



**shecco**

SUSTAINING OUR ATMOSPHERE

# Natural Refrigerant Market Trends



**ATMO**  
**UN sphere**  
side event  
**natural refrigerants**  
28 June 2013, Bangkok

**Bangkok, June 28, 2013**

**Marc Chasserot, Managing Director**

**shecco**

# about shecco



- market development company for natural refrigerants
- 'accelerate' transition to these sustainable solutions
- No1 publisher of natural refrigerant news & analysis
- offices: brussels & tokyo





# 100+ companies worldwide




# global database on NR solutions



**one global database about NR technology options & providers**




# GUIDEs 2013/14: some examples

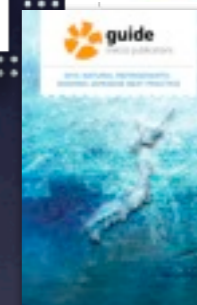
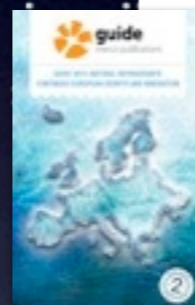




**Europe**  
**2013**

**China**  
**2014**

**Japan**  
**2013**

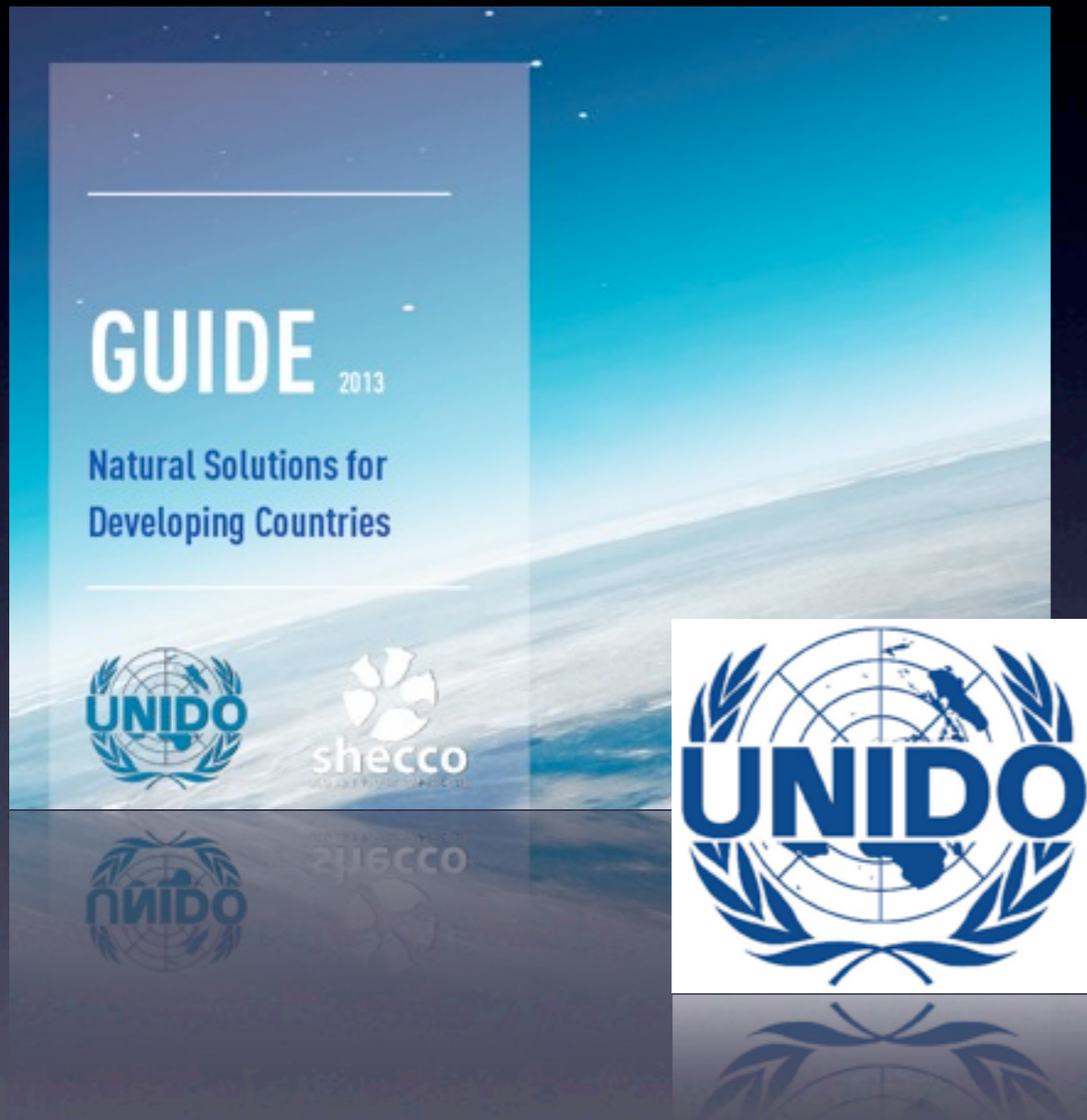
**North America**  
**2014**



  **Developing Countries**  
**2013**



# GUIDE UNIDO - Natural Solutions for Developing Countries



- ◎ **in collaboration with the United Nations Industrial Development Organization**
- ◎ **launch: Sep 2013**
- ◎ **success stories: applications of natural refrigerants & foams**
- ◎ **global survey results: market shares, trends, barriers, solutions**
- ◎ **case studies: best practice examples**
- ◎ **= BUSINESS CASE IN EMERGING ECONOMIES**

# market observations



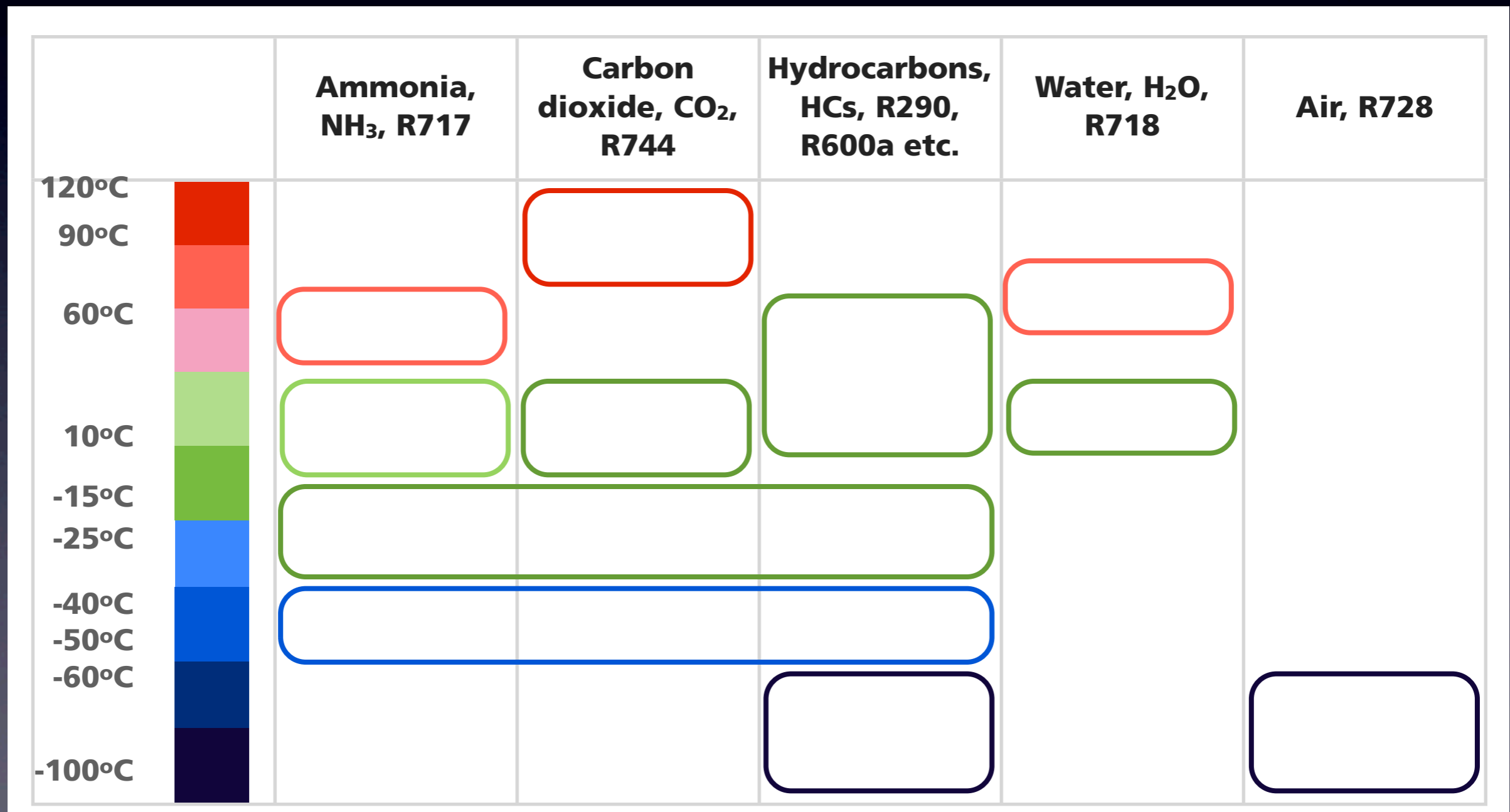
- 20 year patent cycle for synthetic refrigerants (CFC, HCFC, HFC, Low-GWP HFCs....)
- Protocols, Policies, Regulations are speeding this up
  - Bans, Phase downs, taxes etc...
- Uncertainty in the market place, with many alternatives



# natural refrigerants coming back ...



**Across the whole range of heating, cooling and refrigeration needs Natural Refrigerants have potential**



# ... in the food retail chain

## NORTH AMERICA

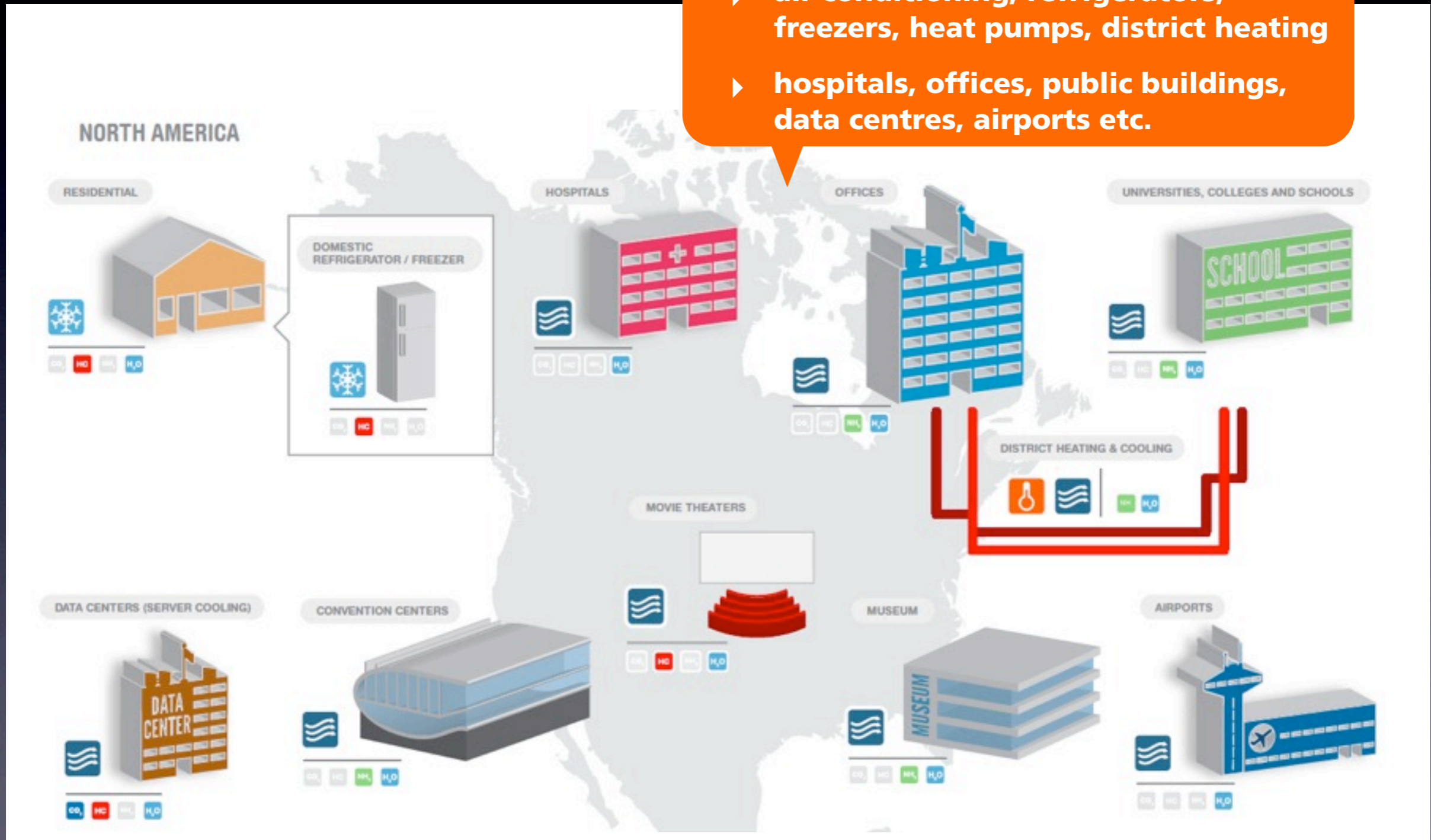


- ▶ factories, warehouses
- ▶ supermarkets
- ▶ fast-food restaurants etc.



# ... in buildings

- ▶ air-conditioning, refrigerators, freezers, heat pumps, district heating
- ▶ hospitals, offices, public buildings, data centres, airports etc.



# ... in transport

## NORTH AMERICA

### TRANSPORT REFRIGERATION



CO<sub>2</sub> HC NH<sub>3</sub>



### PASSENGER CARS



CO<sub>2</sub> HC NH<sub>3</sub>



### BUSES



CO<sub>2</sub> HC NH<sub>3</sub>



### FISHING VESSELS / TRAWLERS



CO<sub>2</sub> HC NH<sub>3</sub>



### CARGO SHIPS / REEFERS



CO<sub>2</sub> HC NH<sub>3</sub>



- ▶ transport refrigeration, passenger car and bus air-conditioning, fishing vessels and reefers refrigeration



# ... in special applications

- ▶ deep mining, ski slopes & ice rinks
- ▶ industrial & chemical plants
- ▶ research labs freezing & cooling

## NORTH AMERICA

### DEEP MINING



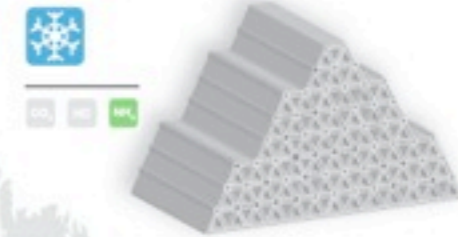
### SKI SLOPES / BOBSLEIGH



### ICE RINKS



### BIOSPHERES



### INDUSTRIAL AND CHEMICAL PROCESSES



### PETROCHEMICAL PLANTS



### PHARMACEUTICAL PROCESSES AND LABORATORIES



### CONSTRUCTION



# manufacturers



- Hundred's of manufacturers are now developing solutions for natural refrigerant applications
  - bringing down costs
  - improving efficiencies
- They are forward looking and planning for the future where these technologies will not be banned (hedging their bets)
- They have the cash-cow of today (HFC) and are developing the cash-cow of tomorrow (Nat Refs) in order to stay competitive



# accelerate due to end users



news, products, community - R744.com is the industry platform for CO<sub>2</sub> cooling and heating experts worldwide.  
**Everything R744**

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**Worldwide, retailers commit to CO<sub>2</sub> – the view from CGF's "Moving away from HFCs...Naturally!" Summit**

11 June 2013

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In June 2013 the Consumer Goods Forum (CGF) held their 3<sup>rd</sup> Refrigeration Summit, "Moving away from HFCs... Naturally!" hosted by leading UK retailer Tesco, who revealed plans to double their number of CO<sub>2</sub> stores in 2013. Also in attendance were supermarket chain representatives from around the world, including Woolworths Australia, Aeon Japan, and Sainsbury's UK, together with CO<sub>2</sub> system supplier Advansor.

Explaining the rationale behind the CGF Refrigeration Summits, Tesco's Climate Change Director Helen Flemming said, "Our aim has been to share knowledge so that our whole industry feels confident to use natural refrigerant technology and shift away from HFC gases."

**Tesco plans to double number of CO<sub>2</sub> stores in the UK in 2013**

According to the presentation by Joe Gomez, Head of Refrigeration at Tesco, there are several compelling reasons for Tesco to tackle refrigeration in their bid to

- Consumer Goods Forum (major brands)
- 2015 Phase-in Nat Refs (regardless of legislation)
- Motivation is not to be 'Green' or because of NGO pressure
- It's simply to save money!
  - ST: more efficient
  - LT: avoid another phase-down or Ban or tax.....

some examples



# HFC-free industrial refrigeration



**90% NH<sub>3</sub> use in  
developed - 40% in  
developing countries**



# HFC-free domestic refrigeration



**about 50% of new  
domestic refrigerators  
use HCs**



# HFC-free light-commercial refrigeration



**1.2 million HC ice cream freezers (Unilever)**

**approx. 950,000 HFC-free vending machines (Coca-Cola + Pepsi)**

**313,000 HFC-free bottle coolers (Red Bull)**



# HFC-free light-commercial refrigeration



**approx. 2.5 m HFC-free  
light-commercial units**



# pioneering projects



**Brazil: CO2 cascade systems: 5-20% energy savings**

**South Africa: conversion of supermarkets to NR**

**Africa: plug & play NH3 chillers for A/C**

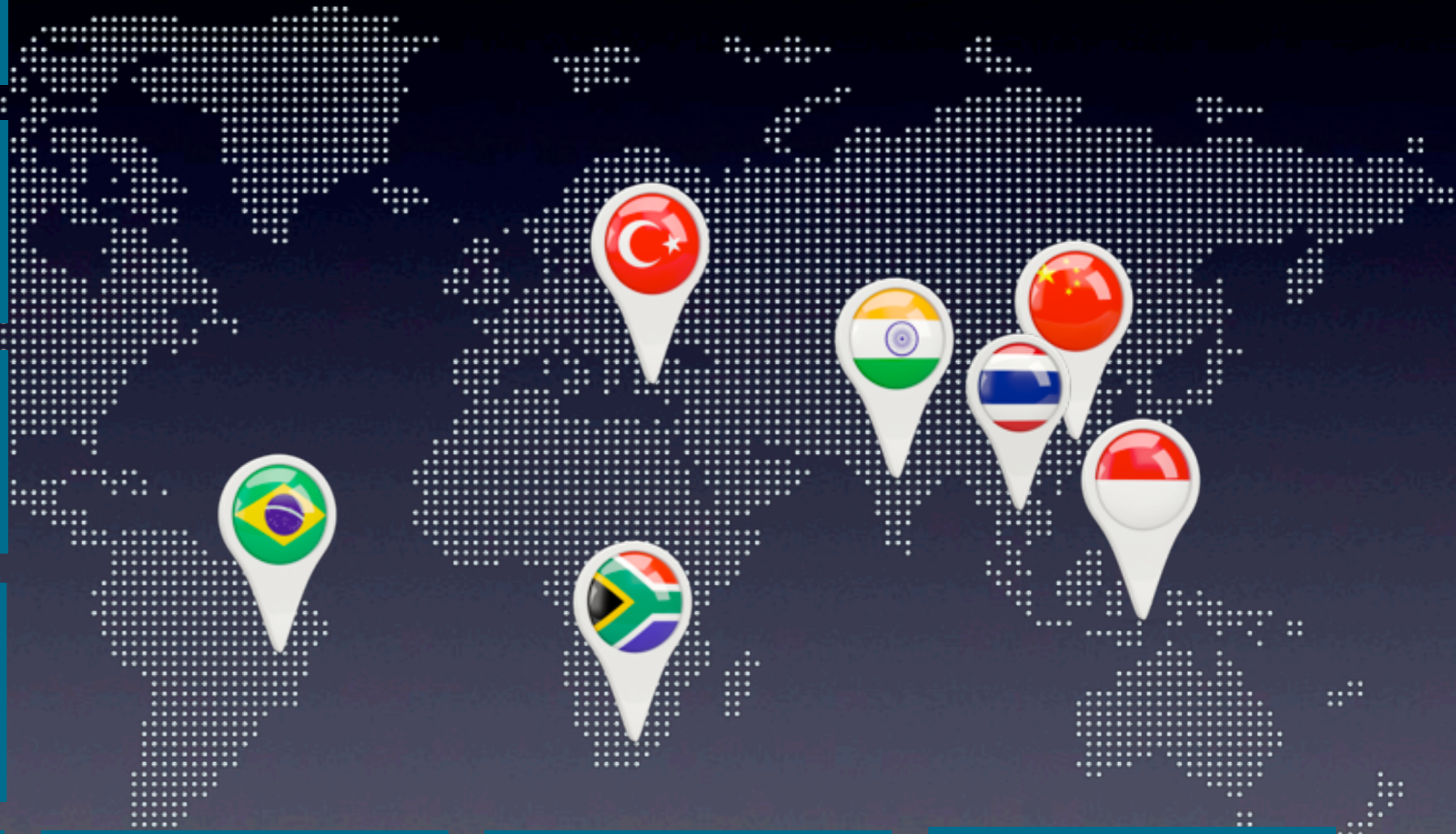
**Turkey: transcritical CO2 system in warmer climate**

**Thailand: conversion of industrial A/C to HC + NH3/CO2 cascade system**

**China, India: production of R290 residential A/C**

**China: NH3/CO2 two-stage refrigeration system for cold storage**

**Indonesia: HC air-conditioning & refrigeration**





# commercial refrigeration



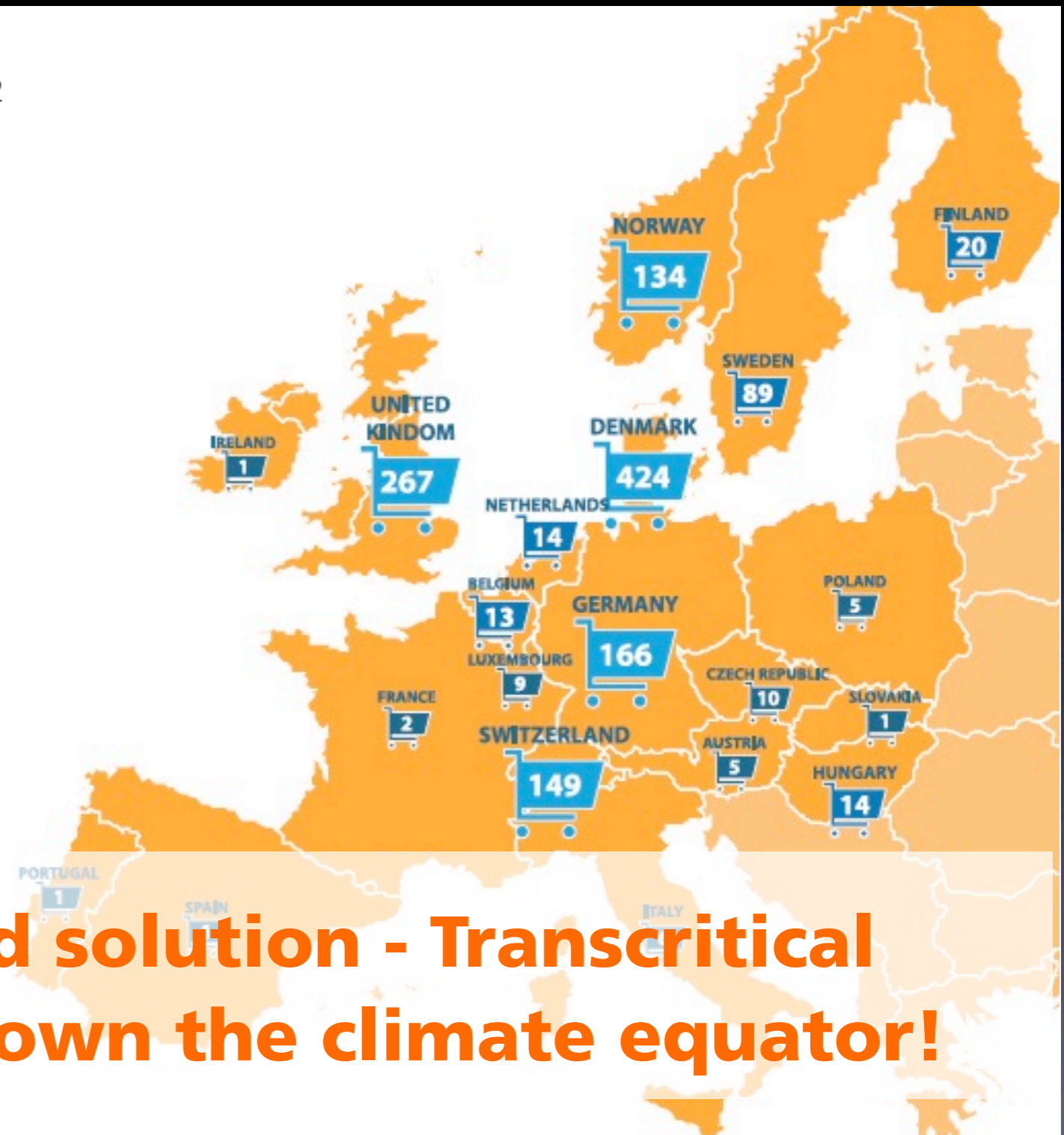
# CO<sub>2</sub> TC supermarkets: europe (est.)



**verified:** 1,331 transcritical CO<sub>2</sub> stores by mid-2011 for Europe

**estimated: 1600+ CO<sub>2</sub> supermarkets by end-2012**

**estimated: 3000+ supermarkets using NR**



**Cascade a standard solution - Transcritical systems moving down the climate equator!**

# CO<sub>2</sub> TC supermarkets: japan

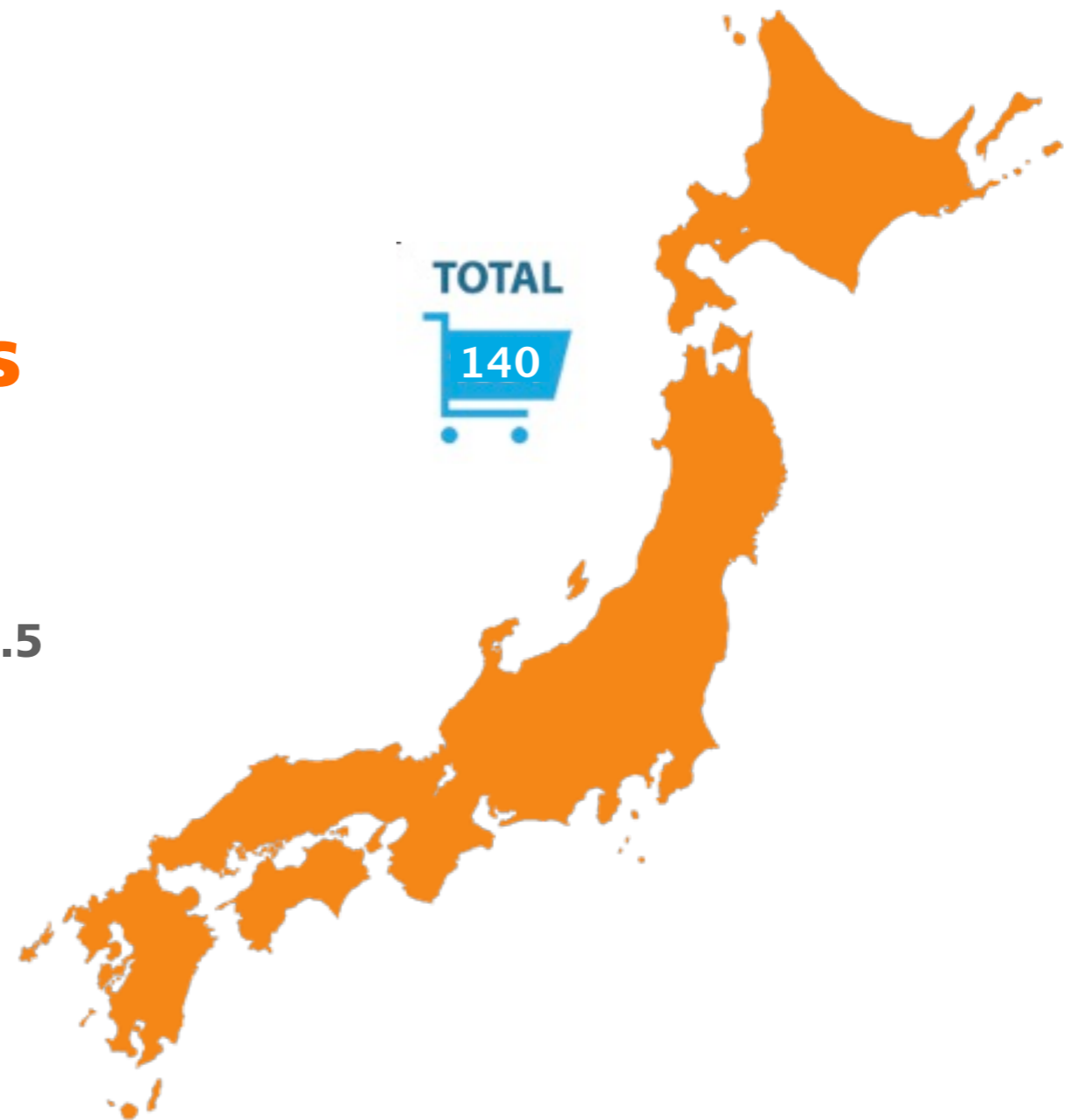


**140+ stores with  
transcritical CO<sub>2</sub>  
systems today**

**Transcritical systems  
dominate**

**CO<sub>2</sub> TC experience gained through 3.5  
million CO<sub>2</sub>-only heat pumps = 98%  
market share for residential heat  
pump water heaters**

**annual production: 500,000 units**



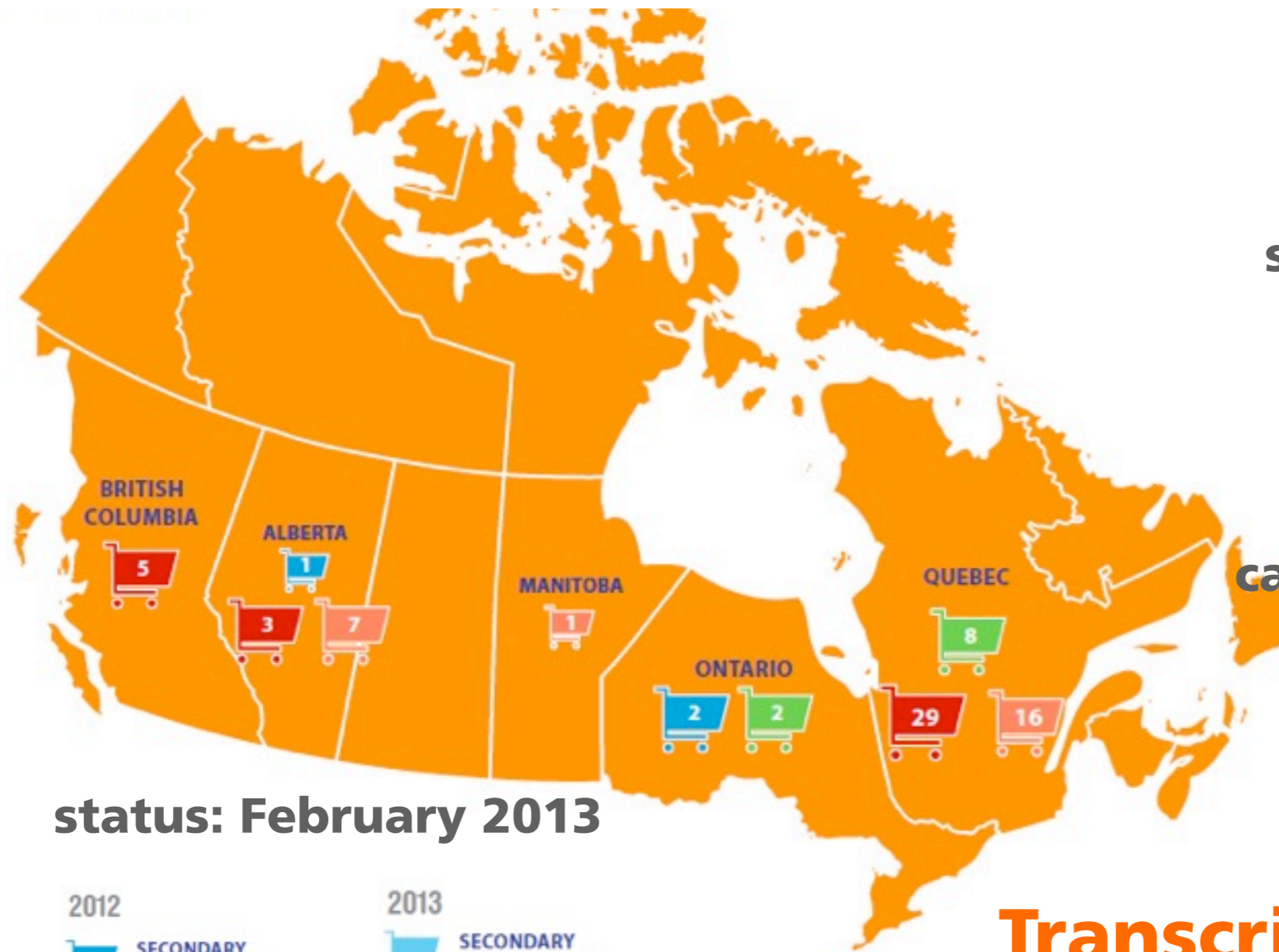


# CO<sub>2</sub> refrigerant supermarkets: canada



**37 stores with transcritical CO<sub>2</sub> systems in 2012; 24 new ones already planned for 2013**

**13 stores with CO<sub>2</sub> cascade & secondary systems in 2012**

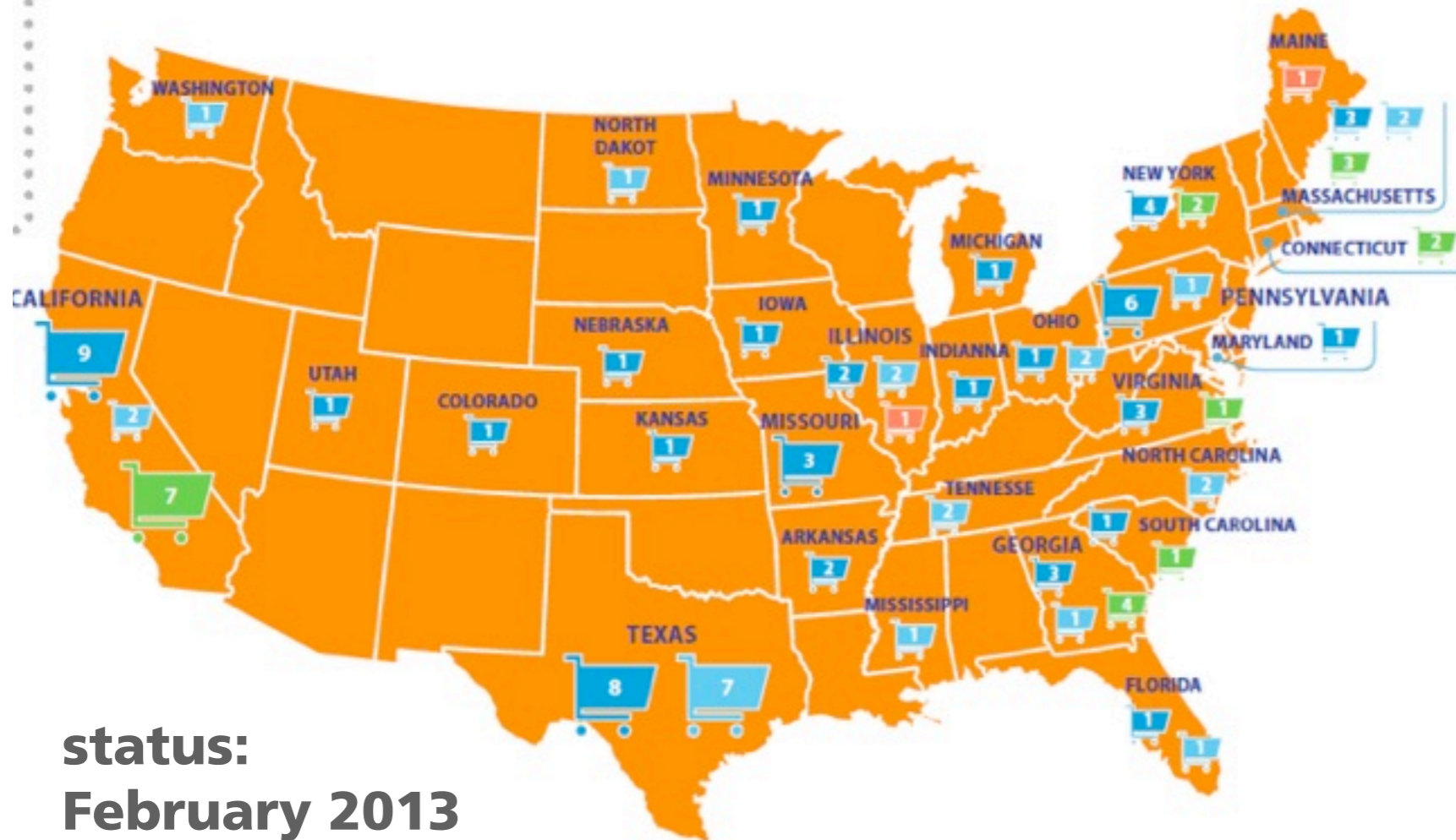


**status: February 2013**



**Transcritical systems dominate**

# CO<sub>2</sub> refrigerant supermarkets: usa (2013)



status:  
February 2013

4 stores with TC  
CO<sub>2</sub> systems  
in 2013/14

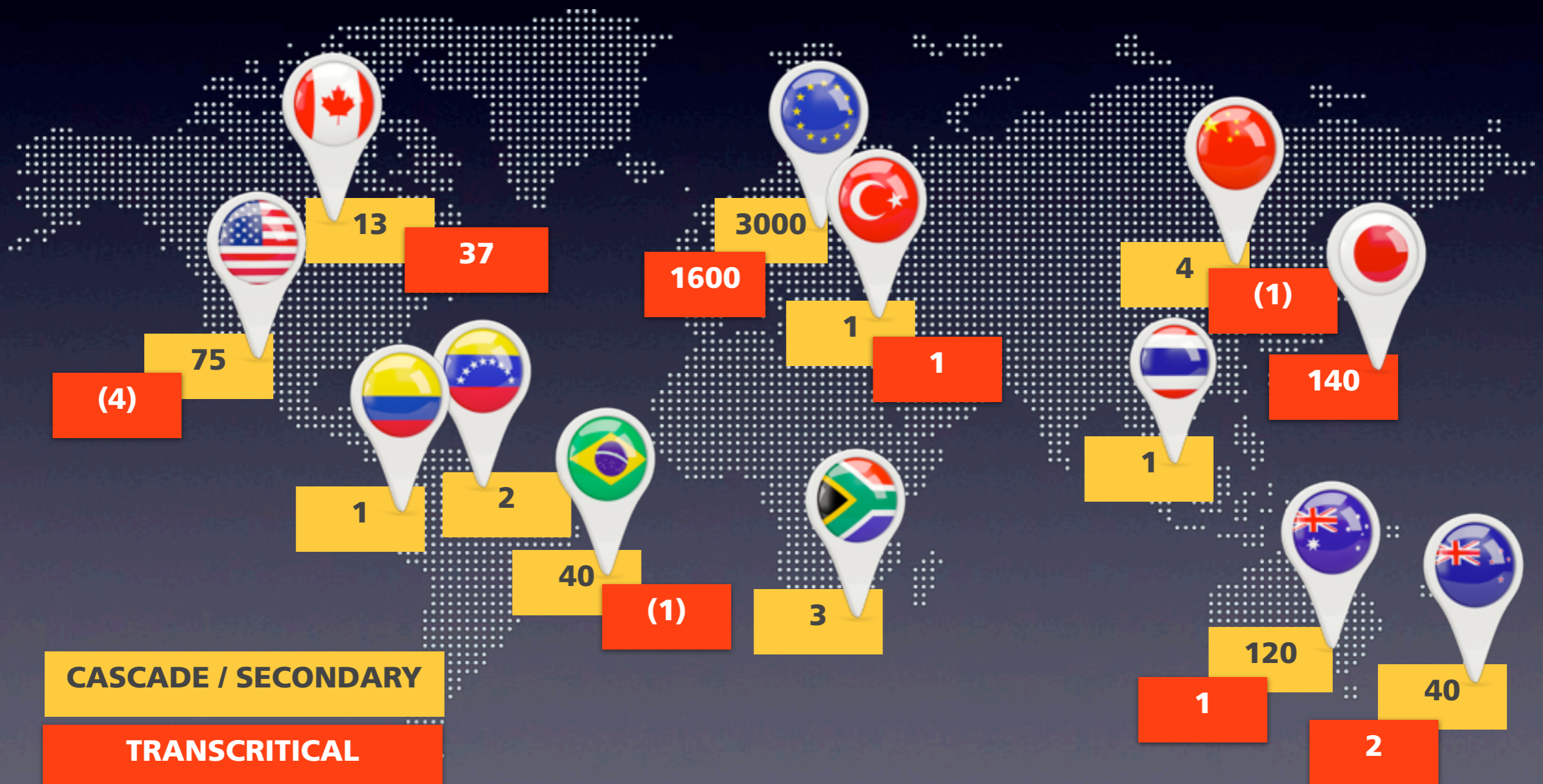
75 stores with  
CO<sub>2</sub> cascade &  
secondary  
systems in 2012;  
already 25 new  
ones planned for  
2013



**Cascade & secondary systems dominate - Transcritical systems are coming !**



# estimated CO<sub>2</sub> systems in the world - status: May 2013 (incl. outlook for 2013)





# global CO<sub>2</sub> transcritical stores



**approx. 1800 CO<sub>2</sub>  
transcritical stores**  
technology moving from north to south



# CO<sub>2</sub> refrigerant supermarkets: usa



# CO<sub>2</sub> refrigerant supermarkets: usa





# CO<sub>2</sub> refrigerant supermarkets: canada



**METRO GROUP**

**Sobey's**

**Cooper's Foods**

**Walmart**

**IGA**

**save on foods**  
SO MUCH *more* IN STORE

**Loblaws**

**Overwaitea Food Group**

# CO<sub>2</sub> refrigerant supermarkets: canada



**METRO GROUP**

**Sobeys**

**Cooper's Foods**

**Walmart** \*

**IGA**

**save on foods**  
SO MUCH *more* IN STORE

**Loblaws**

**Overwaitea Food Group**

**min. 12 brands**



# CO<sub>2</sub> refrigerant supermarkets: europe



# CO<sub>2</sub> refrigerant supermarkets: europe



min. 55 brands





# CO<sub>2</sub> refrigerant supermarkets: brazil



# CO<sub>2</sub> refrigerant supermarkets: brazil





# CO<sub>2</sub> refrigerant supermarkets: japan



# CO<sub>2</sub> refrigerant supermarkets: japan



6 brands



source: shecco Japan, Japanese food retailers



# food retail brands using CO<sub>2</sub> (May 2013)



**min. 113 brands**



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