

shecco
Base



**NATREF MARKET TRENDS AROUND
THE WORLD**

ALVARO DE ONA, COO, SHECCO

BUSINESS TRENDS

01

TOWARDS CONSOLIDATION IN THE MARKET - ALSO IN NA



MARKET TRENDS COMMERCIAL REFRIGERATION

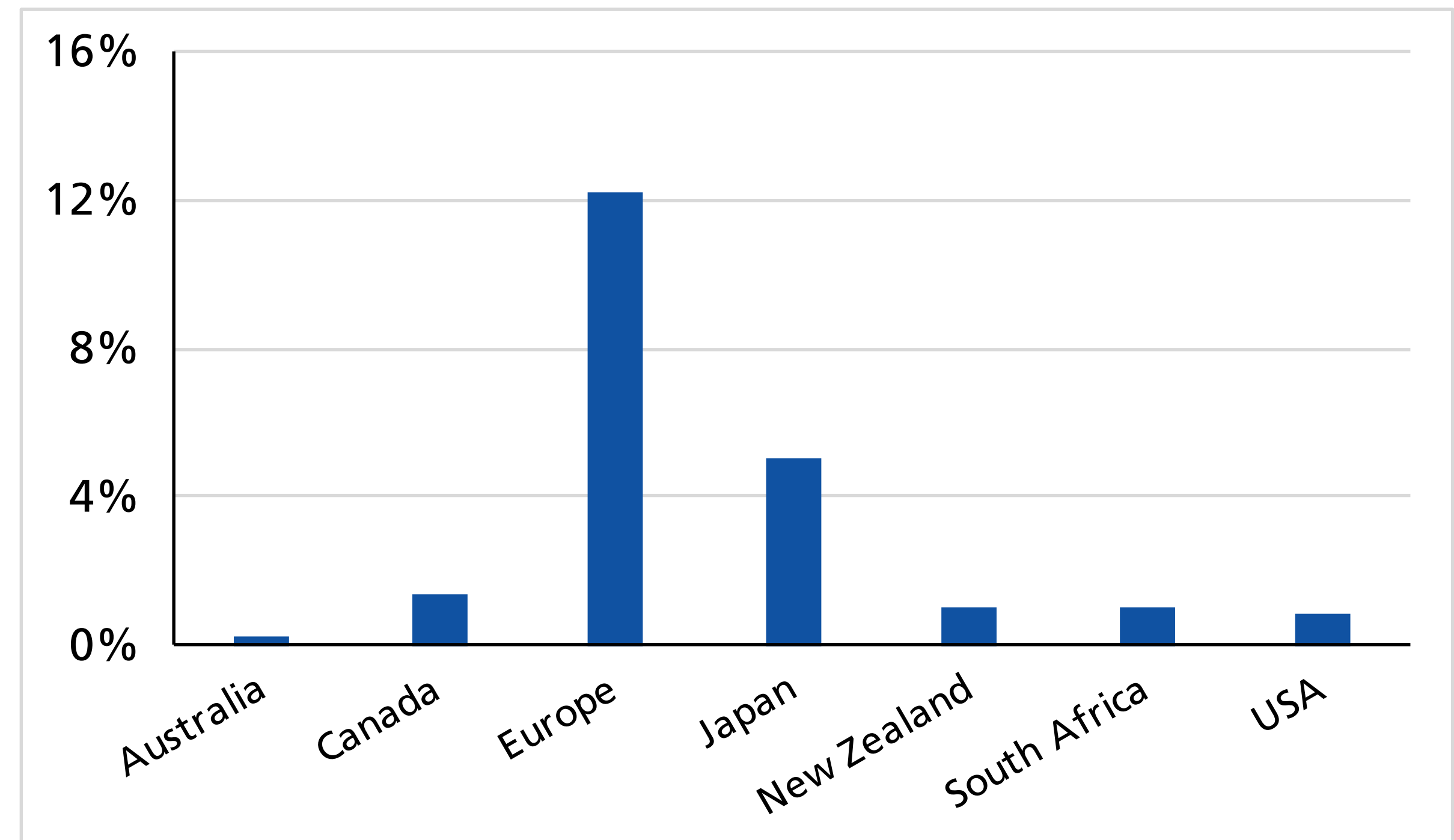
02

CO₂ TC STORES SHARE FROM TOTAL

The market is still in it's early stages.

Based on estimations from the numbers of stores of major end-users:

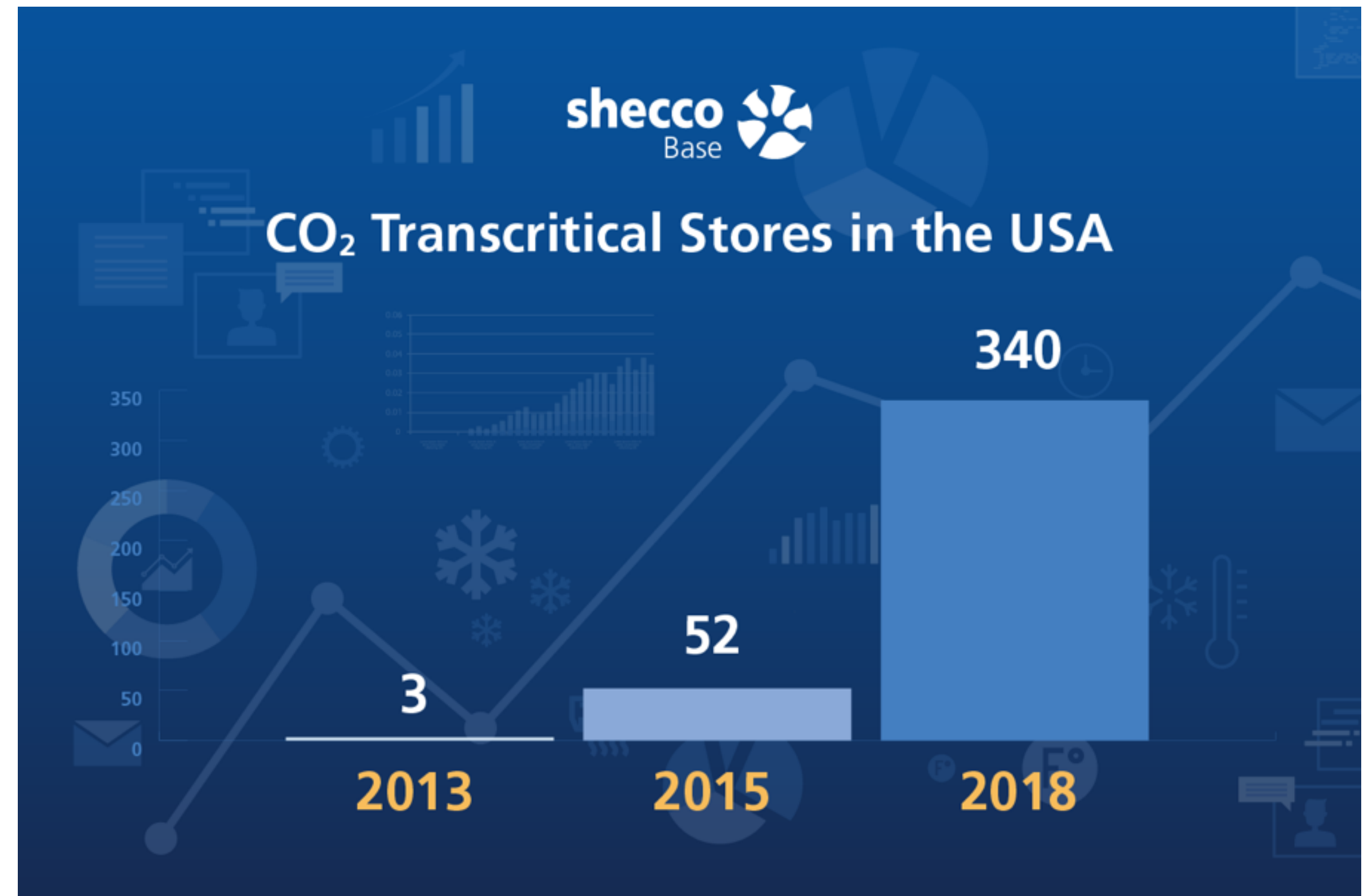
- **CO₂ TC stores** account for **less than 10% of total stores** in Australia, Canada, Europe, Japan, New Zealand, South Africa and the USA.



CO₂ TC IN THE USA

The US have experienced an **increased growth** in the number of CO₂ transcritical stores since 2013.

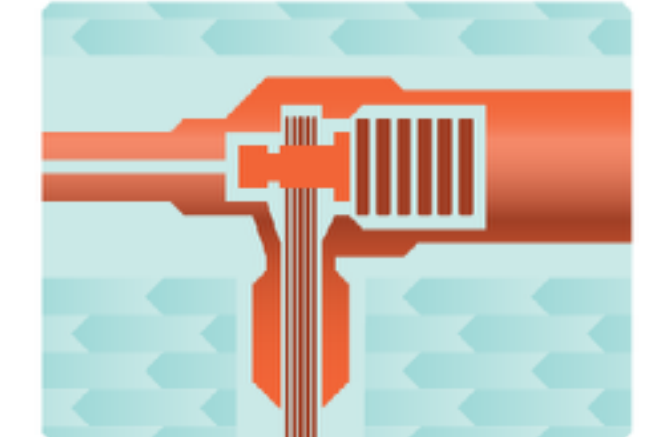
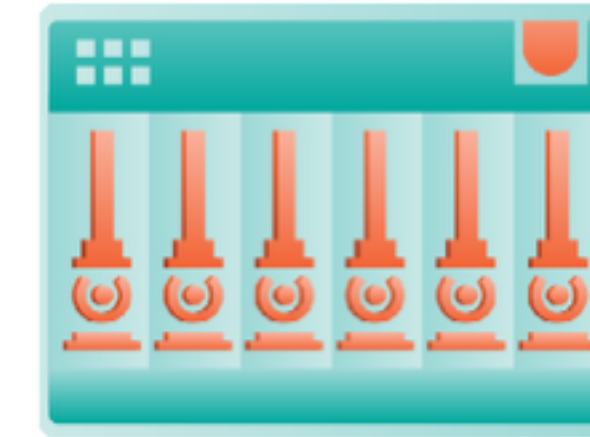
This trend is **driven by major end-users and manufacturers** aiming to bring in the US market energy efficient and environmentally friendly commercial refrigeration technology.



KEY TREND: INCREASING EFFICIENCY & TOWARDS SMALLER SYSTEMS

1. Higher efficiency in warm weather conditions

- Parallel compression
- Ejectors
- New innovations / system designs



2. Towards small capacity systems

- **Japan** - leader in CO₂ condensing units for smaller store formats
- **Europe: From high capacity racks expanding capacity to condensing units/ small boosters**
- **N. America:** also smaller capacity to become available?



Competition increasing = higher efficiency, lower prices

GROWING COMPETITION - HYDROCARBONS

Plug-in Units: Global market estimate (April 2018) = **2 mil R290 units**

Drivers: simplicity, efficiency and trend towards smaller size stores

Major growth in Europe is expected between 2020-2022 due to the F-Gas Regulation HFC ban (GWP > 150) in hermetically sealed commercial ref equipment that enters into force in Jan 2022

Charge limits => the key to future evolution (globally)

- A higher charge limit would enable to units with one R290 circuit instead of multiple ones reducing cost and increasing energy efficiency



R290 WATERLOOP GAINING GROUND

Innovative waterloop solutions are gaining ground due to the advantages in place:

According to manufacturers waterloop solutions have:

- lower installation cost and -time compare to integrated CO₂ systems
- lower energy consumption and competitive advantage in warm climates
- lower service- and maintenance-costs
- no need of refrigeration engineers/ high skilled workers
- lower Total Cost of Ownership

Main challenge to overcome:

-> R290 charge limits



MARKET TRENDS INDUSTRIAL REFRIGERATION

03

COMPETITION BETWEEN DIFFERENT NR SYSTEMS INCREASING

Industrial refrigeration market traditionally dominated by **ammonia** and H(C)FCs

NR cutting edge technologies becoming strong trend and competing:

- **ammonia low charge**
- **CO₂ transcritical**
- **NH₃/CO₂**



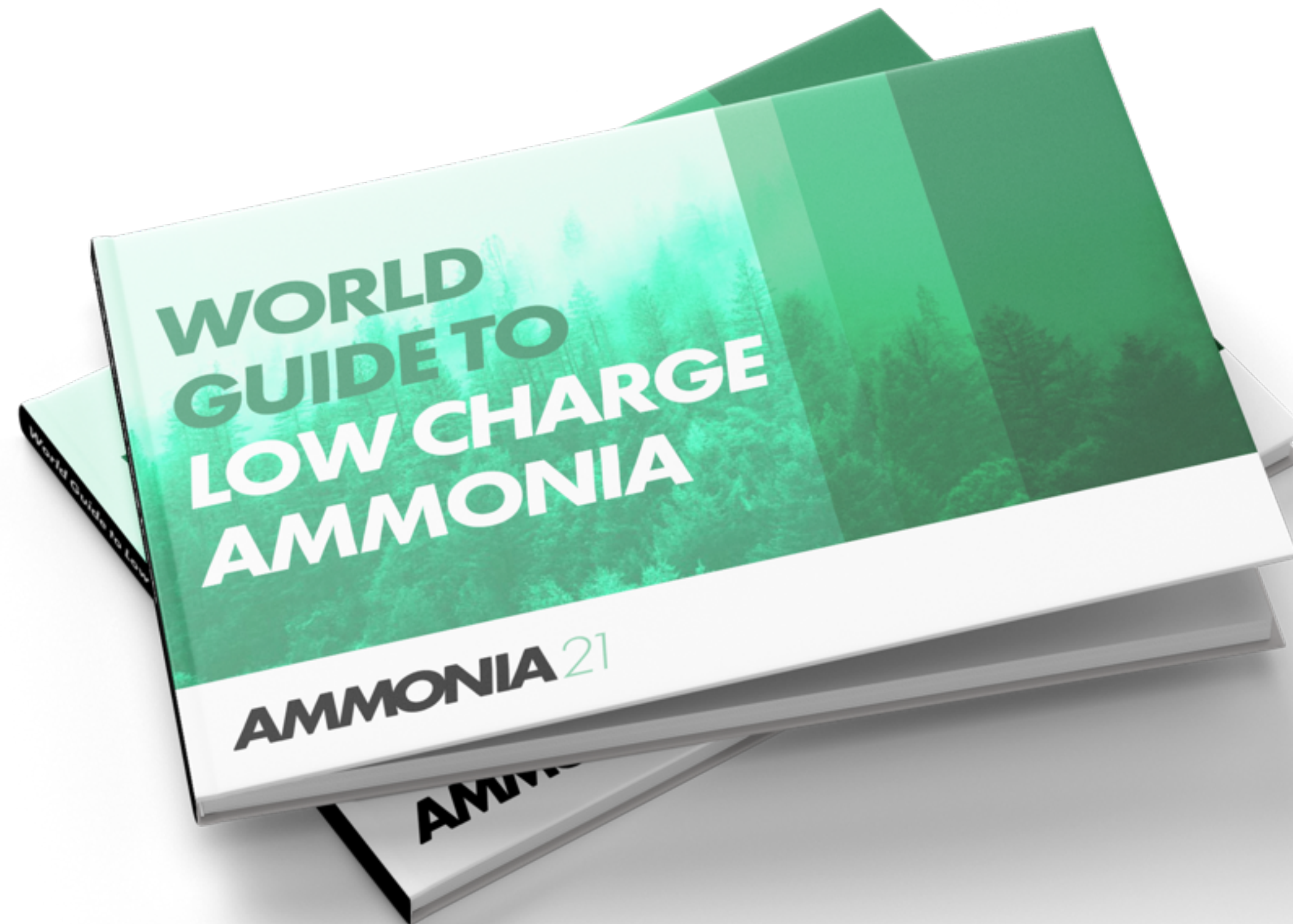
Key drivers:

- **increased safety - lower risk**
- **higher efficiency**
- **easier servicing**
- **return on investment for the end user**
- **growing competition - prices pushed down, technology becoming more available**

LOW-CHARGE AMMONIA GUIDE

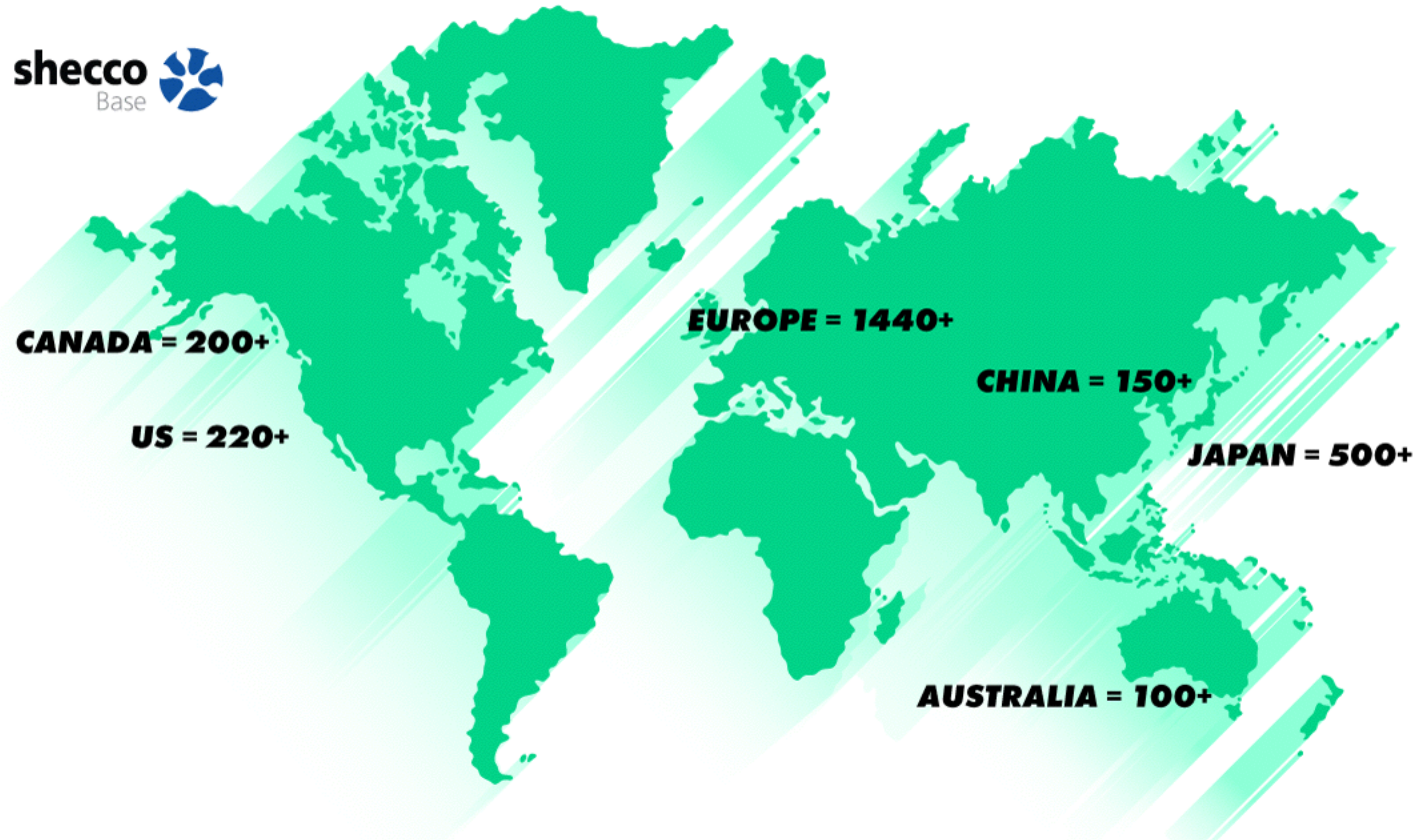
Highlights:

- Technology trends
- Definition of low-charge
- Worldwide survey
- Case studies



LOW-CHARGE AMMONIA TODAY

Low charge ammonia installations around the world



CO₂ IN INDUSTRIAL REFRIGERATION

CO₂ transcritical - **gaining grounds** in industrial refrigeration in different parts of the world:

Bigger capacity compressors + other components for larger applications becoming available from several key suppliers

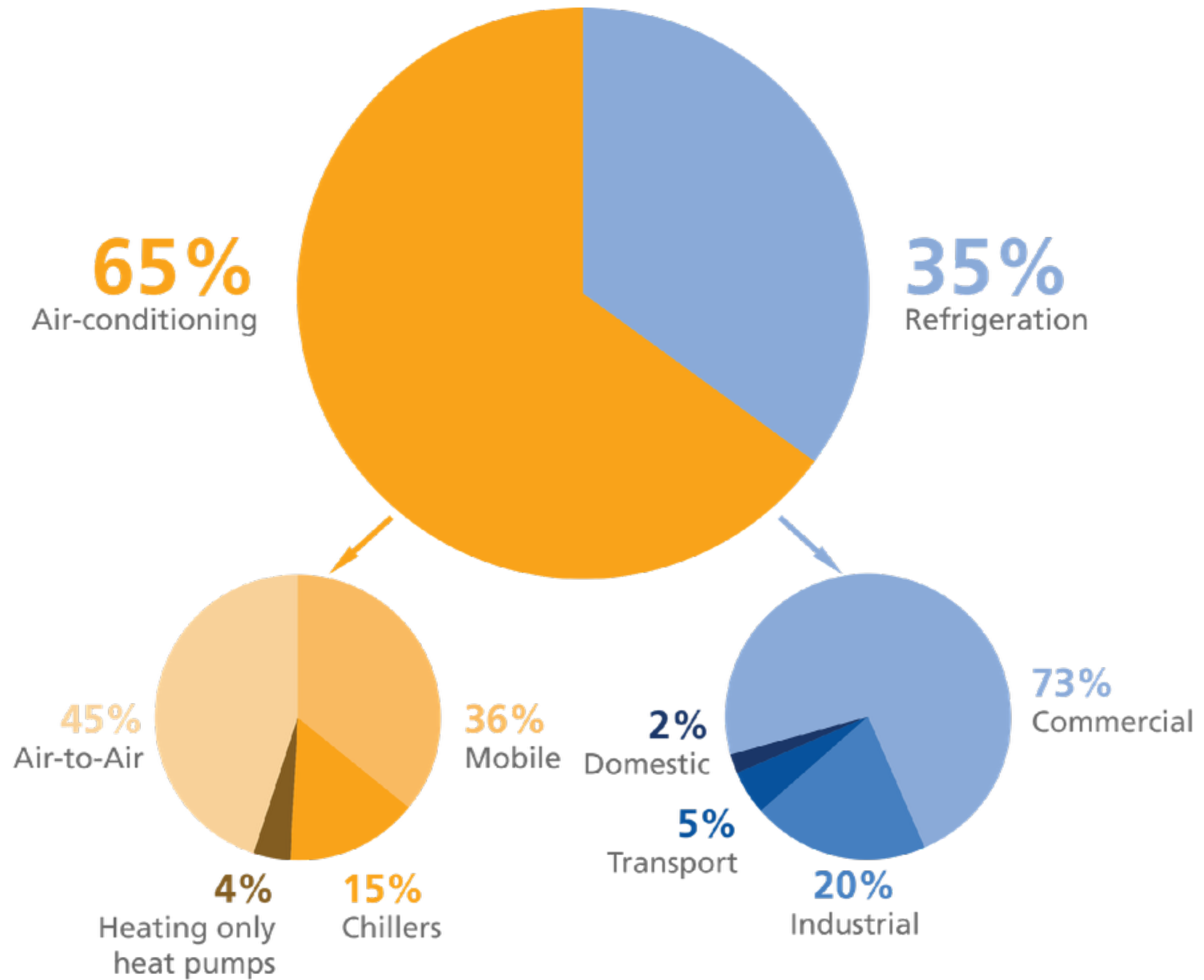
- **N. America:** Growing number of CO₂ TC installations in cold storage / food processing (i.e. upcoming world's largest CO₂ plant in California, several installations in Canada, etc.)
- **Europe:** Demand for CO₂ in industrial refrigeration growing, several manufacturers providing CO₂ TC technology in commercial refrigeration expand to industrial sector
- Large plants planned also in South Africa, Australia, etc.

OTHER APPLICATIONS

04

F-GASES CONSUMPTION IN THE HVAC&R SECTOR

Opportunities for Natural Refrigerants in other sectors



Source: UNEP

RESIDENTIAL AC - MARKET TRENDS

Supply of split and window RAC units: major manufacturers from Asia.

China - world's biggest manufacturer of RAC with market share of **85%, 100 million AC units / year**

China and India established production of R290 RAC, BUT market uptake is slow

= active policy support, update of safety regulations, and stronger industry commitment needed to unlock full R290 RAC market potential



HEAT PUMPS WITH CO2 AND HC

CO2 Heat Pumps for Domestic Hot Water: from Japan to the world (Residential, Hotels, etc..)

Growing interest in HC based water chillers targeting **commercial air-conditioning** and **process cooling applications**

- **Large number** of manufacturers active with available solutions in the market
- **Reliable performance at 45°C** (i.e. in Australian summer)



COOLING ENTIRE BUILDINGS WITH NATREFS

Hydrocarbons

- Medium capacity (TripleAqua system in Europe in Town-halls, medium-sized Buildings, etc.)
- Large capacity Chillers with R290 on office buildings: Several options in the market (i.e JCI, with installations in Europe, Middle East, South East Asia)

Ammonia

- Large capacity chillers soon available in the market (i.e. GEA, announced at Mostra in March 2018)



MOBILE AIR CONDITIONING

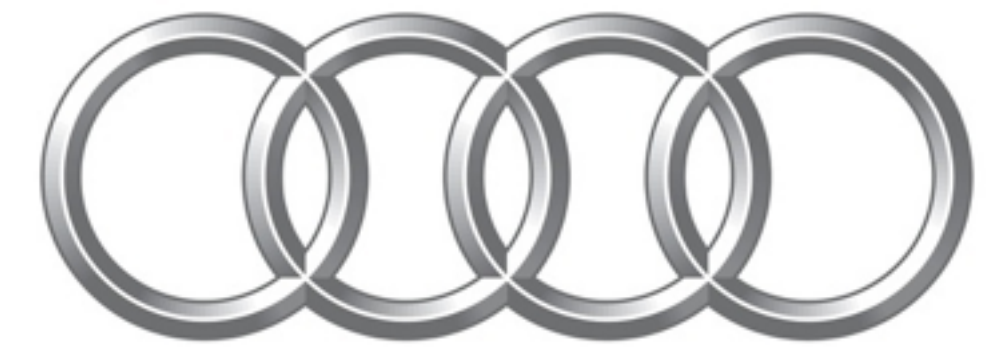
DAIMLER

Major automotive manufacturers are turning towards CO₂ for mobile air conditioning systems to reduce GHGs and comply with HFC phase down.

CO₂ also holds potential for electric vehicles- First Mercedes-Benz Citaro Electric with CO₂ coming in Hamburg and Berlin by the end of 2018



Volkswagen



Audi



CONCLUSION

05

CONCLUSION

- Pressure on HCFCs and HFCS driving markets globally towards natural refrigerants
- NatRefs = INNOVATION
- Competition between different types of natural refrigerant-based systems increasing: leading to better performance & reduced costs
 - ➔ **CO₂ transcritical** growing in commercial refrigeration, and also in industrial sector
 - ➔ **Hydrocarbons** gaining ground in refrigeration in small and medium-sized capacities
 - ➔ **Low-charge ammonia** systems increasing penetration in industrial refrigeration due to increased safety and efficiency
- **2018:** Key year to develop together the market for natural refrigerants
- Further development in HVAC solutions expected

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Business Case for
Natural Refrigerants

June 12-14, 2018 – Long Beach

Thank you very much!

