

china: an emerging market for NR solutions across all applications



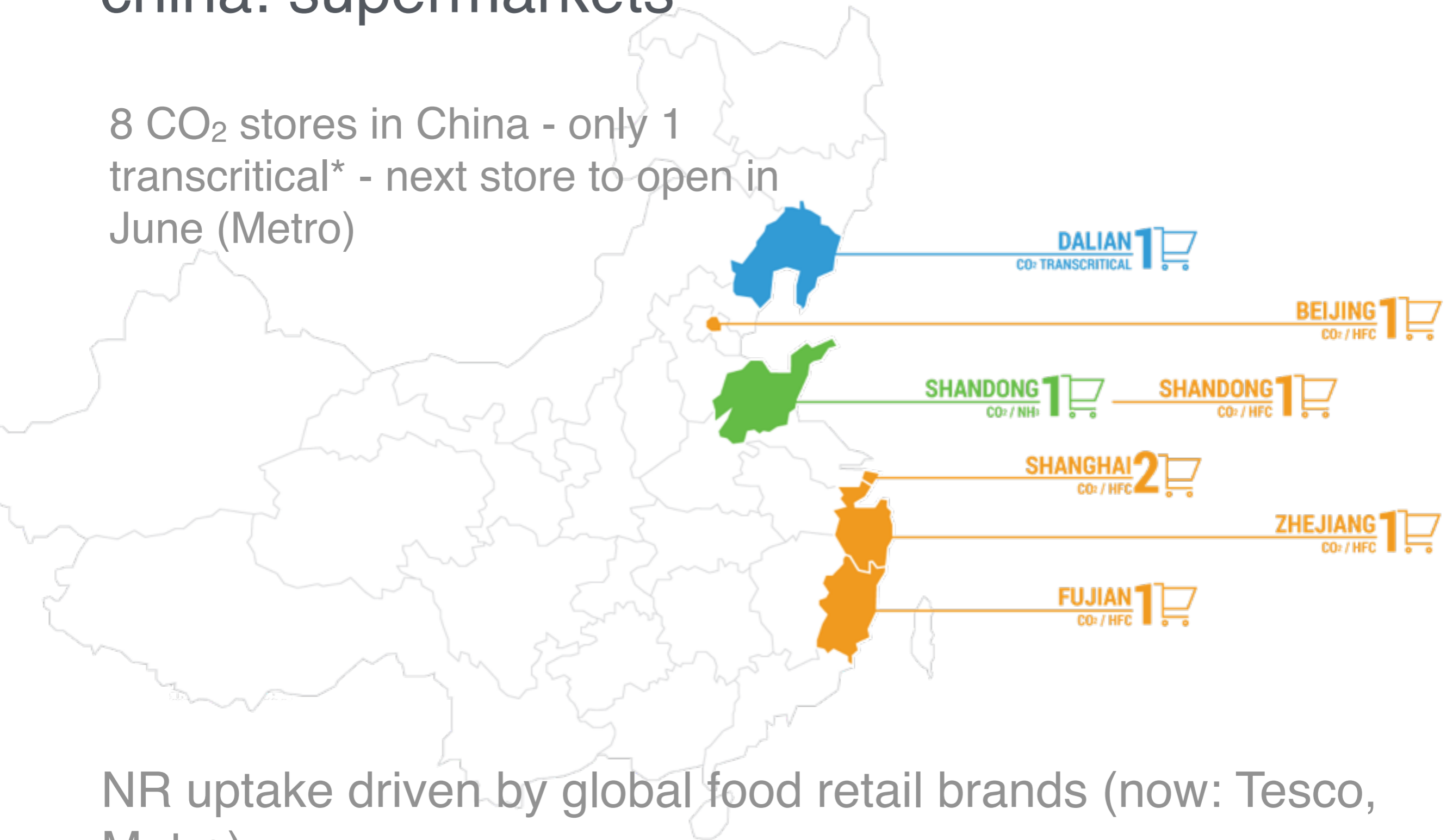
GUIDE China 2015



- in cooperation with Chinese Association of Refrigeration
- survey launched in Chinese and English = largest survey about NR so far
- close to 1,100 respondents
- overview of NR technology, market & policy trends
- eco-systems, case studies, market maps

china: supermarkets

8 CO₂ stores in China - only 1 transcritical* - next store to open in June (Metro)



NR uptake driven by global food retail brands (now: Tesco, Metro)

china: end-user interview

What are the key drivers for you to invest in natural refrigerant technology in China?

Metro Cash & Carry (...) follow(s) a clear policy referring the use of refrigerants that exceeds the national minimum standards in terms of environmental impact. Therefore **we go for the implementation of natural refrigerants as well in China**. Here our **focus is initially set on CO₂ applications in the low temperature range**.



Holger Guss,
Senior Manager
Technical Engineering

How do you evaluate your progress in using natural refrigerants in China so far and what are your plans for the next 5 years?

We successfully opened our **first hybrid cooled store in November 2014**. For the coming new store openings and the planned remodeling under our global F-gas exit program **this concept should become our standard concept in China**. Furthermore we are **aiming to install the first transcritical CO₂ system in China in the coming years**. In addition Metro would like to **introduce R290 operated plug-in cabinets as we did already in plenty of other countries we are operating in**.

china: light-commercial applications



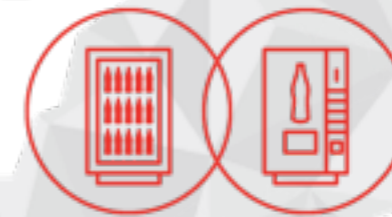
400,000

HC stand alone cabinets



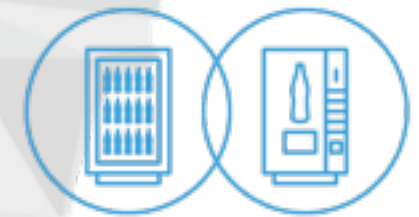
322,000

HC ice cream freezers



2,500

HC bottle coolers
& vending machines

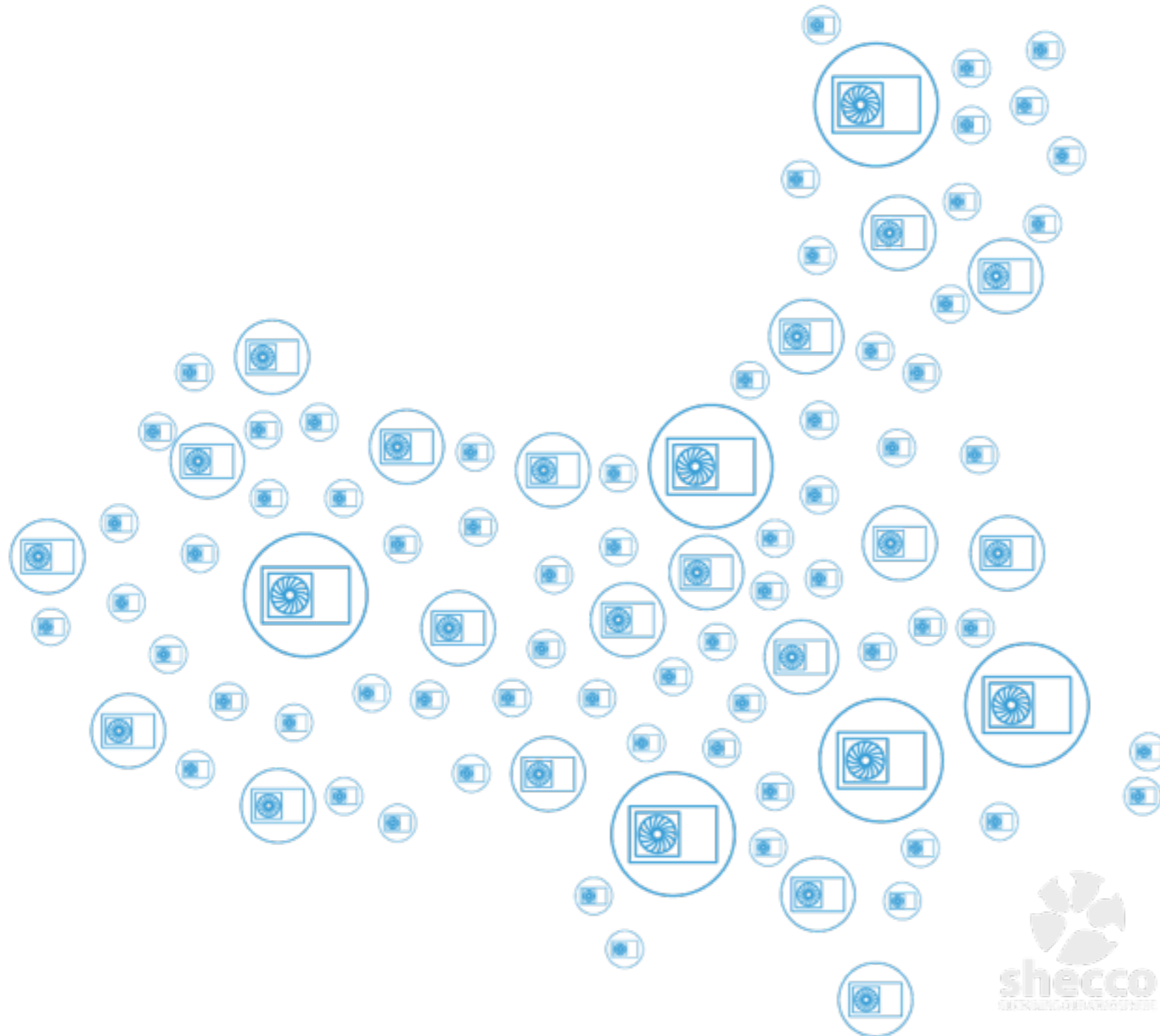


25,000

CO₂ bottle coolers
& vending machines



china: heat pumps



160+

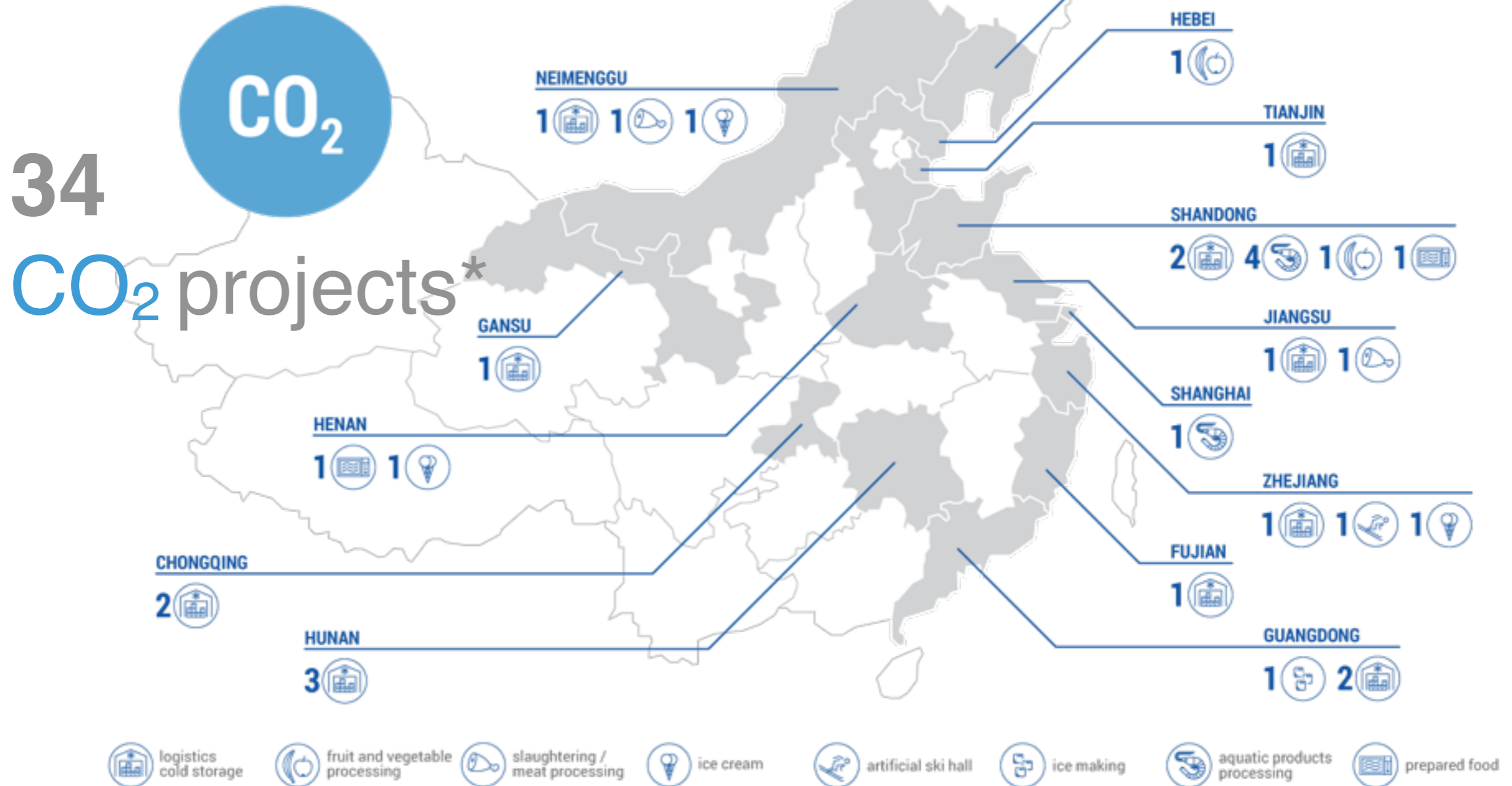
CO₂ transcritical
commercial heat pumps
(7 suppliers)



* data, combined from 7 suppliers

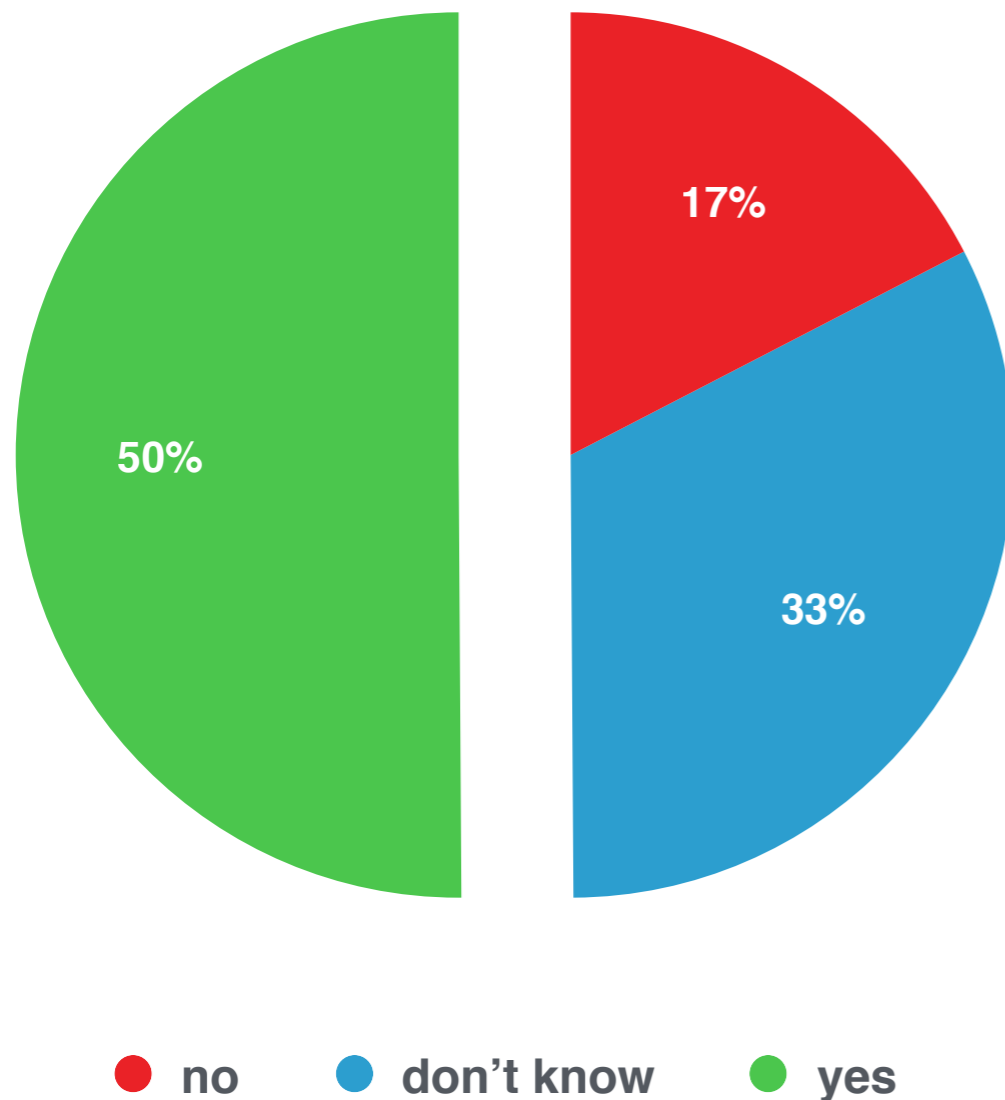
source: shecco, status: March 2015

china: industrial refrigeration



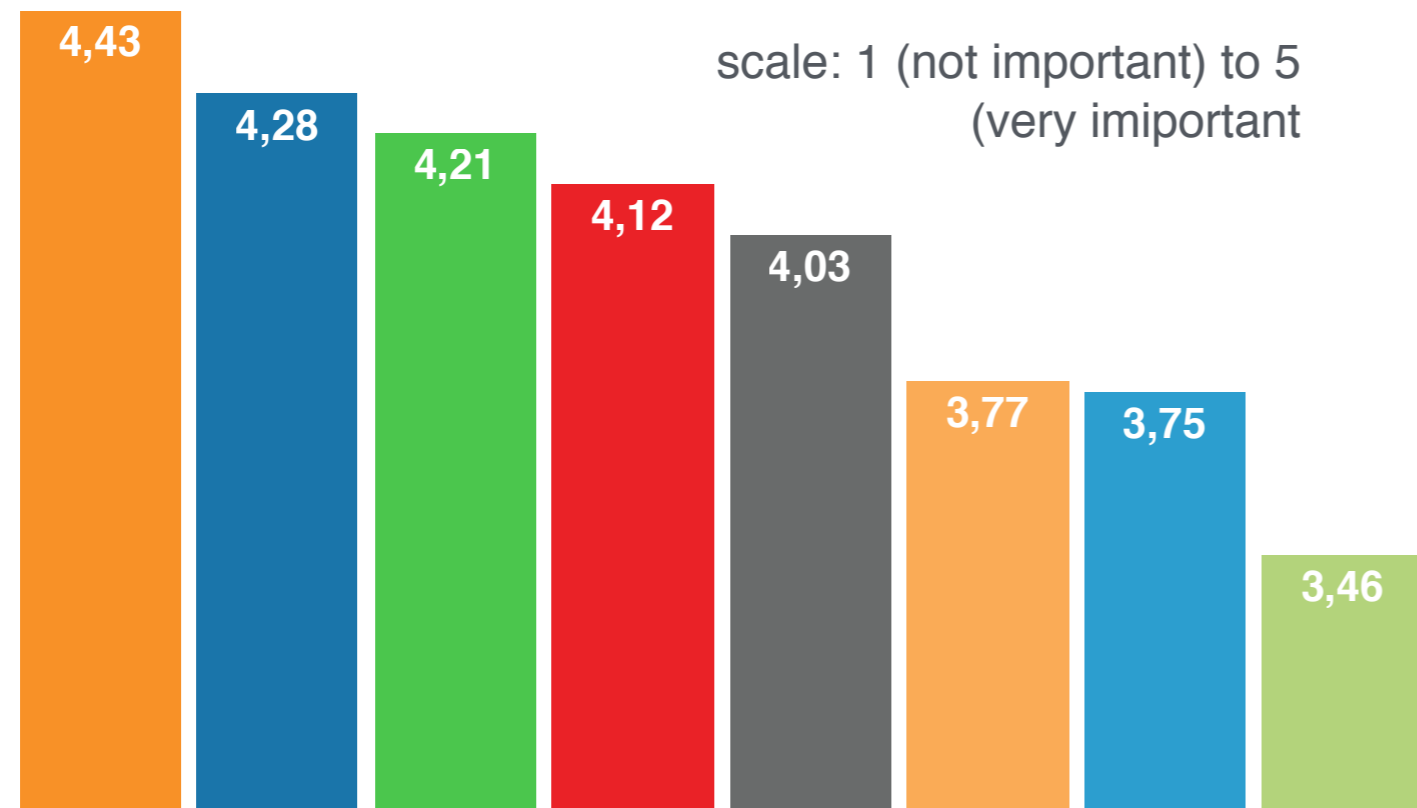
* includes 30 NH₃ / CO₂ both cascade and secondary systems + 4 CO₂/HFC or CO₂/HCFC plants

china: future plan to use NR solutions



- half of all respondents (50.1%) say that they will provide products or services with natural refrigerants in the future
- another 32% is not sure yet = large untapped potential for more communication about NR technology and its business case
- only 17% have currently no plan to provide NR products or services
- in 2020, there will be a big shift towards CO₂ when 34% want to start using it; another 26% plan to use hydrocarbons in five years from now

drivers for NR industry in china



- National regulation restricting HFC use
- Global agreement on HFC phase-down
- Review or introduction of standards to enable NR use
- Financial incentives for manufacturers / end users
- Higher availability of components for NR systems
- Higher awareness of NR technology, knowledge sharing
- Higher availability of training & safety programs for HVAC&R industry
- Voluntary industry / end user commitment to phase out HFCs / HCFCs

- government policy will be key in NR market growth: restricting HFC use is the most important driver = “very important”
- a global agreement on HFC phase-down, better standards for NR, financial incentives = “important”
- no strong belief in voluntary action by HVAC&R industry or end-users

useful links



Industry Platforms:

<http://www.hydrocarbons21.com>

<http://www.R744.com>

<http://www.ammonia21.com>

<http://www.R718.com>

ATMOsphere conferences, side-events & network meetings:

<http://www.ATMO.org>

shecco Publications, incl. GUIDEs

<http://publications.shecco.com>

Accelerate Magazine

<http://accelerate.shecco.com>

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