

# natural refrigerants in china

preview into the GUIDE China - State of the Industry



ATMO  
sphere  
network  
natural refrigerants

07 April 2015 in Shanghai, China

Marc Chasserot, Managing Director

shecco

# china: an emerging market for NR solutions across all applications

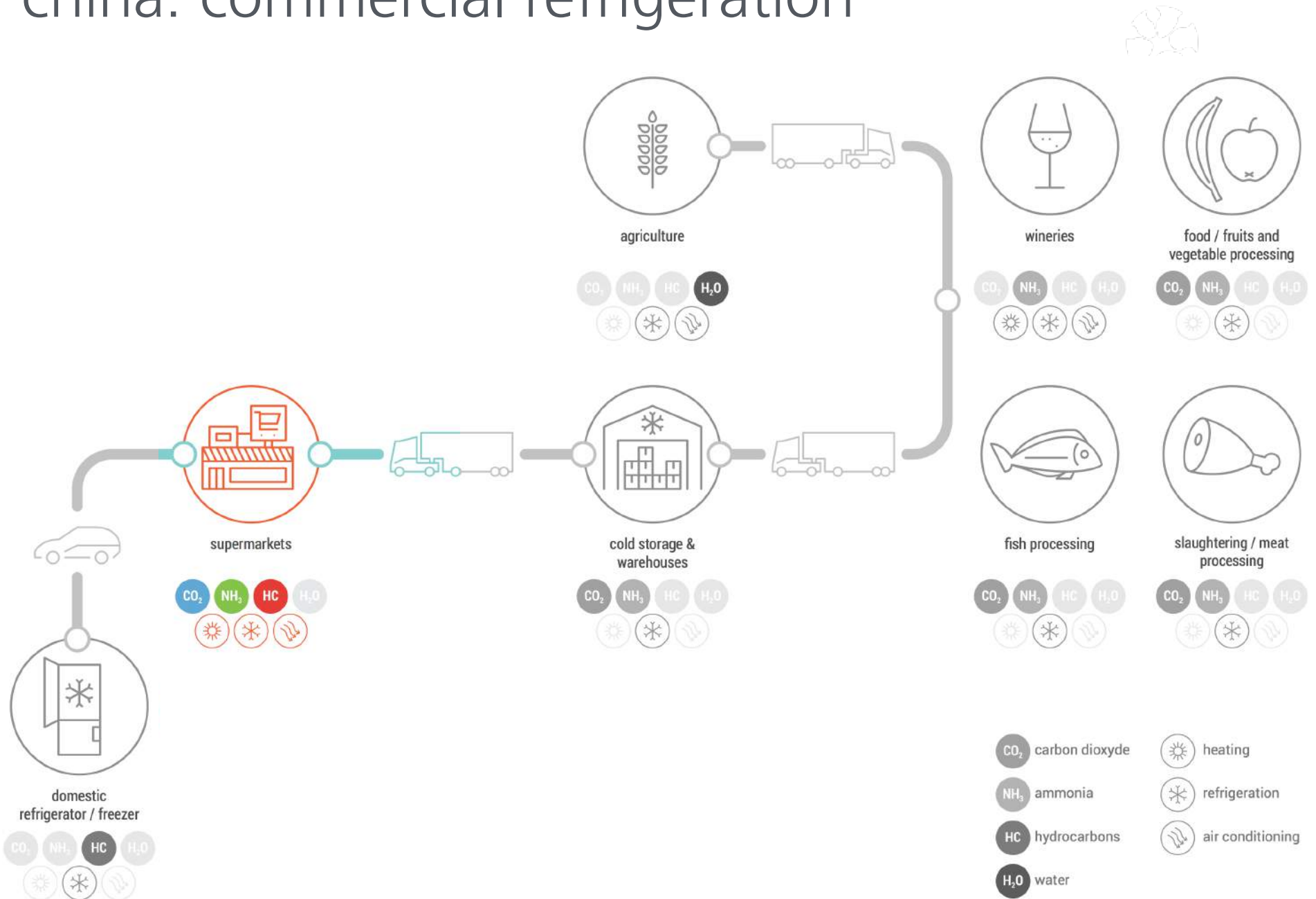


# GUIDE China 2015



- 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: commercial refrigeration



source: shecco, status: March 2015

# china: supermarkets



8 CO<sub>2</sub> stores in China - only 1 transcritical\* - next store to be opened in June (Metro)



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

\* source: shecco, status: March 2015

# 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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.**

\* source: shecco, status: March 2015

# china: end-user interview



## What are the key features in using natural refrigerants technology in China that differs from other countries?

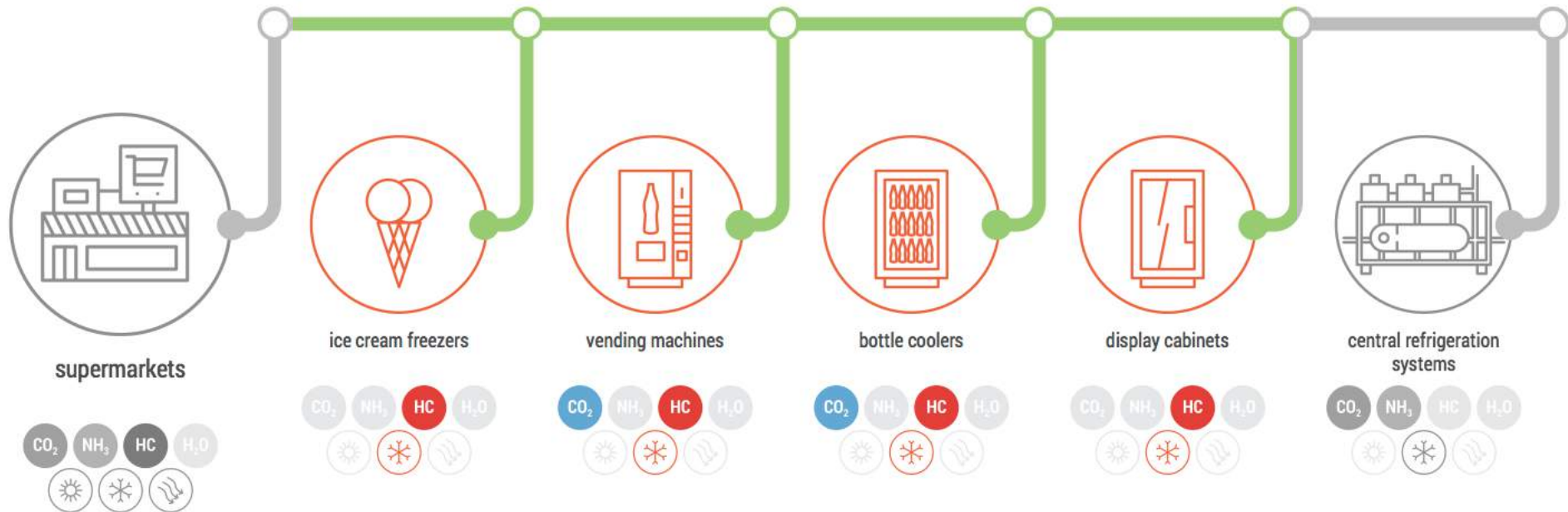
“The aim is everywhere to minimize the environmental impact caused by our business. From a technical point of view the **availability of competent and skilled suppliers** has to be taken into account. Besides this China stretches across several **different climate zones**, which have to be considered in the selection and design of plant concepts.

## What is the return on investment for natural refrigerant technology compared to conventional technology?

The main motivation for us to use natural refrigerants in our systems is higher efficiency and sustainability. In comparison to most of the standard ‘conventional’ systems and according our experience **these advanced and carefully monitored refrigeration systems are more energy efficient and have lower life cycle costs**. This aspect has strengthened our **decision to implement natural refrigerant as well in China although this is not a state of the art technology yet**. With higher market implementation of natural refrigerants **we are expecting less additional costs and even a faster return of investment**.

\* source: shecco, status: March 2015

# china: light-commercial refrigeration



source: shecco, status: March 2015



# china: light-commercial applications



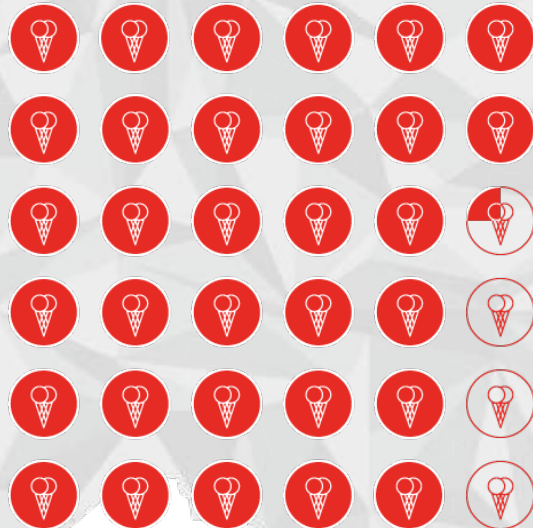
**400,000**

HC stand alone cabinets



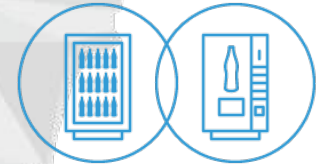
**322,000**

HC ice cream freezers



**2,500**

HC bottle coolers  
& vending machines



**25,000**

CO<sub>2</sub> bottle coolers  
& vending machines



source: shecco, status: March 2015

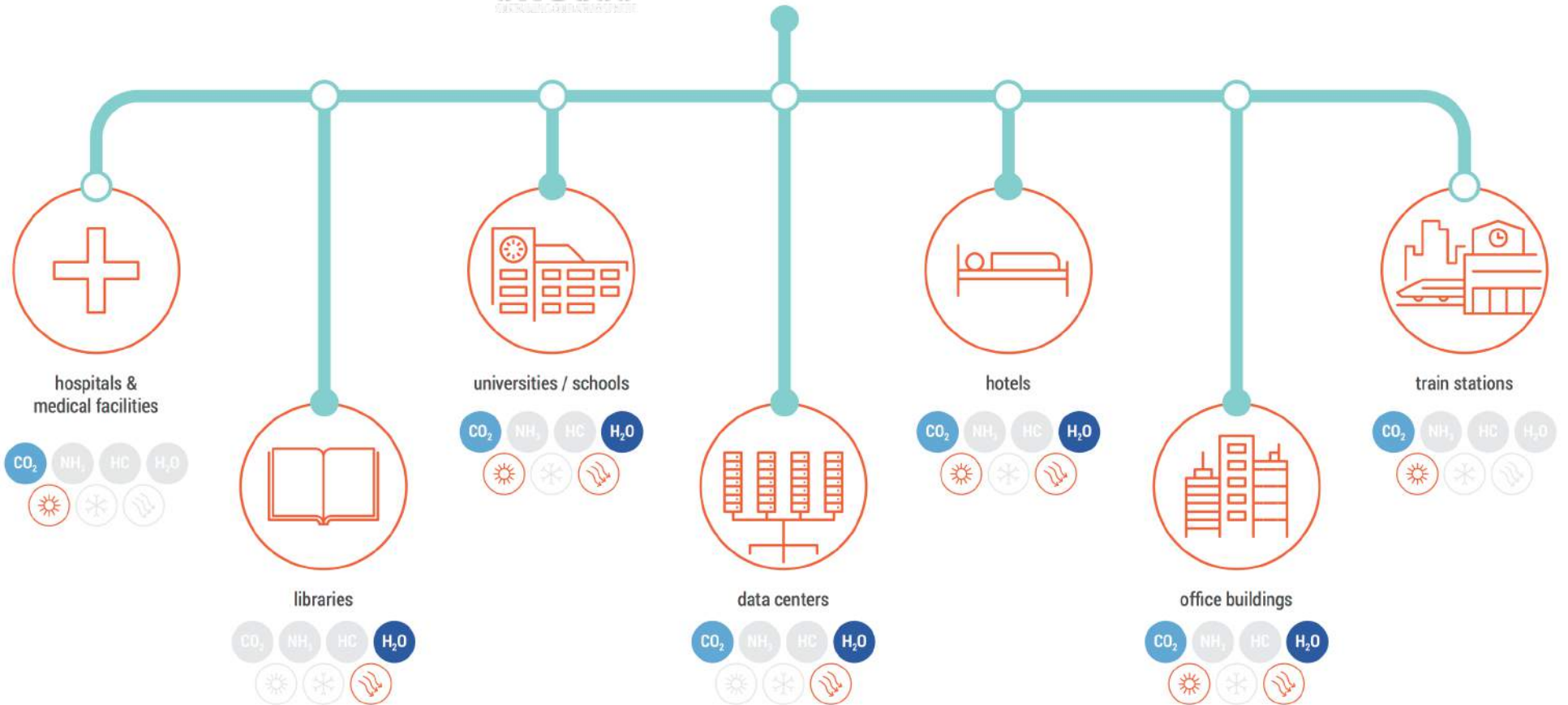
# china: city & buildings

2015



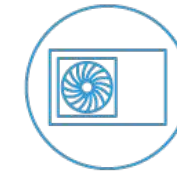
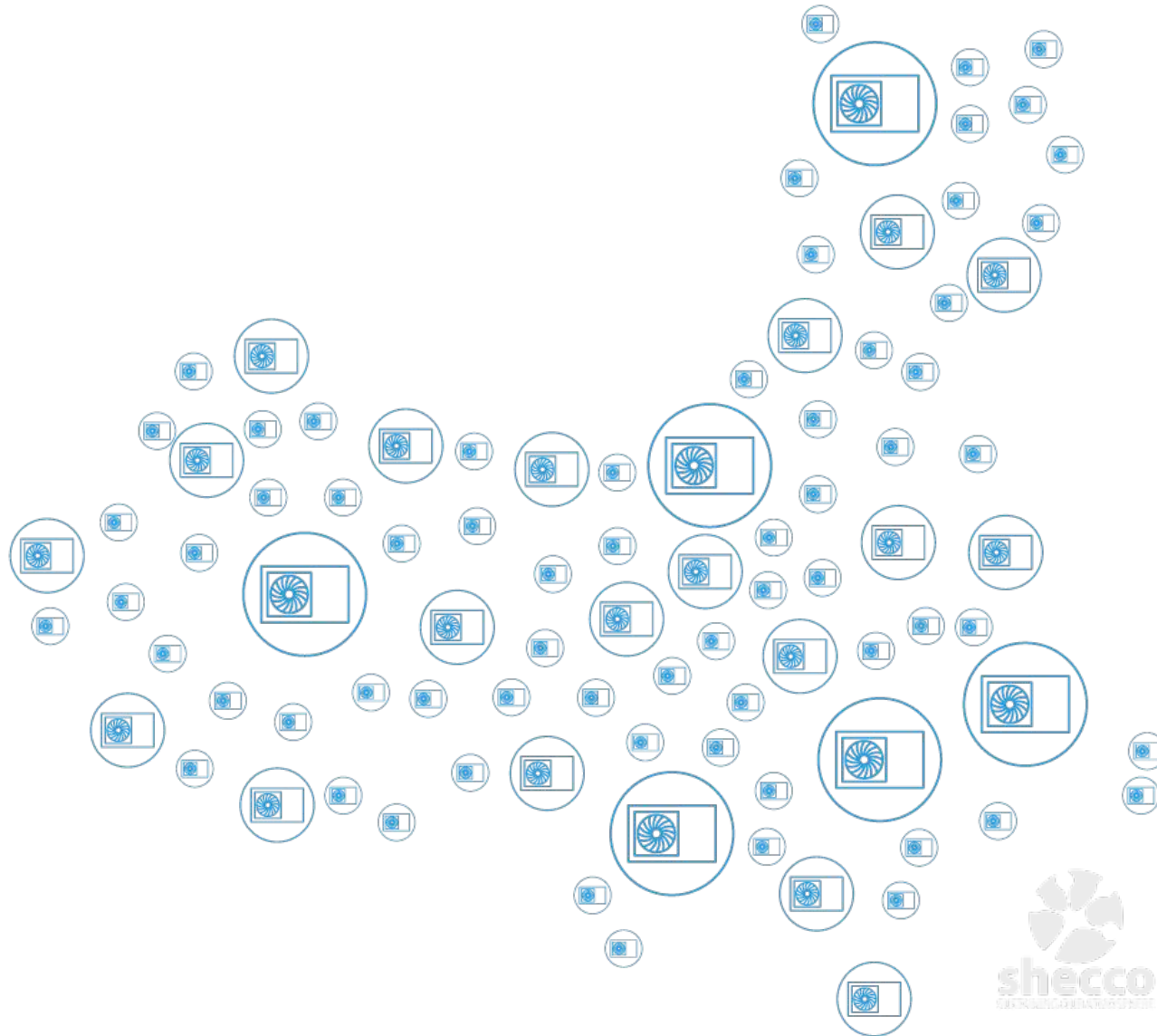
city & buildings

- CO<sub>2</sub> carbon dioxide
- NH<sub>3</sub> ammonia
- HC hydrocarbons
- H<sub>2</sub>O water
- heating
- refrigeration
- air conditioning



source: shecco, status: March 2015

# china: heat pumps



**160+**

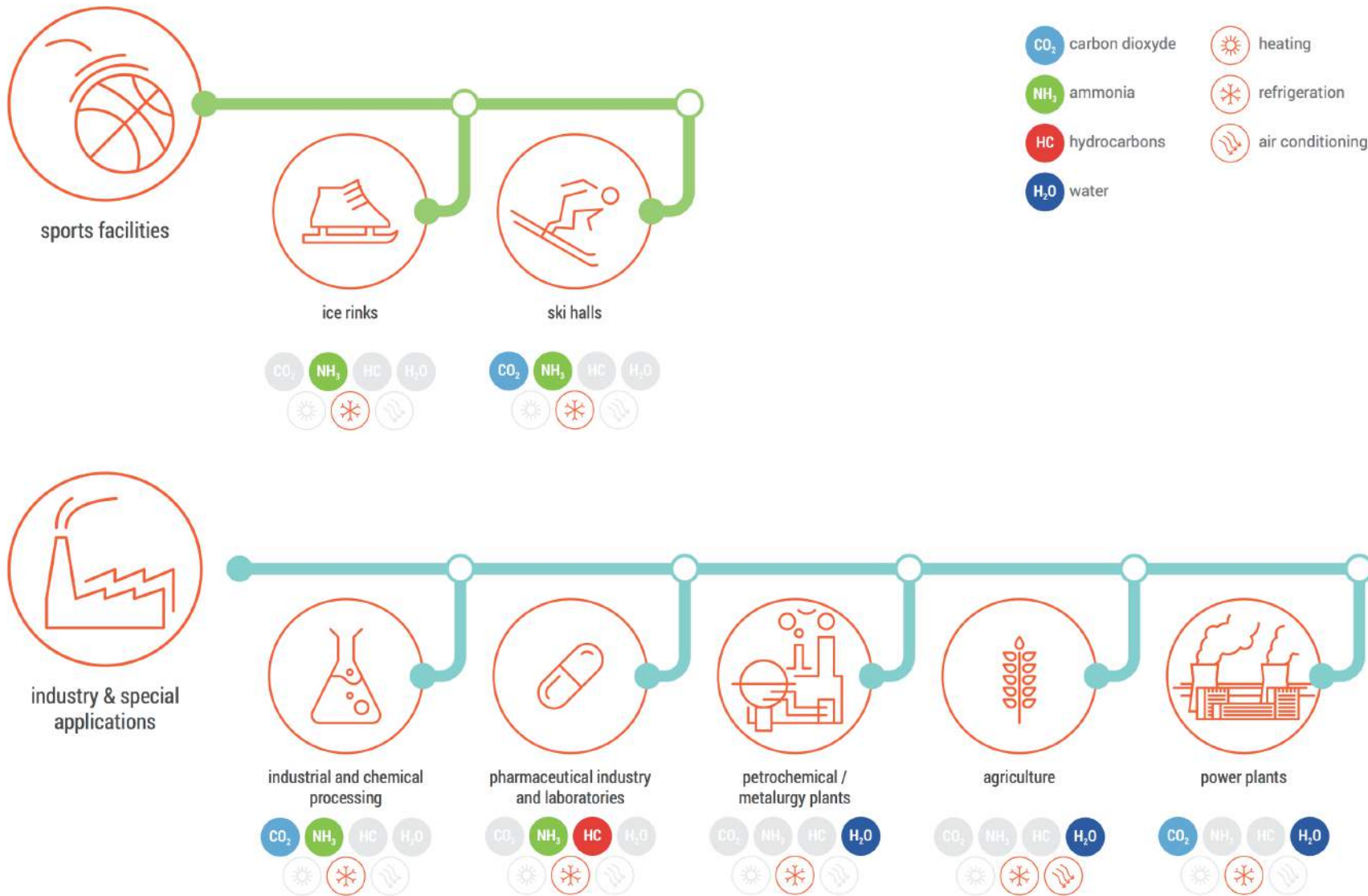
CO<sub>2</sub> transcritical  
commercial heat pumps  
(7 suppliers)



\* data, combined from 7 suppliers

source: shecco, status: March 2015

# china: industrial refrigeration



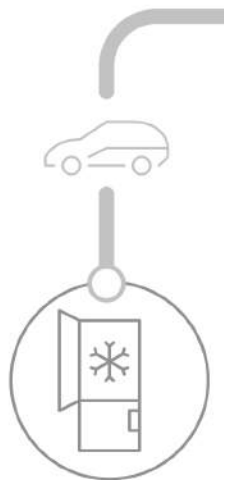
source: shecco, status: March 2015

# china: industrial refrigeration

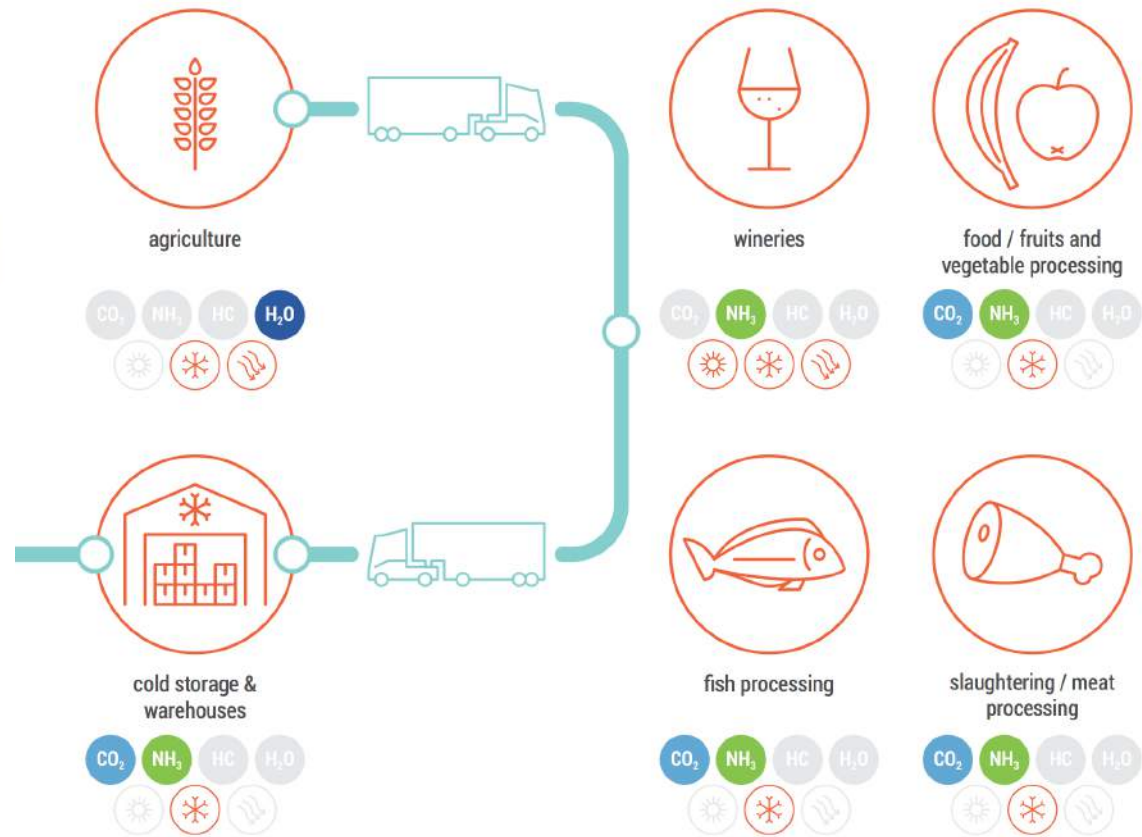


Currently more than 30,000 companies in China use ammonia as a refrigerant.

By 2017, China will likely surpass the capacity of the US cold chain, currently at 115 million m<sup>3</sup> of space.



domestic refrigerator / freezer



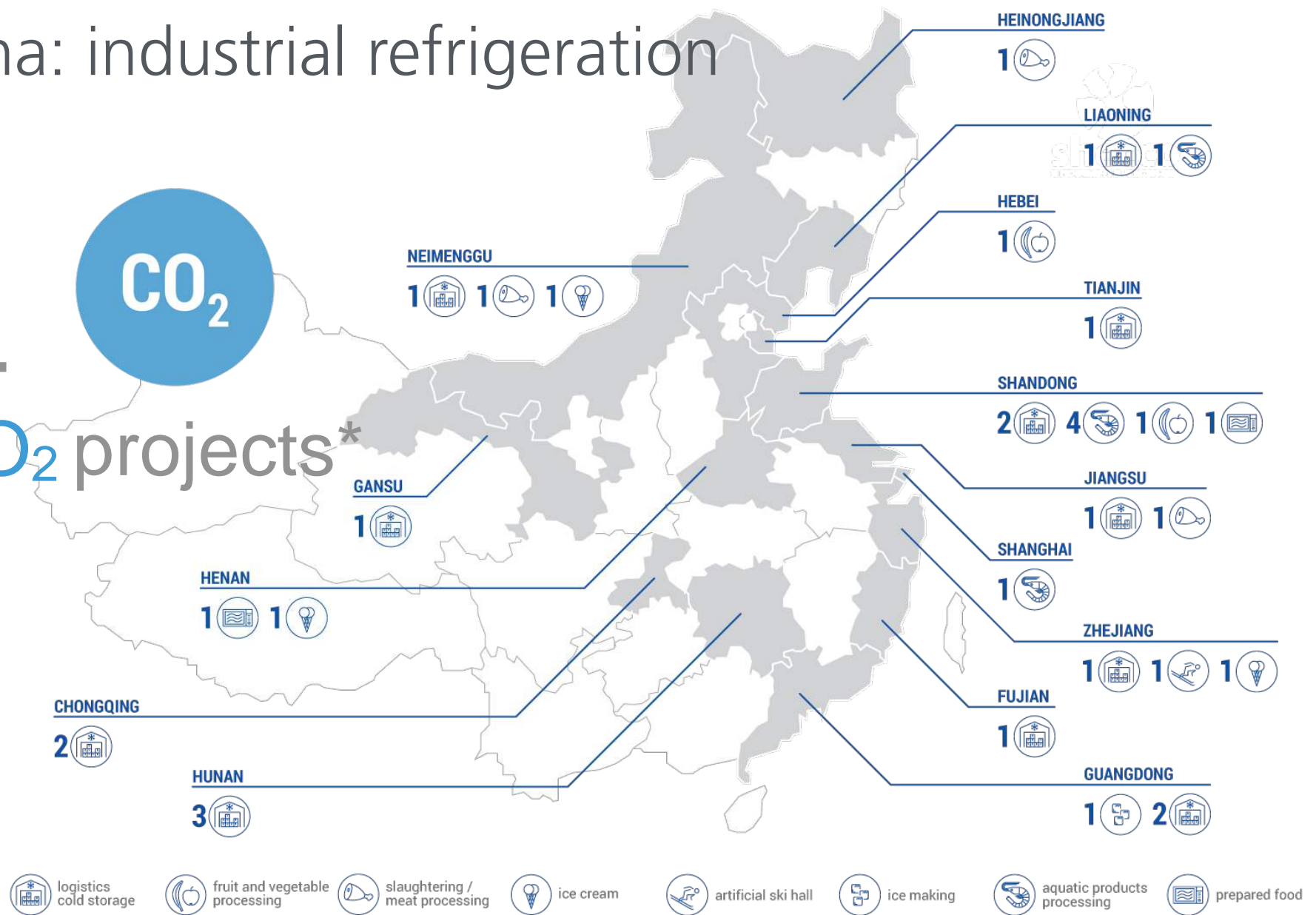
source: shecco, status: March 2015

# china: industrial refrigeration

34

CO<sub>2</sub>

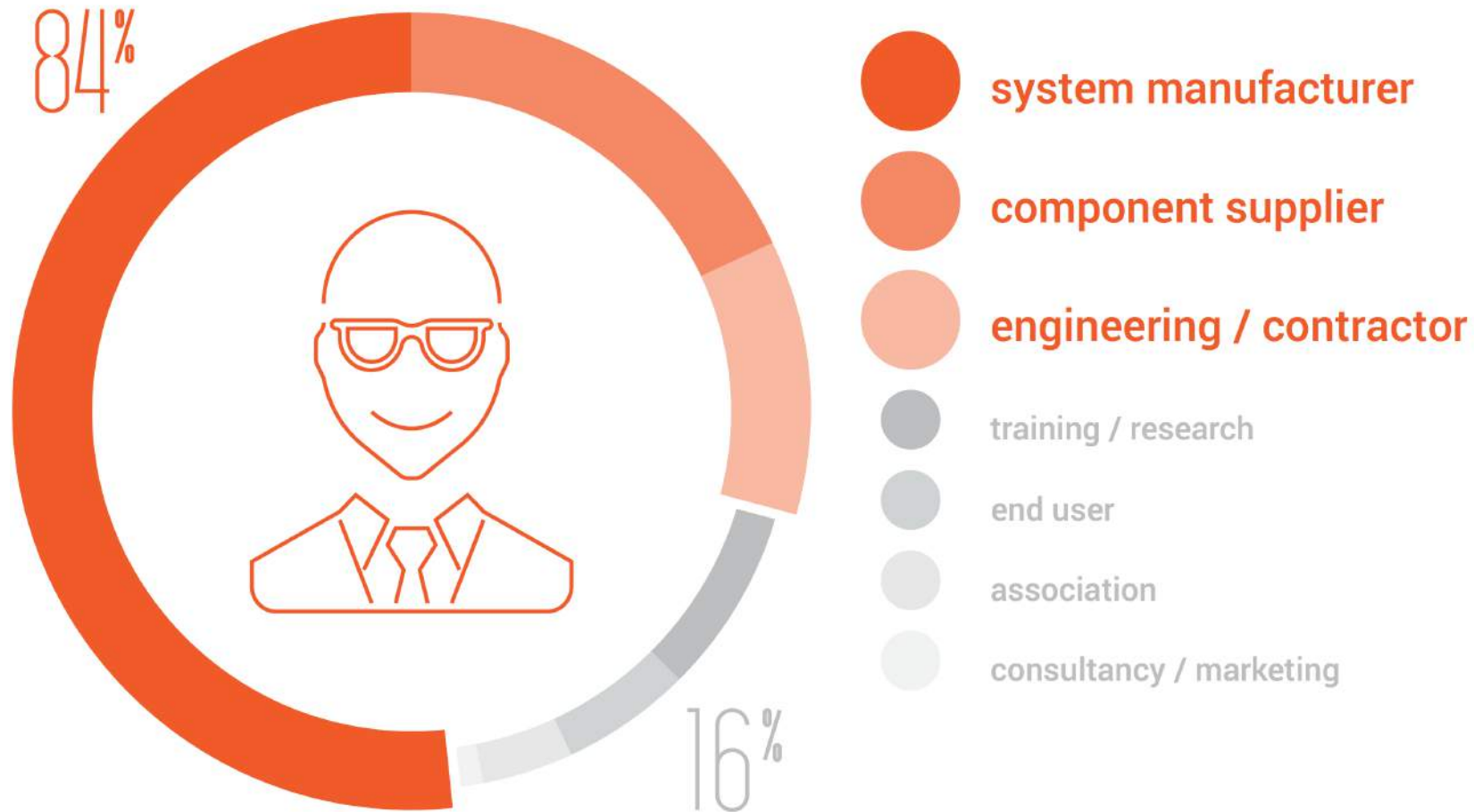
CO<sub>2</sub> projects\*



\* includes 30 NH<sub>3</sub> / CO<sub>2</sub> both cascade and secondary systems + 4 CO<sub>2</sub>/HFC or CO<sub>2</sub>/HCFC plants

source: shecco, status: March 2015

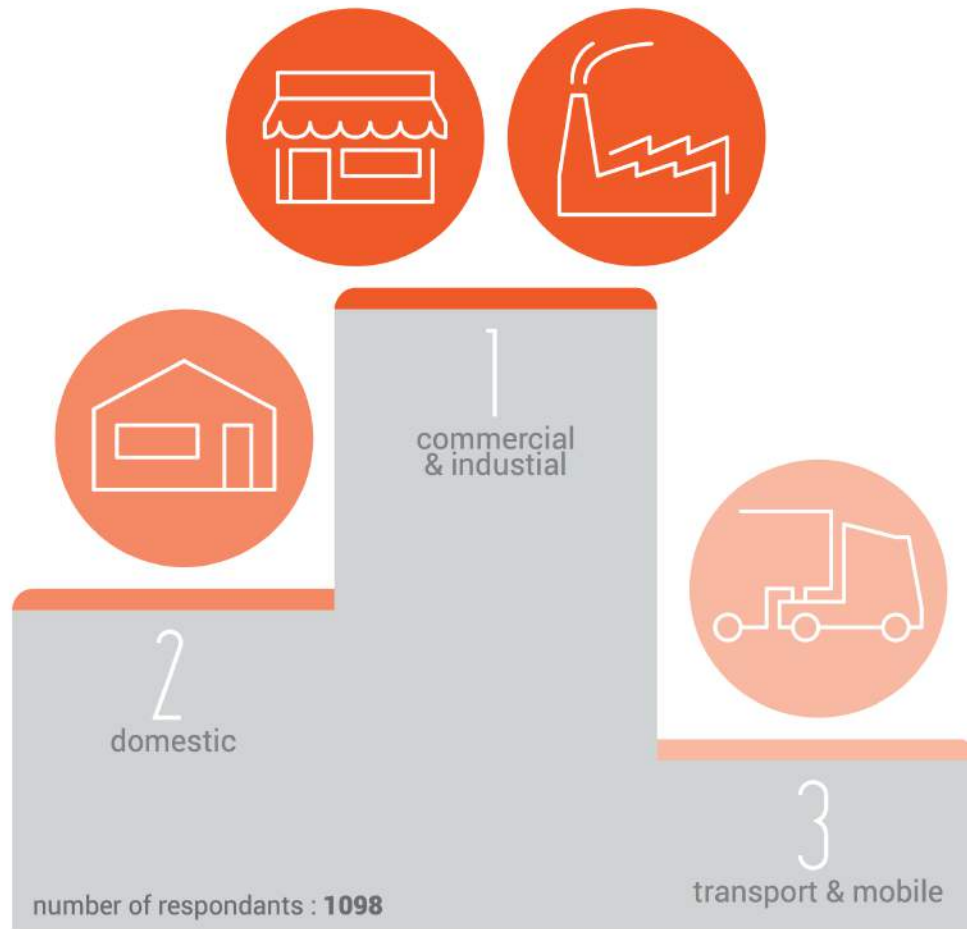
# GUIDE China: survey participants



**= strong industry perspective**

source: shecco, status: March 2015; 1098 respondents

# GUIDE China: survey participants



most represented area of activity

least represented area of activity

in heating, refrigeration and air conditioning applications

**= most active in commercial & industrial size applications**



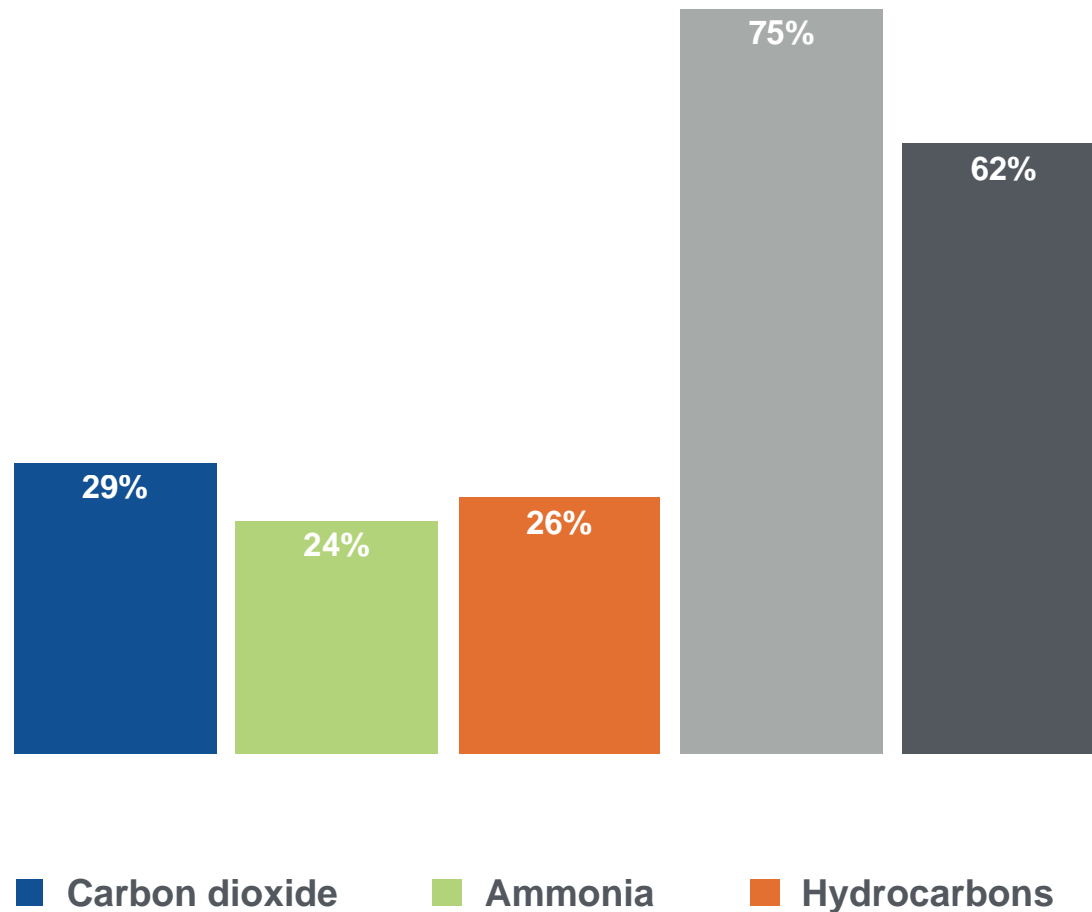
# GUIDE China: survey participants



= high  
representation of  
large market  
players

source: shecco, status: March 2015; 1098 respondents

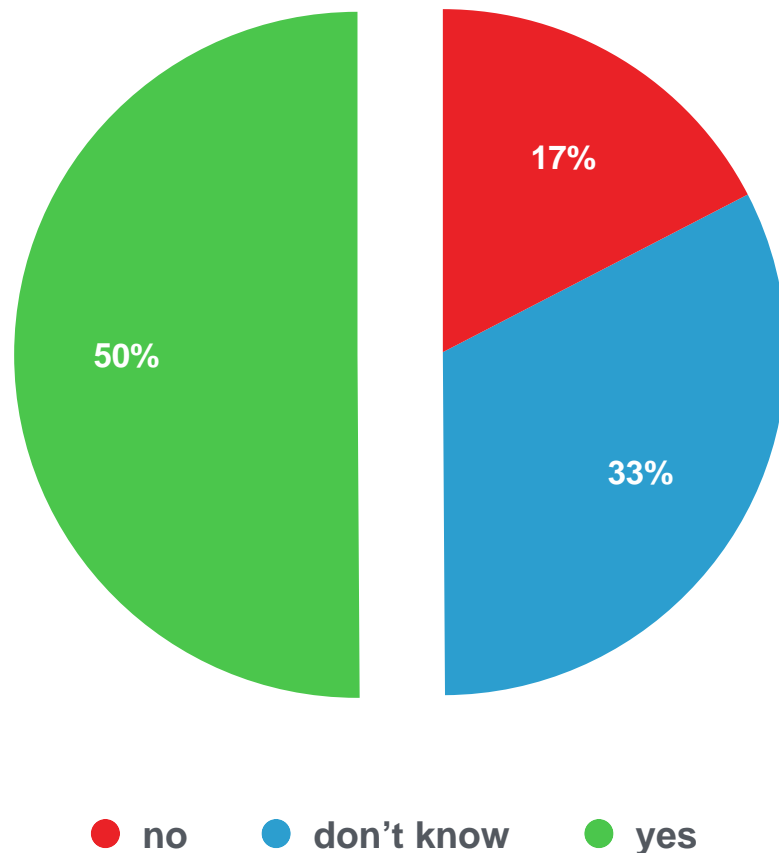
# china: use of natural refrigerants vs f-gases



- today, a clear 3/4 majority still uses HFCs; more than 60% still even use HCFCs
- among NR, carbon dioxide is currently the most popular choice (close to 30% use it), followed by hydrocarbons

source: shecco, status: March 2015; 1085 respondents

# china: future plan to use NR solutions



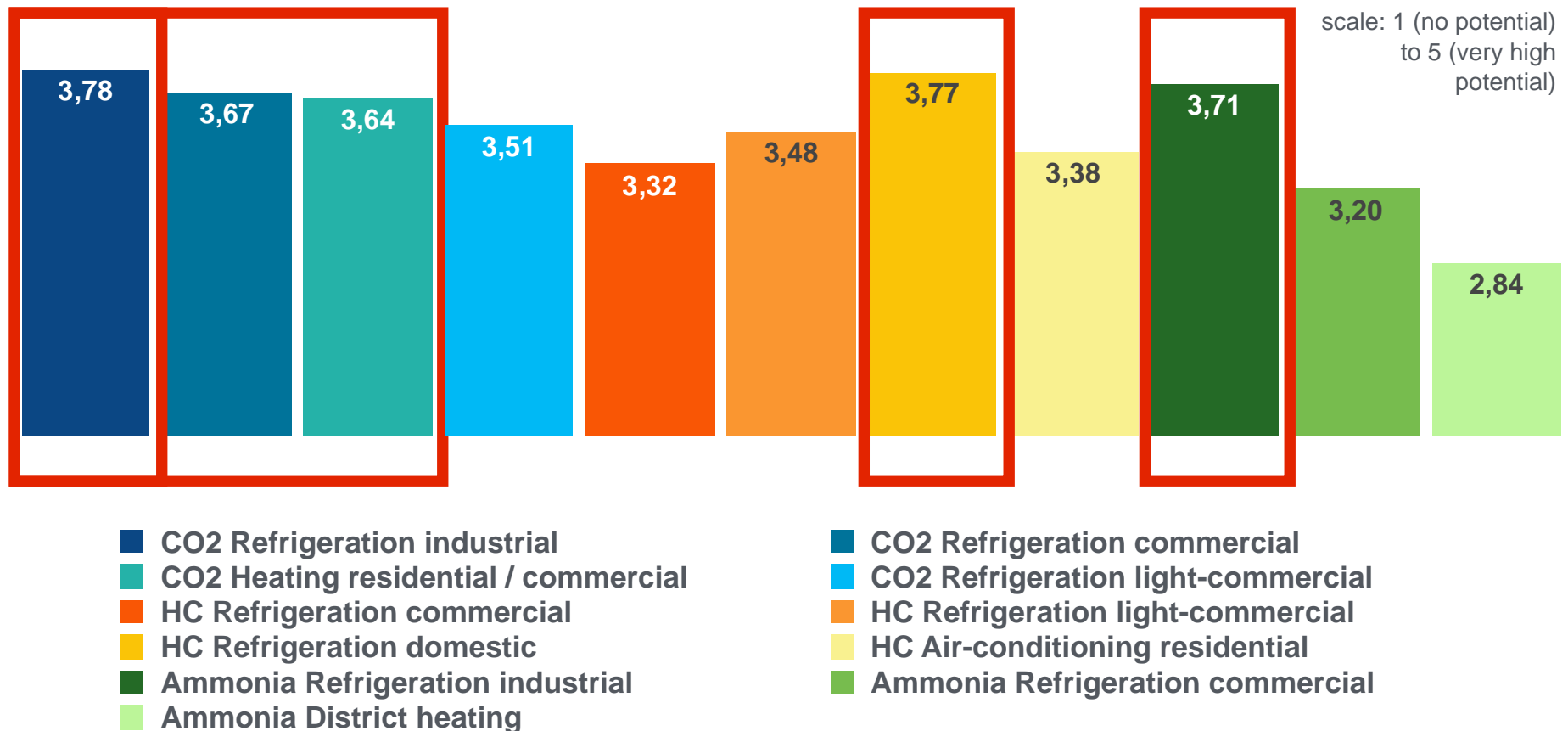
- half of all respondents (50.1%) say that they will provide products or services with natural refrigerants in the future
- another 32% is not sure yet = large untapped potential for more communication about NR technology and its business case
- only 17% have currently no plan to provide NR products or services
- in 2020, there will be a big shift towards CO<sub>2</sub> when 34% want to start using it; another 26% plan to use hydrocarbons in five years from now

source: shecco, status: March 2015; 373 respondents

# NR potential in china 2020, by application

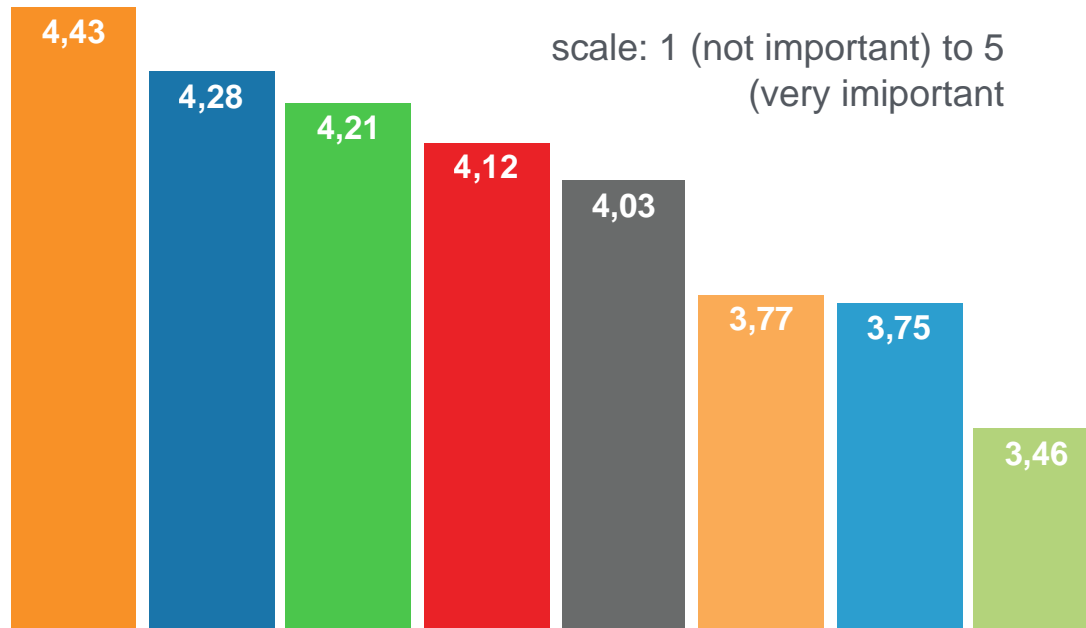


- highest potential for CO<sub>2</sub> in commercial refrigeration, HCs in domestic refrigeration and ammonia in industrial refrigeration
- overall, CO<sub>2</sub> has the highest potential across refrigeration + also in smaller HP



source: shecco, status: March 2015; 490 respondents

# 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

source: shecco, status: March 2015; 587 respondents

# china: policy trends



- new **Environmental Protection Law** for 2015, revised version after 25 years = stricter monitoring and enforcement system
- national **government strategy for natural refrigerants** (HCFC phase-out plan) in RAC - mostly for HC
- expected for 2015: a new **government strategy on CO<sub>2</sub> and NH<sub>3</sub> in the cold storage industry**
- new **Energy Efficiency Label** (Jan 2015); applied to air-source heat pump water heaters
- **Top Runner label** (Jan 2015) for domestic appliances incl. room A/C; 2) high energy consumption industries and 3) public buildings



# shecco - 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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