

# Global market trends by sheccoBase



**ATMOsphere Asia**  
**Bangkok, 6 September 2017**

**Jan Dusek, Managing Director, shecco Japan**

## Biggest success story so far

Over **1.5 billion** domestic refrigerators already use hydrocarbons today

HC is the standard for 50% global production of new domestic refrigeration equipment

By 2020, 75% of new production globally will use R600a/ R290



# LIGHT-COMMERCIAL REFRIGERATION

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# CONSUMER BRANDS CHOOSING NATURAL REFRIGERANTS



**5.5 million units using natural refrigerants (HC & CO<sub>2</sub>)** collectively installed

=> 33 million tonnes of avoided CO<sub>2</sub> (equivalent emissions of more than 6.7 million passenger cars over one year)



Increasing number of consumer brands choosing HCs for their point of sale equipment - often targeting global procurement 100%



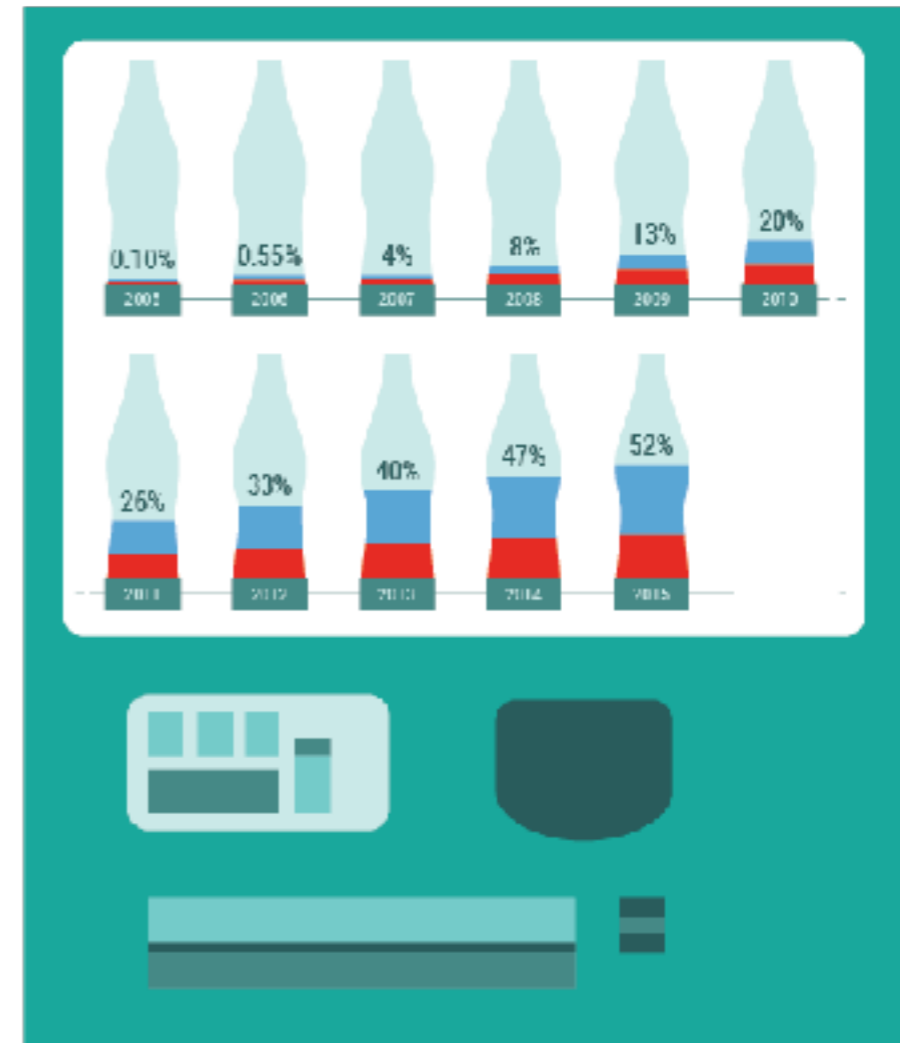
# HC VENDING MACHINES IN JAPAN

**1.35+ million** beverage vending machines in Japan use either hydrocarbons or CO<sub>2</sub> - world's highest number per capita

**550,000+ HC (R600a) vending machines in the market**

natural refrigerants make up over **50% of the market**

from 0.1% to 52% market share in just 10 years



# HYDROCARBONS GROWTH

Plug-in Units in Supermarkets  
with R290: A reality today

Market estimate by early 2017 -  
Figures reported by AHT (market  
leader):

**1,500,000+ units  
worldwide**

- over 300,000+ units  
manufactured per year

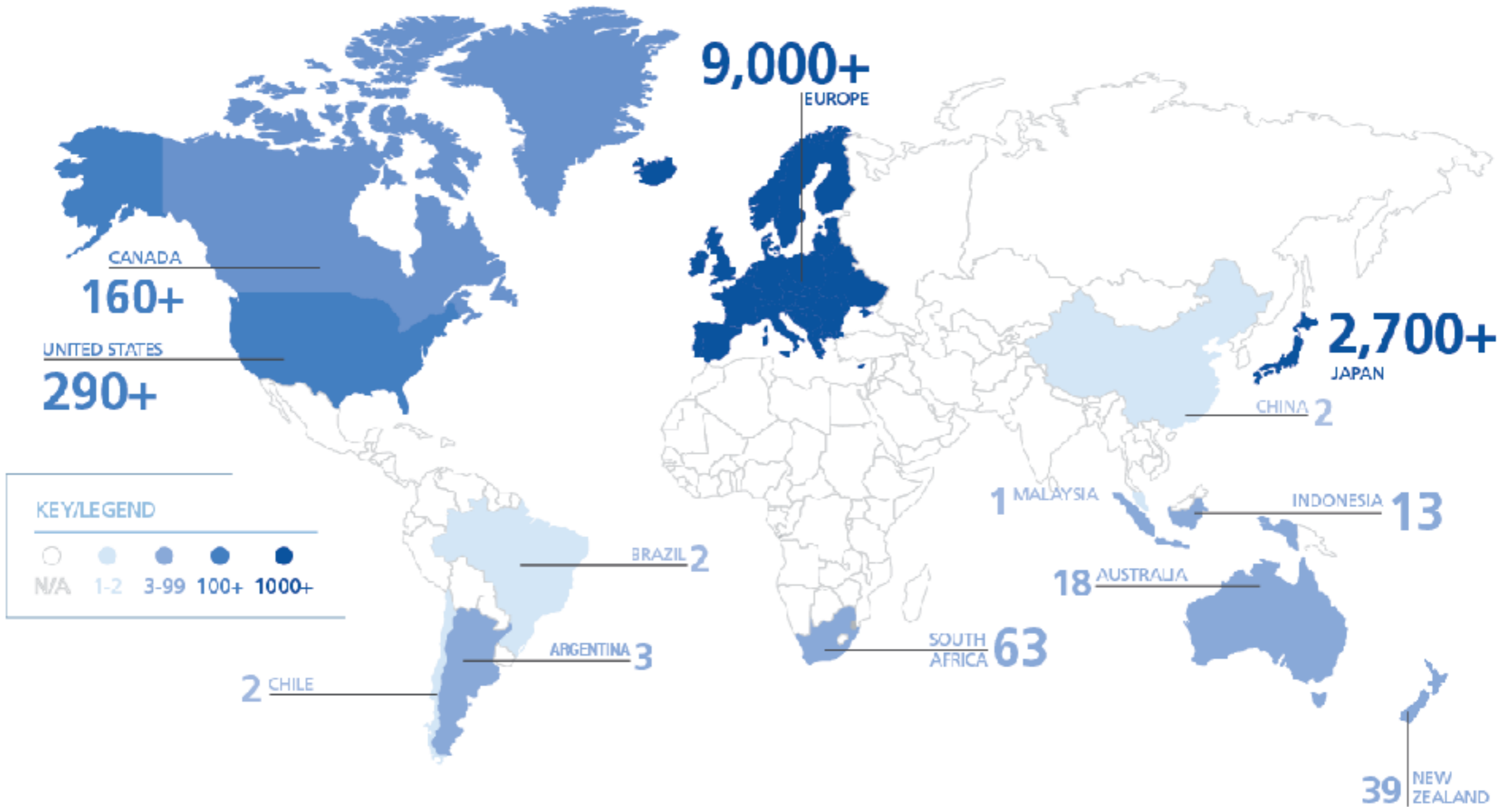


# COMMERCIAL REFRIGERATION

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# CO<sub>2</sub> TC STORES GROWING GLOBALLY (AUGUST 2017)





# CO<sub>2</sub> TC MAJOR MARKETS: GROWTH TRENDS



	2015	Early 2017	<b>Growth</b>
<b>Europe</b>	5.500	9.000	<b>64%</b>
<b>USA</b>	52	260	<b>400%</b>
<b>Canada</b>	139	150	<b>8%</b>
<b>Japan</b>	1.500	2.400	<b>60%</b>

Other regional markets also emerging as a result of individual **food retailers' efforts**

# CO<sub>2</sub> IN CHINA (JULY 2017 UPDATE)

- **First CO<sub>2</sub> transcritical** store to be completed in 2017
- Currently **40 subcritical CO<sub>2</sub> supermarkets** in China (HFC/CO<sub>2</sub> cascades)
- Majority operated by Metro China, first ever installed by Tesco
- Market opening up to natural refrigerants. Potential identified in:
  - CO<sub>2</sub> in commercial and industrial; heat pumps



# KEY TREND: CO<sub>2</sub> RACK SYSTEM



Highly **competitive evolving market** for suppliers providing CO<sub>2</sub> solutions

# KEY TREND: CONDENSING UNITS / SMALLER SYSTEMS



**Japan** - leader in CO<sub>2</sub> condensing units for smaller store formats

**Europe** traditionally working with large capacity CO<sub>2</sub> racks, but **several manufacturers** introduced small systems

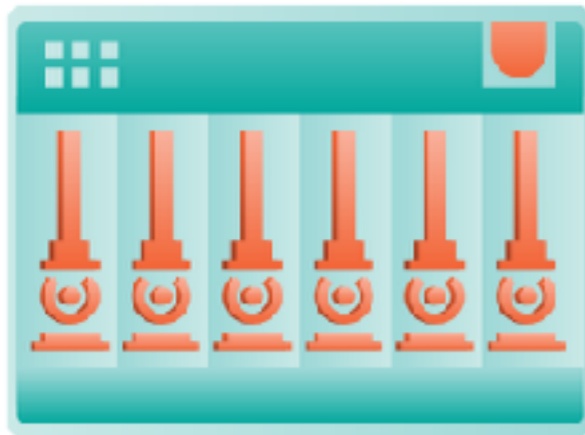
**Competition increasing:** more efficiency, lower prices

# KEY TREND: SMALLER NH<sub>3</sub>/CO<sub>2</sub> SYSTEMS

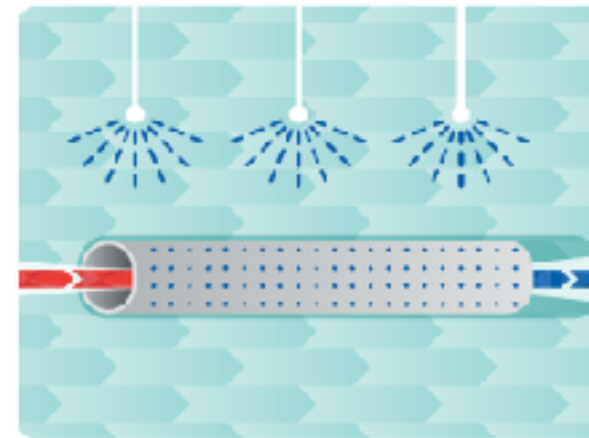


Growing line up of **small size NH<sub>3</sub>/CO<sub>2</sub> systems** - potential to serve supermarkets?

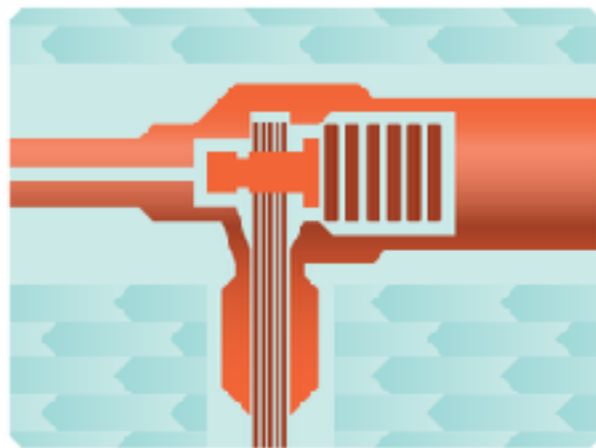
# KEY TREND: SOLUTIONS FOR EFFICIENCY IN WARM CLIMATES



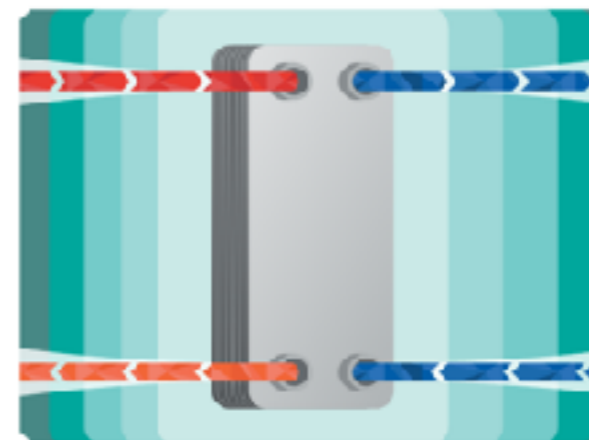
**Parallel Compression**



**Adiabatic Cooling**



**Ejector**



**Sub coolers**

# KEY TREND: CO<sub>2</sub> COST OF EQUIPMENT DECREASING

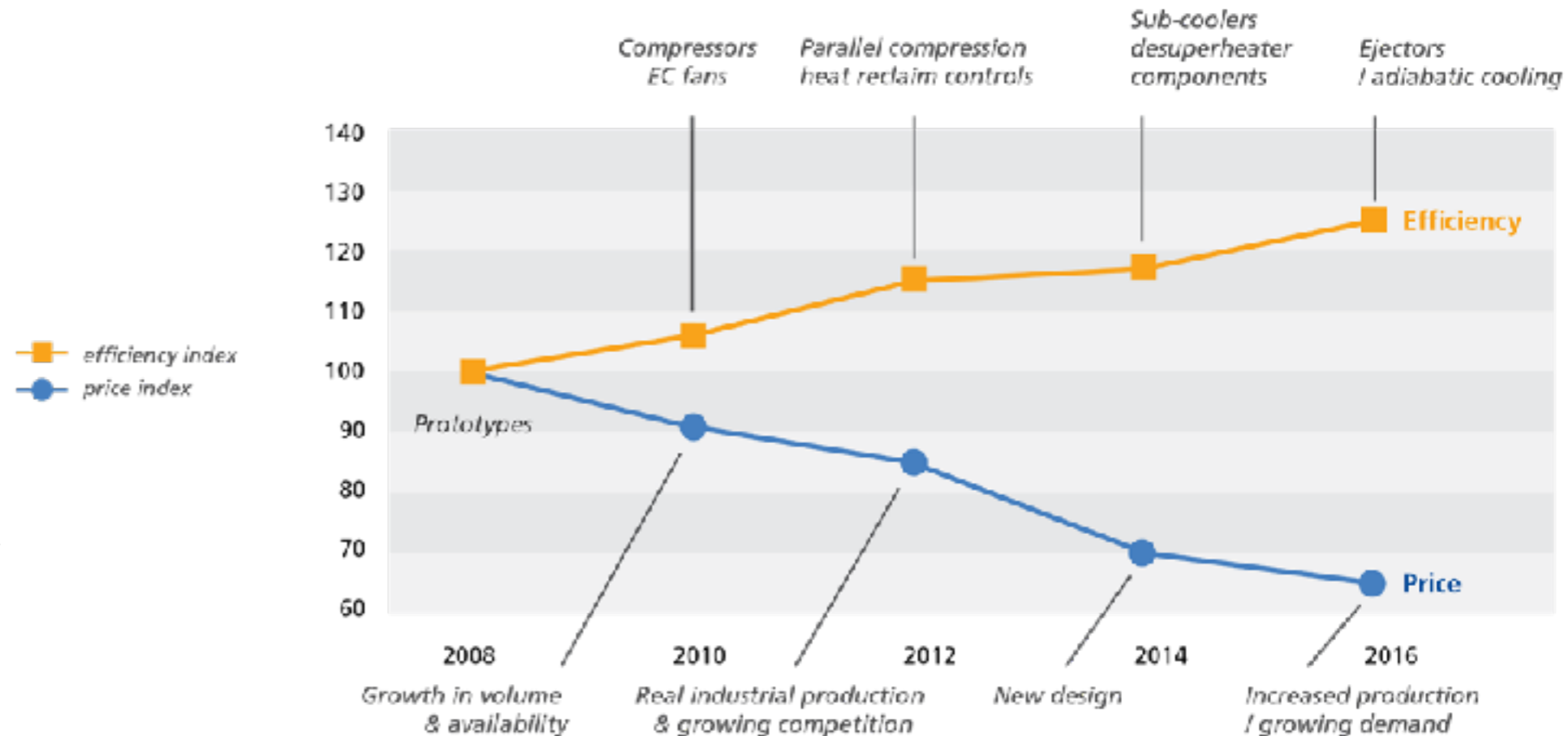


In **Europe**:

Cost of equipment becoming comparable to systems using HFCs

**HFC alternatives growing in availability => prices falling** - in commercial refrigeration same as HFC technology or 5-10% higher

Each year, reported higher energy efficiency, lower prices as technology reaches mass production



# INDUSTRIAL REFRIGERATION

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# COMPETITION BETWEEN DIFFERENT NR SYSTEMS HAS INCREASED

market traditionally dominated by **ammonia** and HFCs

NR cutting edge technologies becoming strong trend and competing:

- **ammonia low charge**
- **CO<sub>2</sub> transcritical**
- **NH<sub>3</sub>/CO<sub>2</sub>**



## 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

# KEY TREND: INDUSTRIAL APPLICATIONS WITH CO<sub>2</sub> & NH<sub>3</sub>



# JAPAN: INDUSTRIAL REFRIGERATION WITH CO<sub>2</sub> & NH<sub>3</sub>



The market is changing, from a strong reliance on R22 to a renewed uptake of (lower charge) NH<sub>3</sub> systems

Estimated **450+ installations** use secondary NH<sub>3</sub>-CO<sub>2</sub> systems



# CHINA: INDUSTRIAL REFRIGERATION WITH CO<sub>2</sub> & NH<sub>3</sub>



Estimated **150+ refrigeration projects** in industrial sector with **CO<sub>2</sub> & NH<sub>3</sub>**



# EUROPE: CO<sub>2</sub> IN INDUSTRIAL APPLICATIONS - CASE STUDY

## World's biggest CO<sub>2</sub> industrial plant

(vegetable processing plant in the Netherlands by Advansor for Staay Food group):

- 3,36 Megawatt (MW) total cooling capacity
- 7 transcritical CO<sub>2</sub> racks
- 45 Bock compressors (28 medium temp., 14 parallel, 3 frost)
- 600 kW of heat recovery, providing “free” heating for the office facilities
- Installation in 2016, in operation since early 2017
- Lower capital, installation & maintenance costs.



# AIR-CONDITIONING

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# INDIA MOVING TOWARDS R290 RAC

India showing strong trend towards R290 RAC

- Currently **400,000+** units installed in the market

Major leader: **Godrej Appliances**

- Replaced CFC, HFC and HCFC as early as 2002
- Efficient and green ACs using R290; first in the world
- **India's first ACs with 7-star performance**
- Earliest brand to opt for voluntary energy labelling of its refrigerators



# R290 AC IN CHINA

## Chinese market showing an interest towards R290 RAC

- **1,300+ units** installed already
- Major players: Midea, Gree, Haier

### Midea case study:

- Nanyang Vocational and Technical College in Jiaxing, (the country's northern Zhejiang province).
- **1,060 R290** based ACs in the dormitories
- Installed in November 2016, no problems in operation so far
- Completed additional projects in warm ambient regions, including Seychelles University in the Seychelles.
- Demonstration projects funded from the Multilateral Fund for the Implementation of the Montreal Protocol.







- Triple Aqua's efficient **heat pump using hydrocarbons** is running in two offices and a supermarket in the Netherlands
- can **save up to 50% in heating and cooling costs** in commercial buildings compared to traditional heat pumps, with a COP (coefficient of performance) between 4 to 10
- The system employs propaene (R443A), a mixture of the hydrocarbons propane (R290) and propene (R1270), with a global warming potential (GWP) of 3 and a **charge of < 5 kg**



Source: [http://hydrocarbons21.com/articles/7250/tripleaqua\\_s\\_dutch\\_debut](http://hydrocarbons21.com/articles/7250/tripleaqua_s_dutch_debut)



- HC based water chillers introduced by several companies targeting **commercial air-conditioning** and **process cooling applications**
- RSA Cooling - water chiller for outdoor installations, and are available with **cooling capacity from 3,0 to 15,0 kW**
- HC water chillers in Australia, **reliable performance at 45C** days this summer



# HEAT PUMPS

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# JAPAN: RESIDENTIAL CO<sub>2</sub> HEAT PUMPS

Eco Cute (CO<sub>2</sub> heat pump) in Japan: big success story, with strong government support initially.

**6+ million CO<sub>2</sub> HP water heaters** in total

**98% of all new residential HP water heaters in Japan**

**400-500k** new units per year



# SHECCO USEFUL LINKS



## **Industry Platforms:**

[www.hydrocarbons21.com](http://www.hydrocarbons21.com)

[www.R744.com](http://www.R744.com)

[www.ammonia21.com](http://www.ammonia21.com)

## **shecco Publications, incl. GUIDEs**

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**THANK YOU!**