanta, Georgia

THANK YOU