



Market progress in natural refrigerant technologies

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Advansor 2014

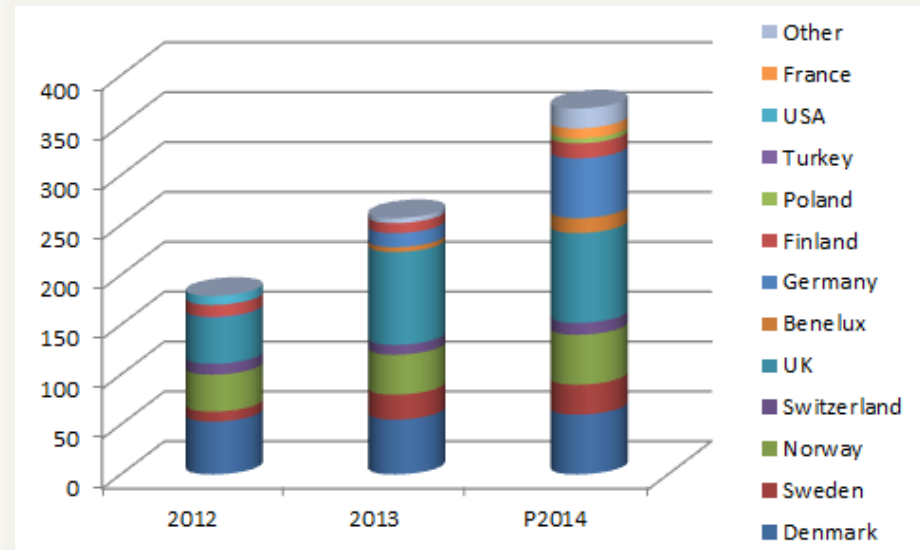
Status

- The Worlds largest producer of CO₂ booster-systems (only CO₂ as refrigerant)
- Reference list: 1000 systems operating in 15 countries with more than 30 different retailers
- Production of 8-10 systems per week
- Production area: 2500 + 1000 m²
- Employees: 65 (+20 at sub contractors)
- Production pr. Year (2014): ∞400 systems
- Production capacity max.: 700 systems/year



Actions Advansor 2014

- Maintain leadership and focus on growth
- Innovation, customer focus, quality and service
- Adding 10.000 ft² production area
- Serial production and new production lines
- New structure in sales organization
- Space Engineering Services



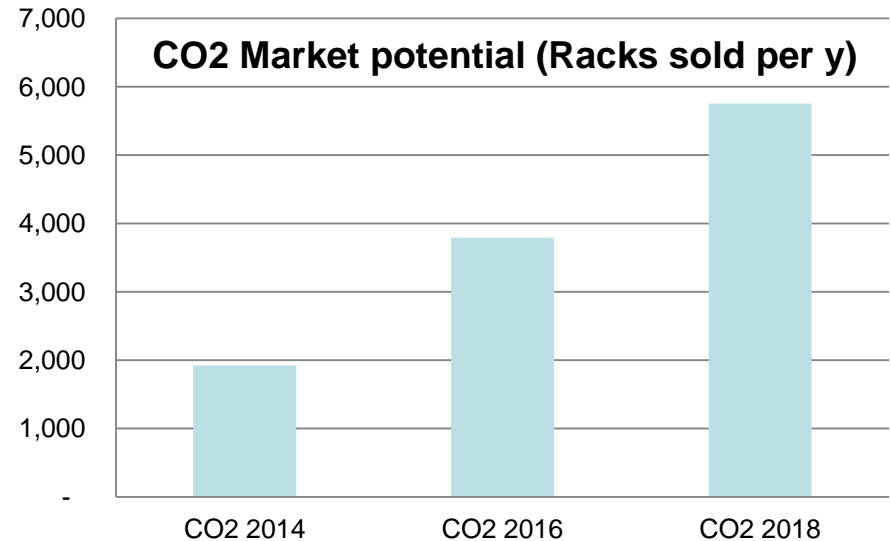
European customer trends

- Growing interest in Central Europe: France, Belgium, Germany, Poland and Italy
- All of Europe's TOP10 Retailers are installing CO₂ booster systems
- 5 out of TOP10 have CO₂ booster as their preferred solution

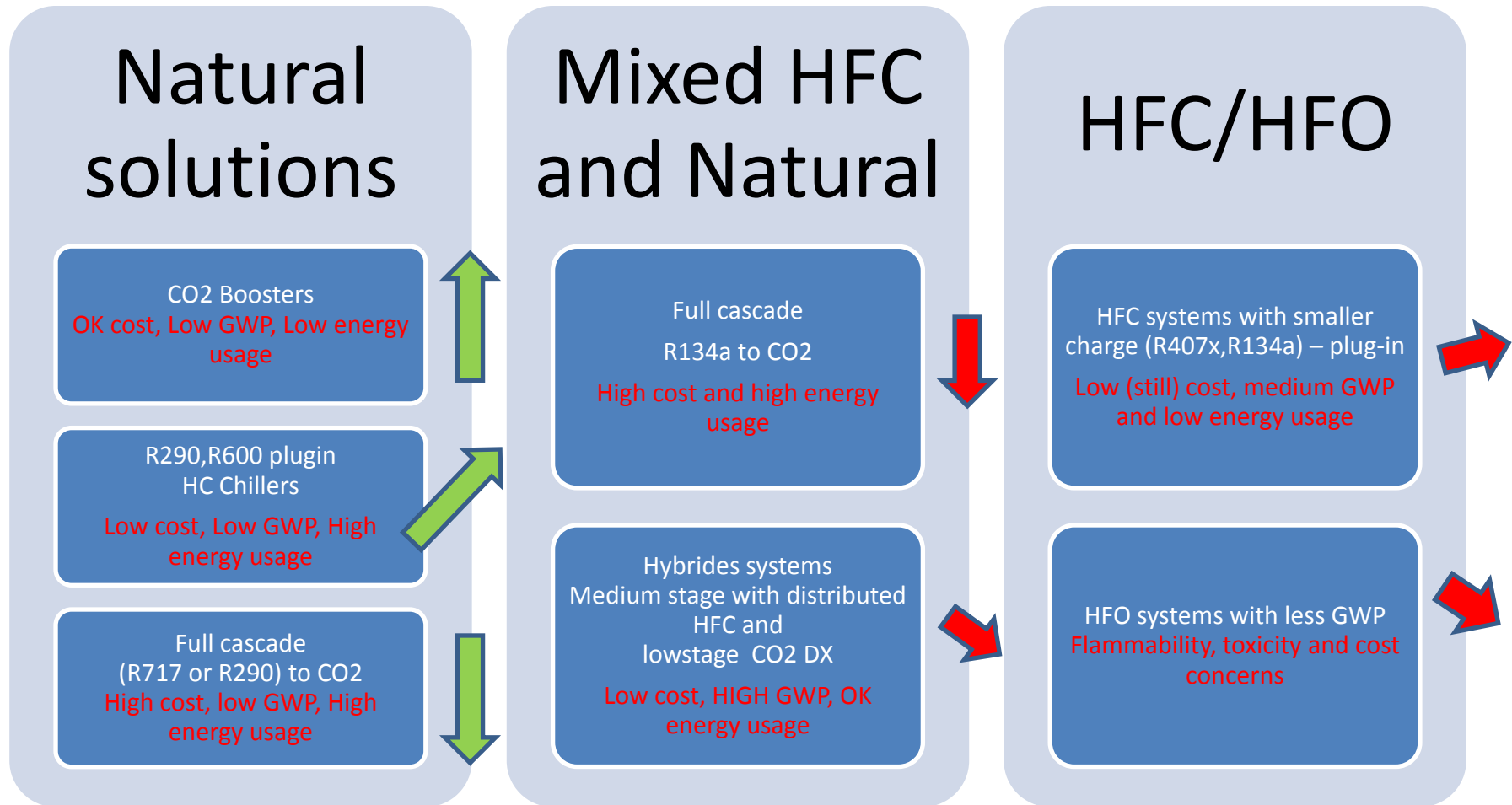
- Many bigger retailers asking for CO₂ quotes
- Primary request is for CO₂

- Clearly consolidated design (CO₂ booster)
- Standardized solutions – less consultancy
- Retailers now have confidence in CO₂

- 4 strong trends
 - Compliance with F-gas directive
 - Focus of energy cost and warmer climates
 - Focus on 1st cost
 - More technology on board (one system does it all)



European Refrigeration Technologies Supermarkets towards F-gas compliance



Trend 3: Focus on 1st cost

Small capacity and Cost Optimized Requirements



3-10 kW with CO₂
MT or LT, single temperature
Single compressor units



40+10 kW with CO₂
MT and LT dual temperature
Max 4 compressors per unit



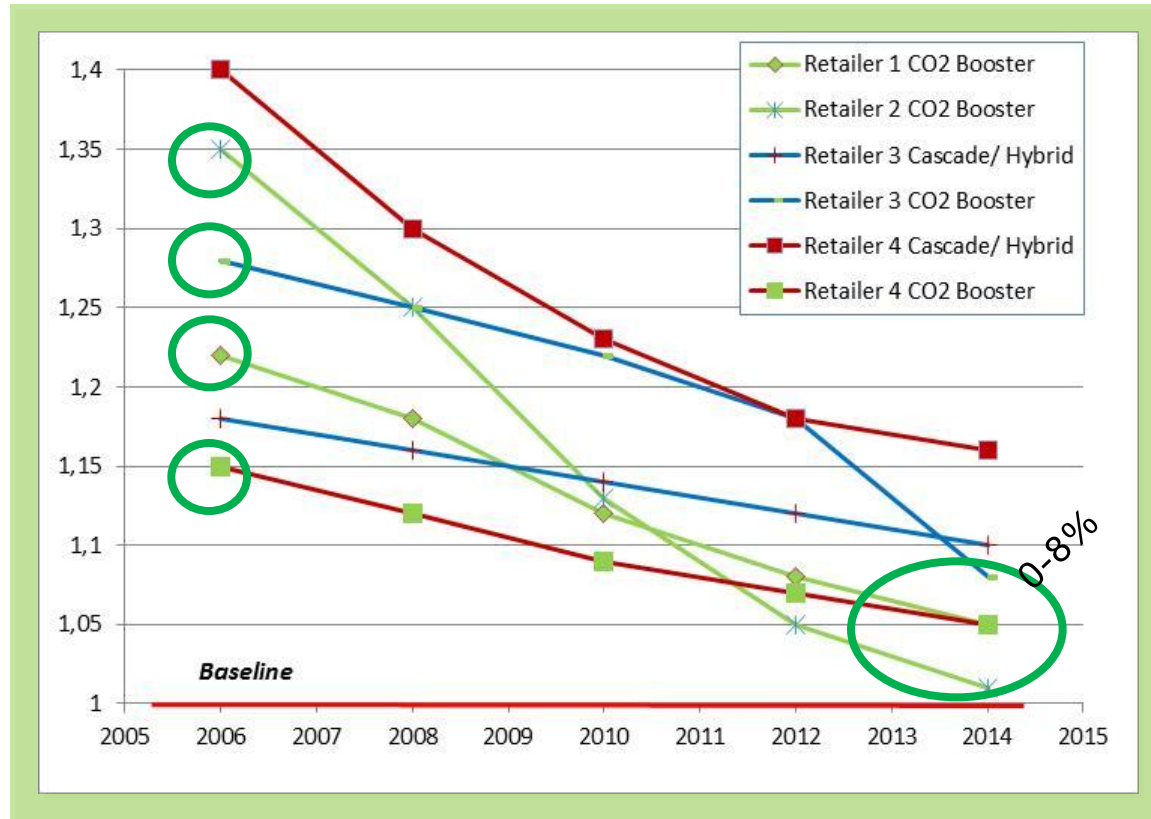
50+10 kW with CO₂
MT and LT dual temperature
Max 5 compressors per unit



Trend 3: Focus on 1st cost

Falling price levels for entire store with CO₂

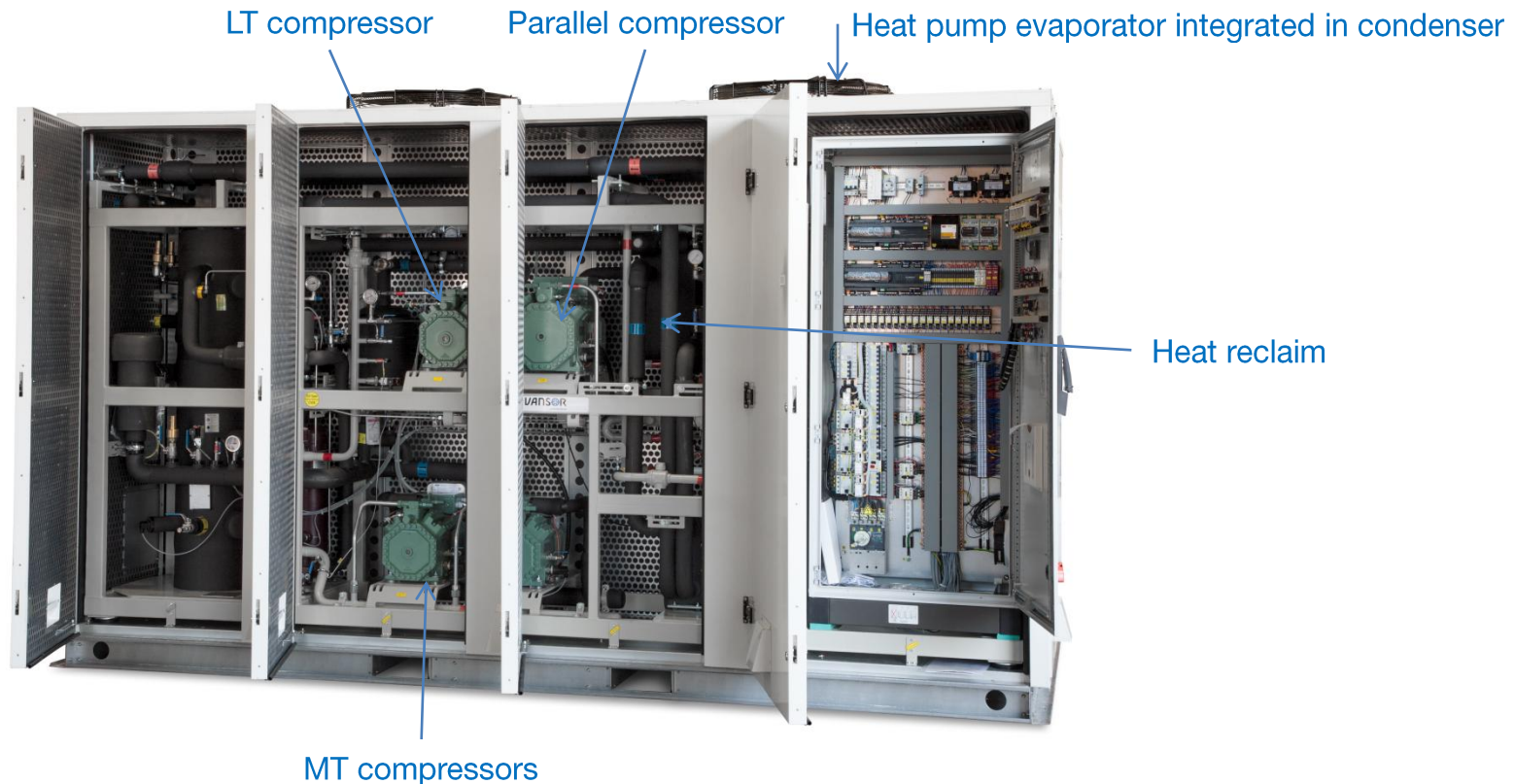
- Rack is more expensive
- Cabinets at same level
- Cheaper installations
- Today Booster CO2 0-8 % more expensive
- Smaller stores still a challenge (ValuePack)
- Operational and maintenance cost savings for 3y period = 5% of first cost (w ref tax = 8% of first cost)



Trend 4: More technology on board

SIGMA – all in one Advanced technology for better total performance

- Plug & Play Total Energy Management System
 - MT & LT
 - AC
 - Full heat recovery with A2W heat pump functionality
- Best in Class Energy Performance with Parallel Compression



Message from Europe

Go ahead with CO2 boosters!

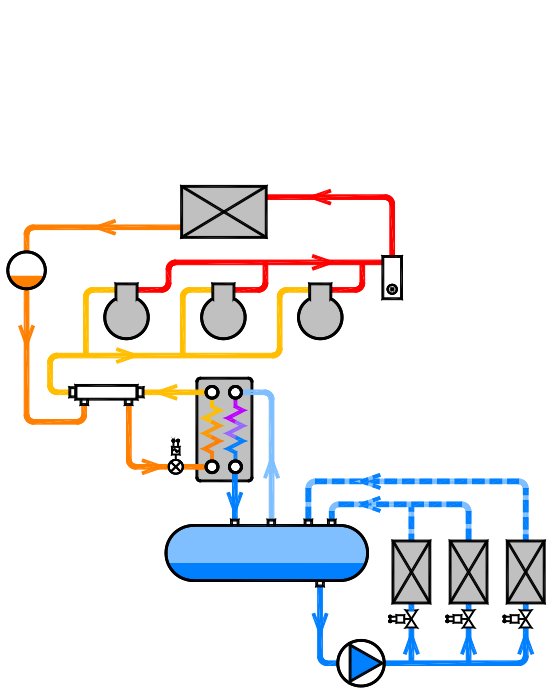
- We already did all the mistakes in Europe – from now on it will be easy
- CO2 Technology is fully developed and ready for the commercial stage
- Technology will convert towards CO2 booster (also in warmer climates)
- Price level on its way down - it is a matter of volume, standardization and effective production
- Energy optimization is on-going to improve even further
- All-in one energy systems

- Knowledge and education is essential – here there are room for improvement everywhere – we all have to do our bit
- Better availability of CO₂ components in NA

Only real worry I have: How to satisfy future demand for CO2 boosters?

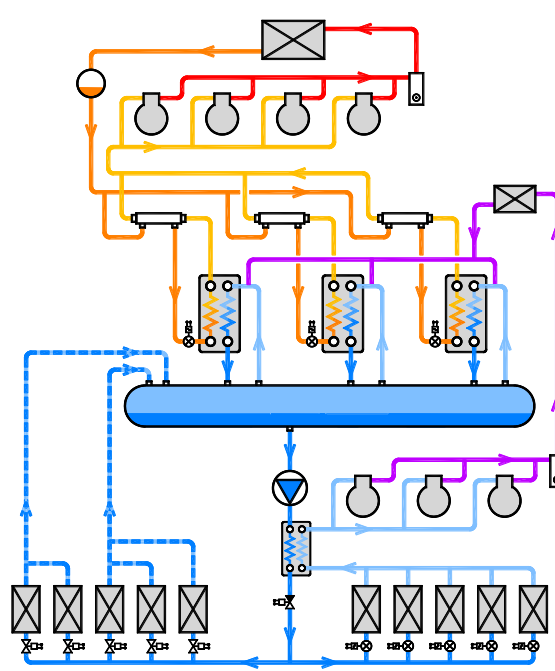
But I can live with that worry!

Sustainable CO2 Solutions for HFC Reduction



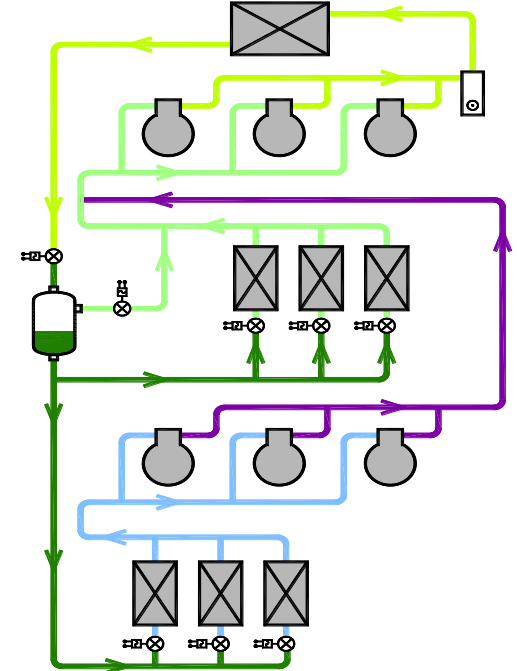
SNMT2/ SNLT2
 Secondary CO2

HFC Primary Only
 (50+% HFC Reduction)



SNMT2LX
 CO2 CASCADE SYSTEM

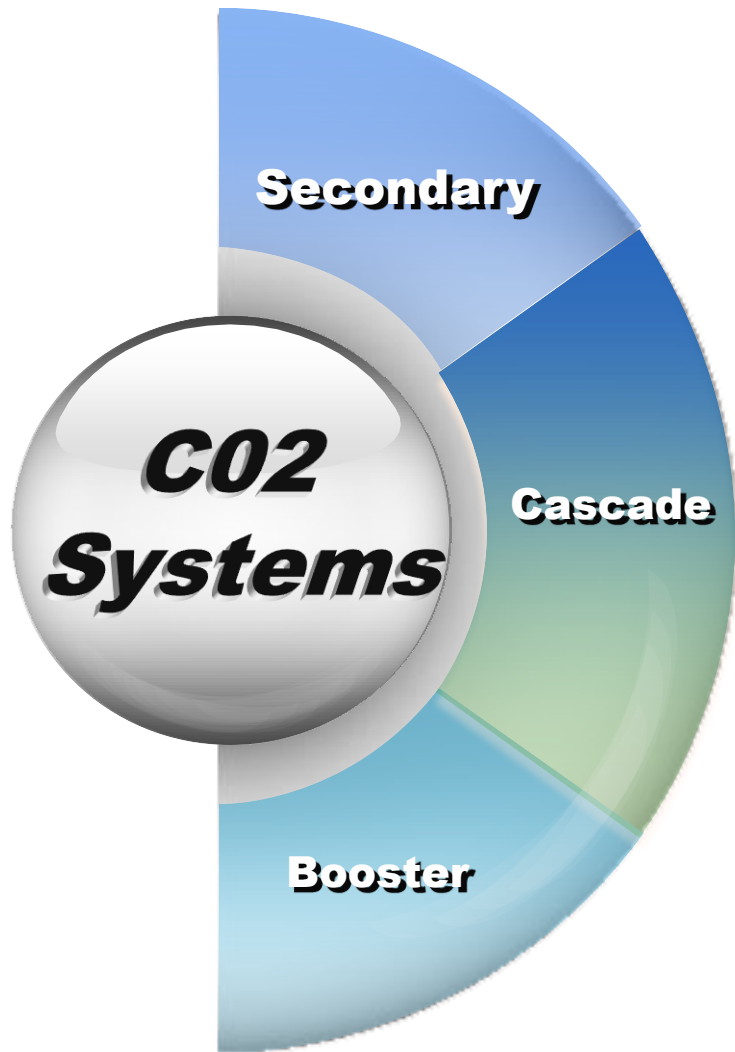
HFC Primary Only
 (70+% HFC Reduction)



ADVANSOR
 by Hill PHOENIX
 CO2 BOOSTER SYSTEM

HFC FREE

CO2 System Evolution for the North American Market



CO2 Secondary (pumped) Systems

2006 Low temperature, 2010 medium Temperature
Over 170 Installation in North America

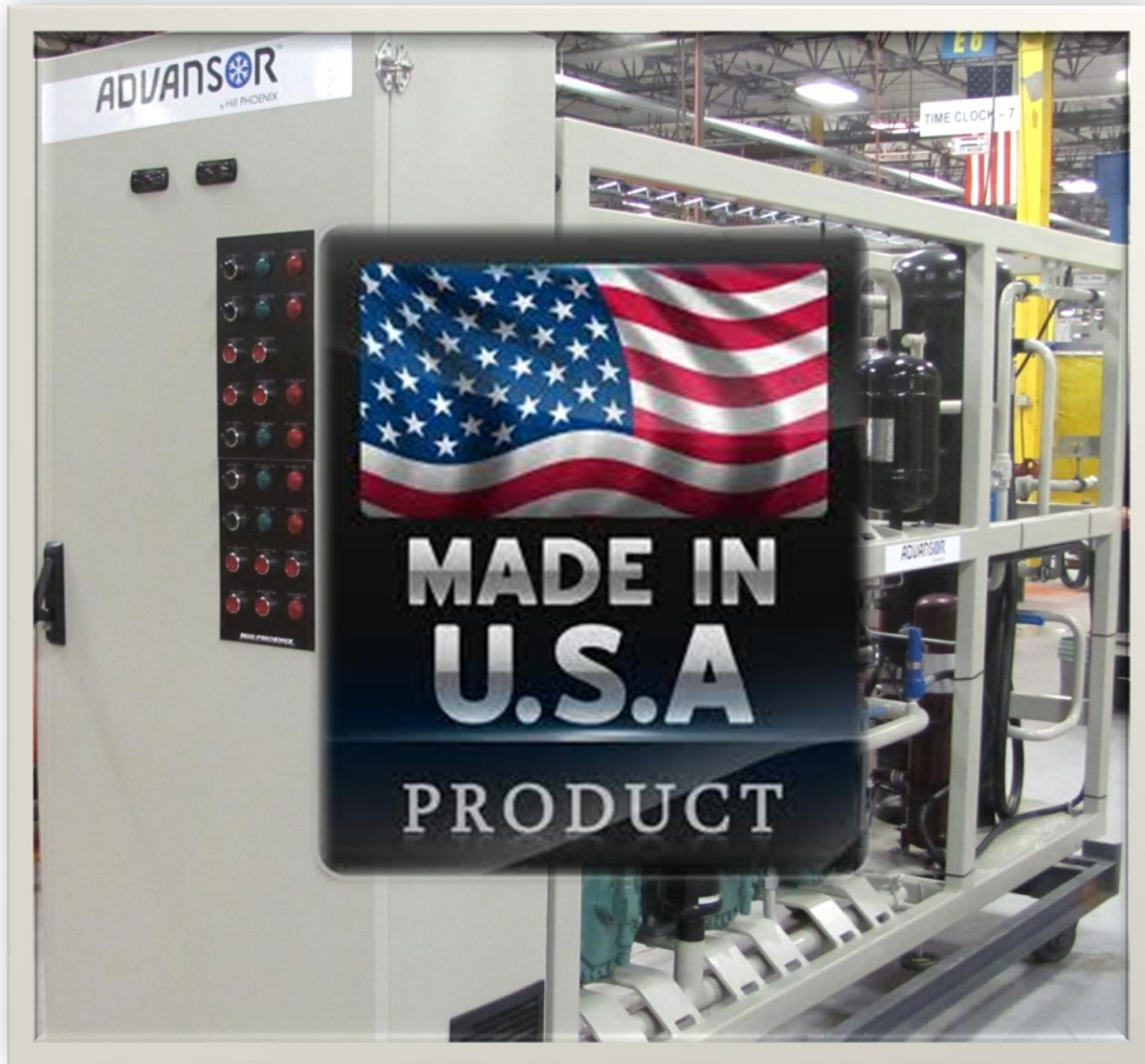
CO2 Cascade (subcritical) Systems

2008 Low temperature
Over 30 Installation in North America

CO2 Booster (transcritical) Systems

2012 Low & Medium temperature
Over 50 Installations in North America
Over 1000 in Europe

CO2 Systems Technology Advansor Booster System



One refrigerant. So many benefits.

ADVANSOR  **TM**

PART OF THE SECOND NATURE FAMILY BY HILLPHOENIX

Leading CO₂ technology for refrigeration.

- 100% environmentally friendly • non-toxic, inflammable
- no ozone depletion • no global warming impact
- low noise • single refrigerant • low cost of installation
- low cost of maintenance • compact design

• future-proof solution

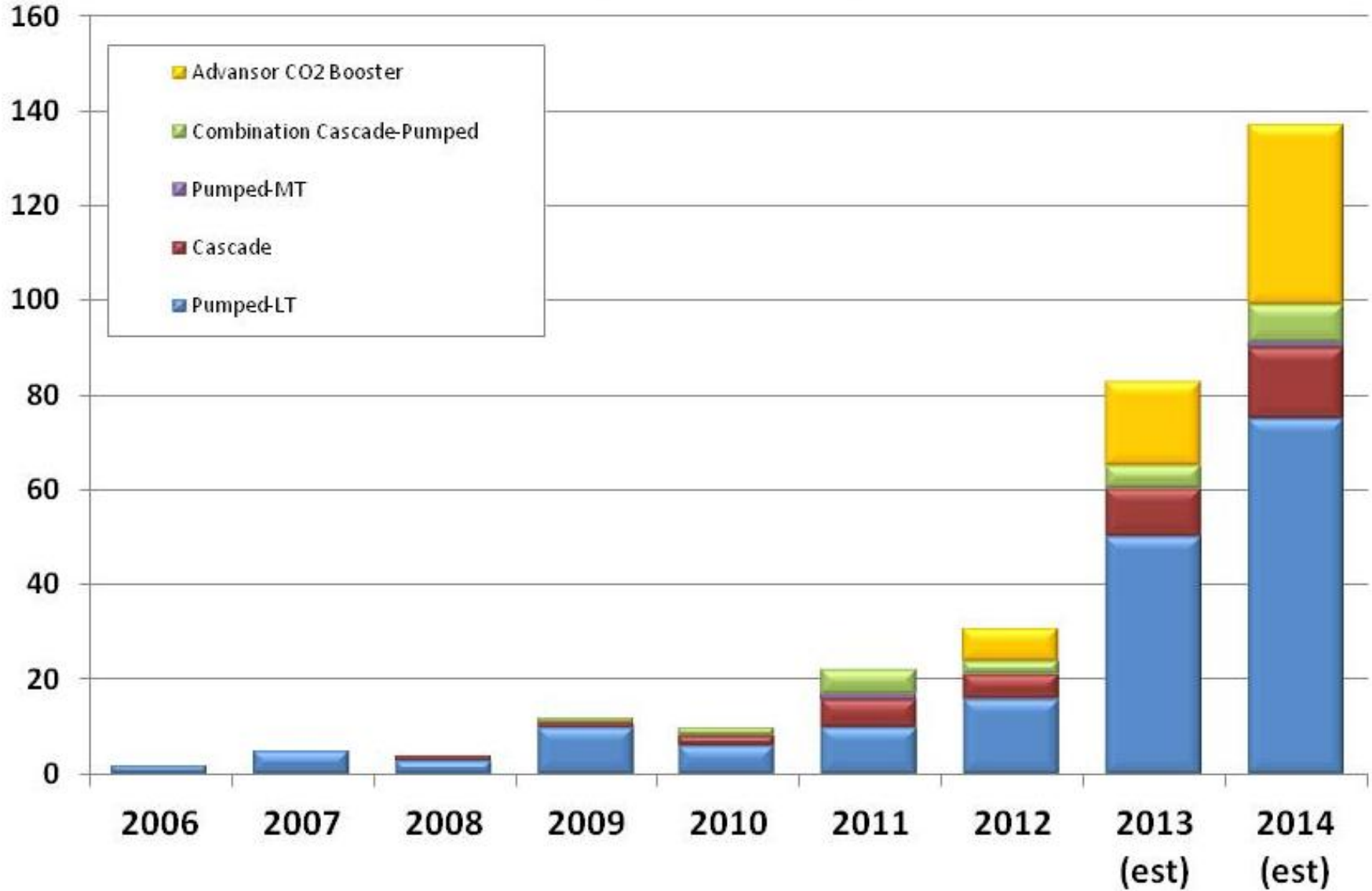
**Fresh thinking.
Responsible solutions.**

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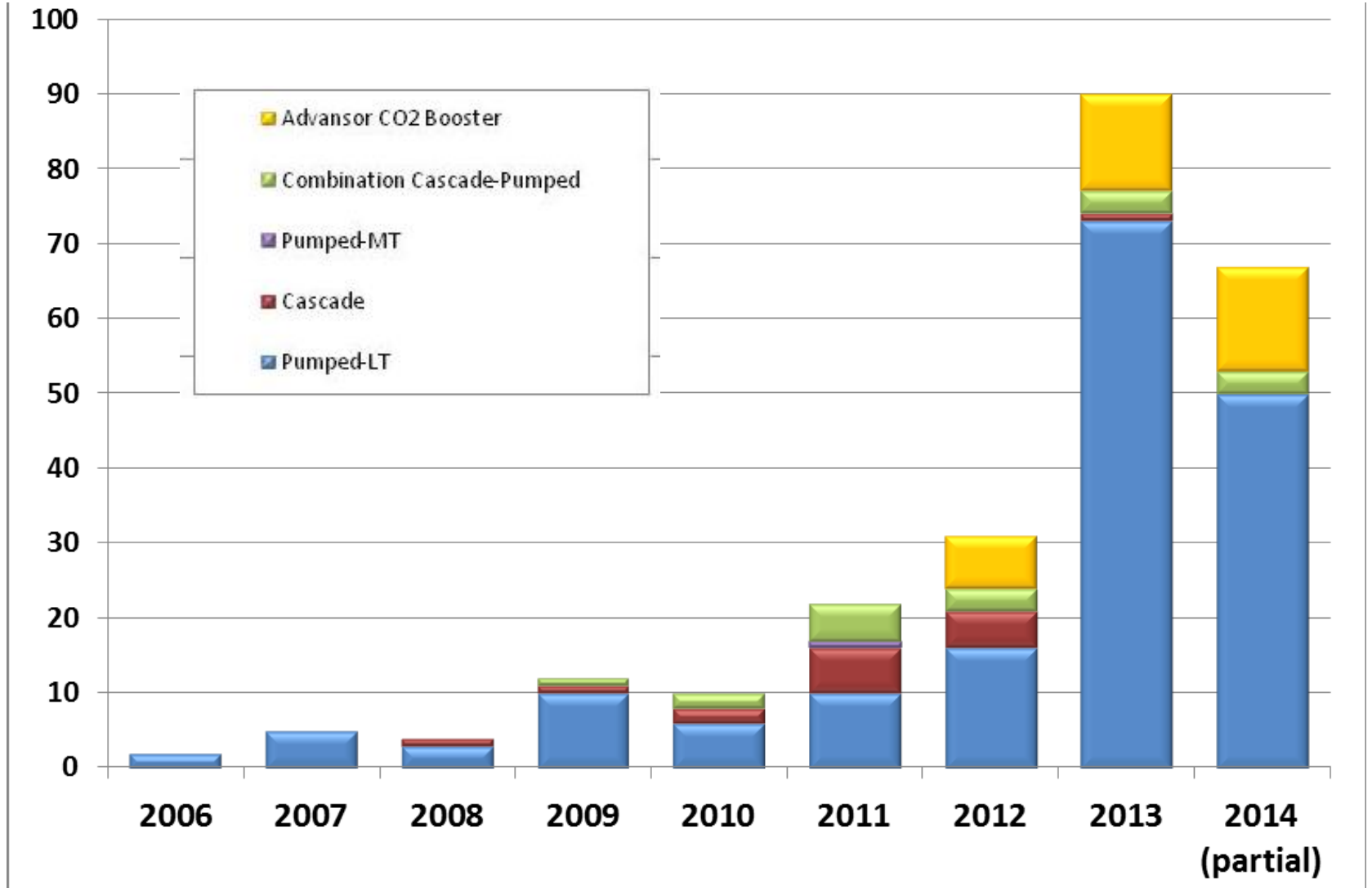
A DOVER™ COMPANY

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CO2 Systems by Type – 2013 Forecast



CO2 Systems by Type – 2014 Actual



CO2 Systems Technology – Booster System



MICRO THERMO
TECHNOLOGIES



EMERSONTM
Climate Technologies

ADVANSORTM
by Hill PHOENIX

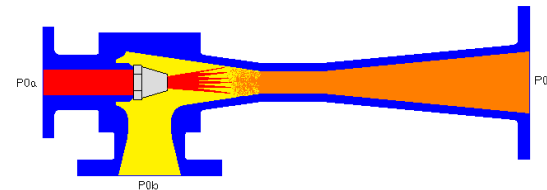
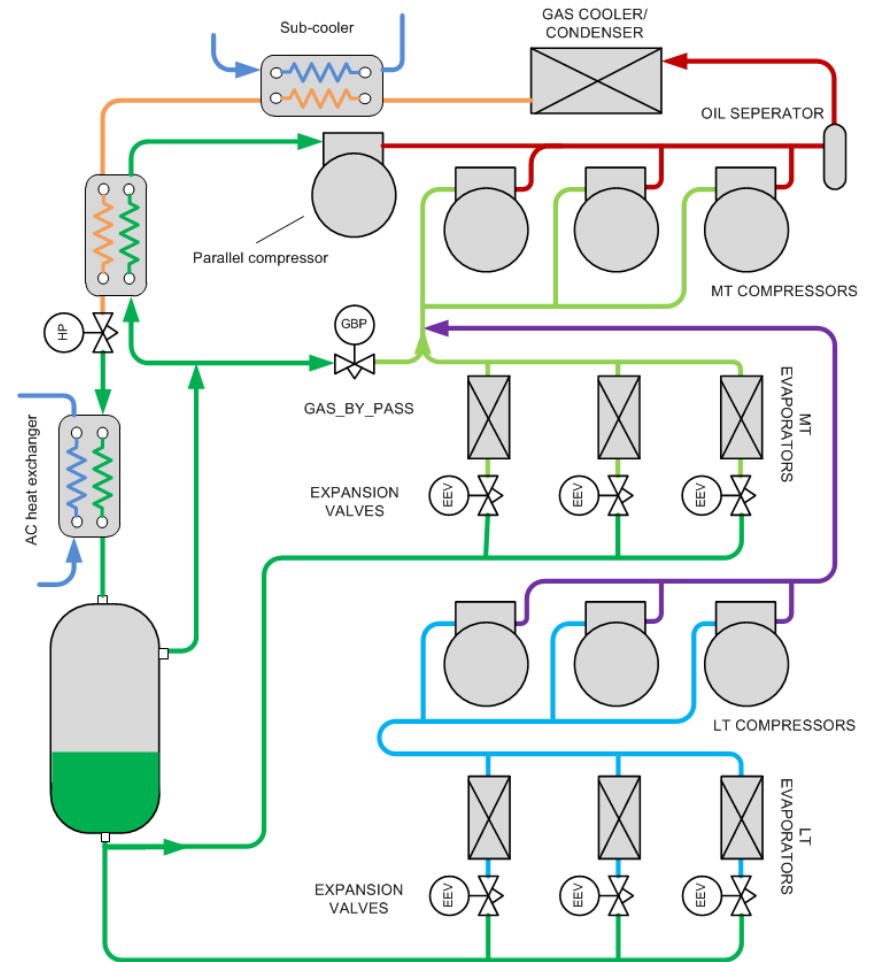
CAREL

Future Developments

- High pressure sub coolers
- Parallel Compression systems
 - Peak savings 12-20%, Annual savings 6-10%
 - Already introduced to the market
- Adiabatic gas coolers
 - Peak savings 20-30+%, Annual savings 10%



- Ejectors
 - Peak savings 15-20%, Annual savings 6-8%
 - Under development





ATMO
sphere

business case

natural refrigerants

June 18-19, 2014 - San Francisco

Thank you very much!