



Mainstreaming Natural Refrigerants

The Business Case for North America



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Nina Masson, Head of Market Research

shecco

GUIDE North America 2013



- **published March 2013**
- **update in 2014**
- **HVAC&R industry survey with 550+ responses**
- **current & future use of NR**
- **market trends & drivers**
- **case studies**
- **CO₂ supermarket map, light-commercial map**
- **North American policies and programs**

the business case for natural refrigerants in canada & the usa



**INDUSTRIAL
REFRIGERATION: NH₃**



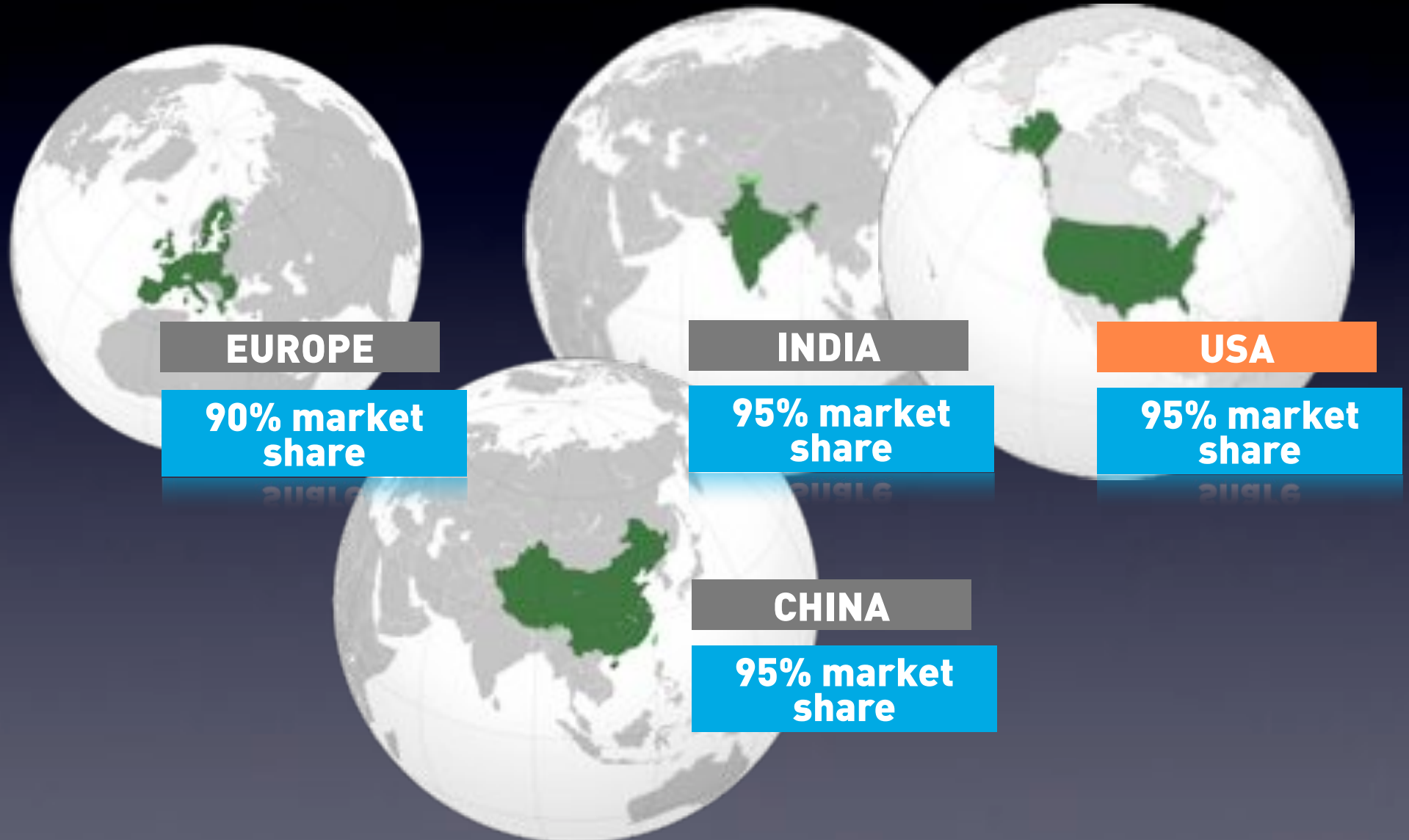
**DOMESTIC & LIGHT-
COMMERCIAL
REFRIGERATION: HC_s**



**COMMERCIAL
REFRIGERATION &
HEAT PUMPS: CO₂**



NH₃ industrial refrigeration



source: TEAP, IIR, etc.

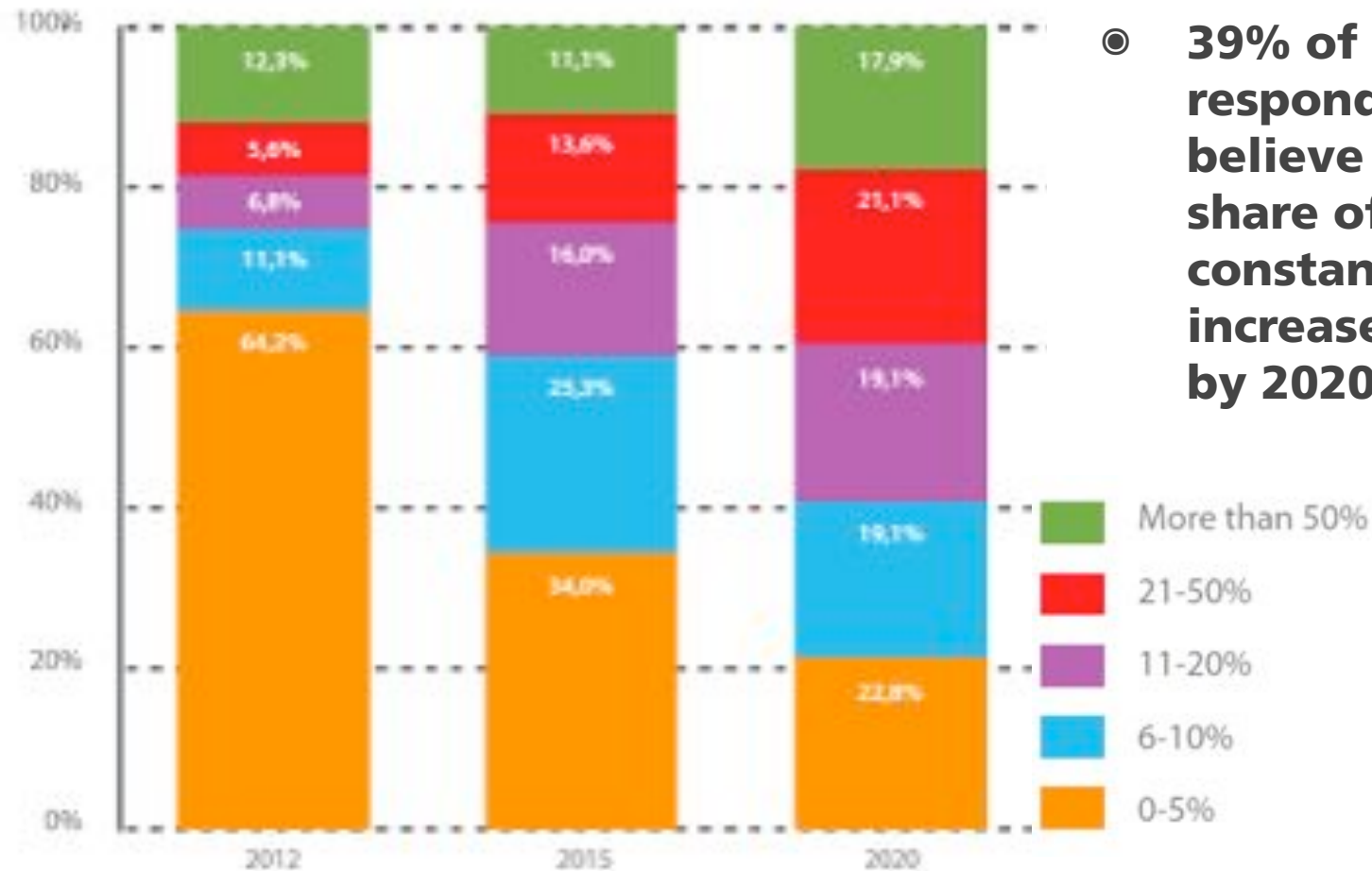
from north america's world leadership
in industrial refrigeration....



**90% NH₃ use in
developed - 40% in
developing countries**

new applications & low-charge systems

market outlook HC light-commercial refrigeration



- 39% of respondents believe the market share of HCs will constantly increase to 21%+ by 2020*

... to large market potential in HFC-free light-commercial refrigeration



► in North America, including Mexico: around 4,000 units (March 2013)



PEPSICO



DANONE

HFC-free light-commercial refrigeration - global industry leaders



**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



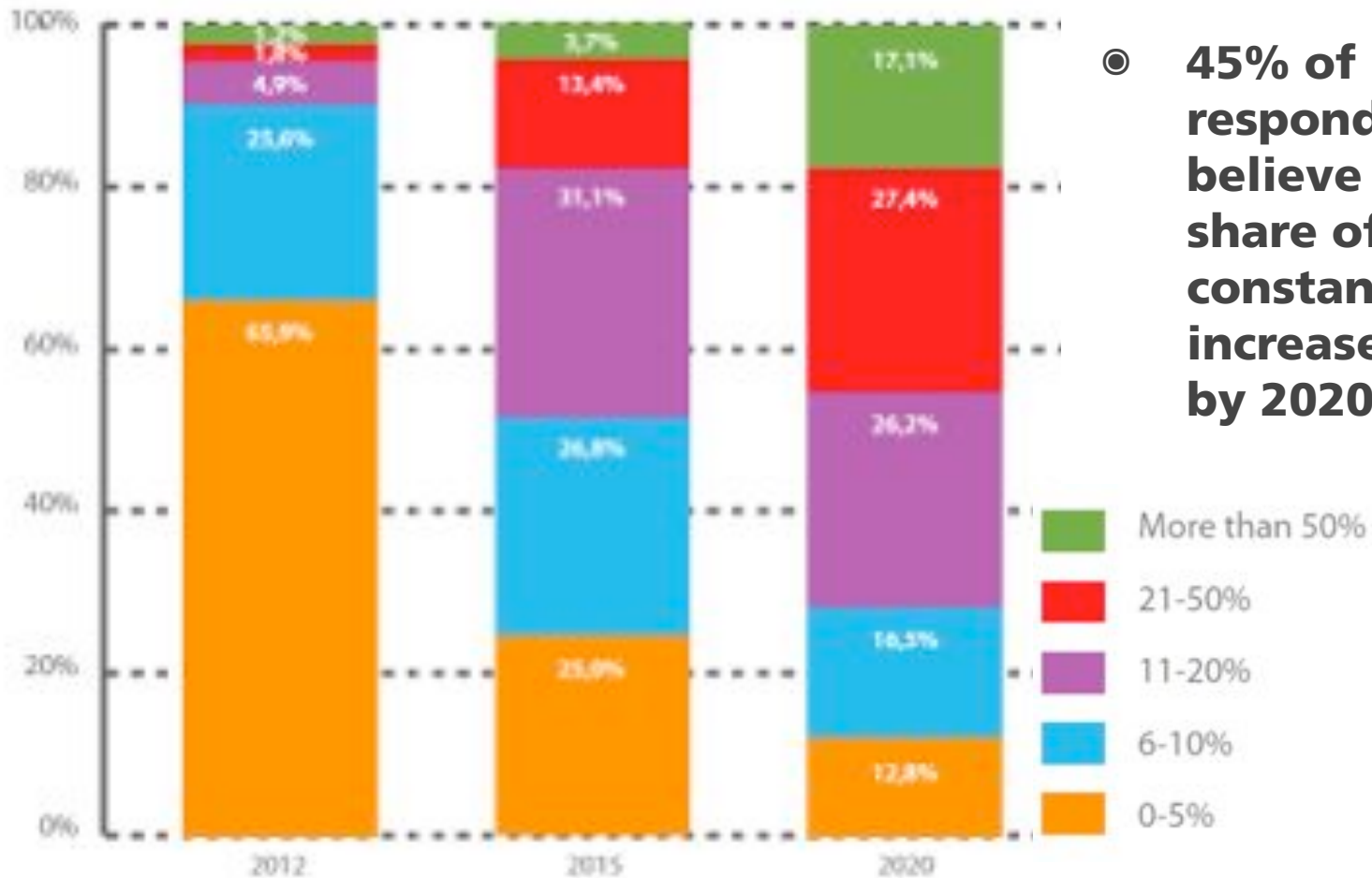
**approx. 2.5 m HFC-free
light-commercial units**

HFC-free domestic refrigeration



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

market outlook CO₂ commercial refrigeration



○ **45% of respondents believe the market share of CO₂ will constantly increase to 21%+ by 2020***

*source: shecco, GUIDE 2013: Market Growth for North America

CO₂ refrigerant supermarkets: usa (2013)



**status:
February 2013**

**4 stores with TC
CO₂ systems
in 2013/14**

**75 stores with
CO₂ cascade &
secondary
systems in 2012;
already 25 new
ones planned for
2013**



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

CO₂ refrigerant supermarkets: canada



37 stores with transcritical CO₂ systems in 2012; 24 new ones already planned for 2013

13 stores with CO₂ cascade & secondary systems in 2012

status: February 2013



Transcritical systems dominate

source: shecco, GUIDE 2013: Market Growth for North America

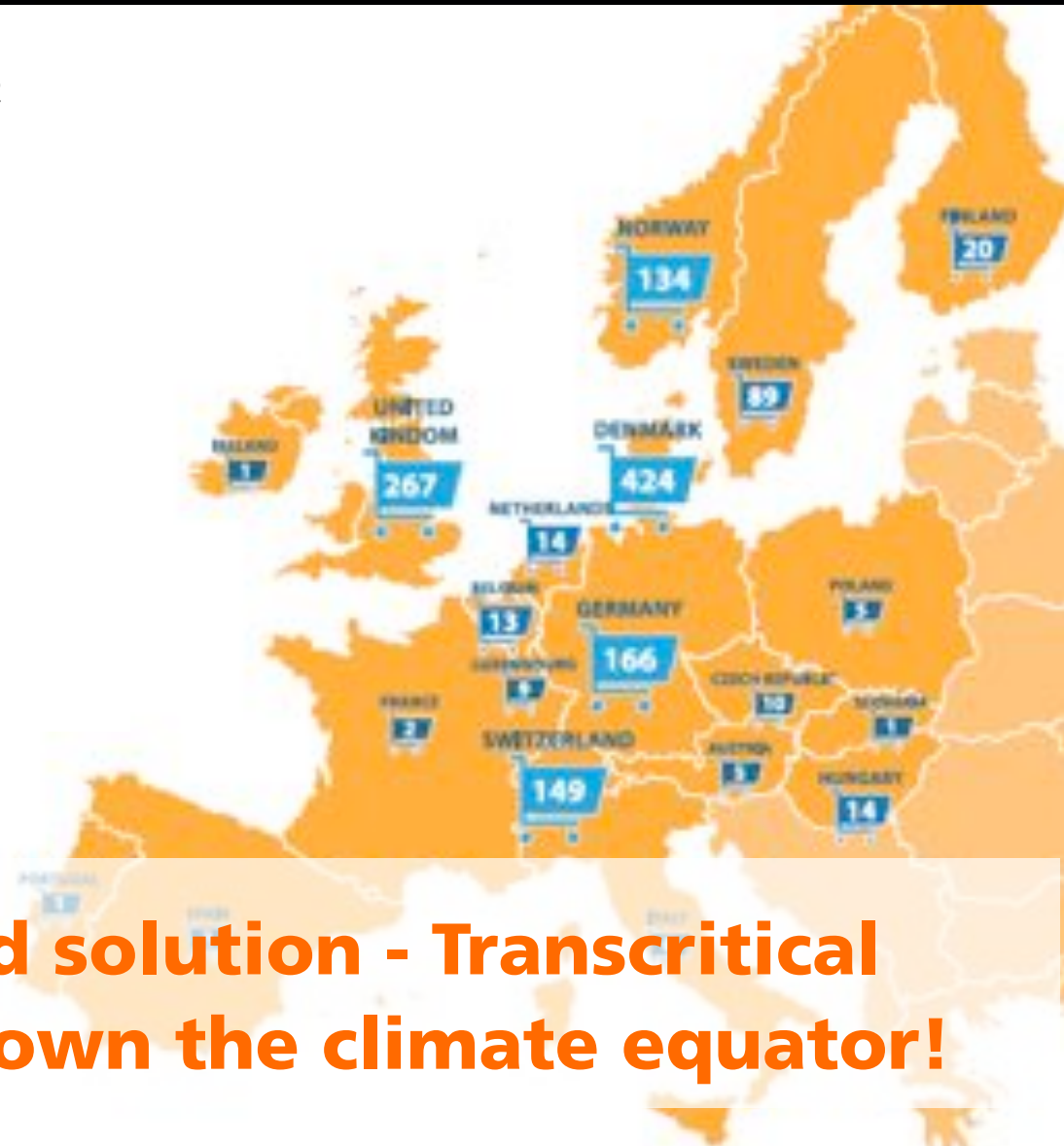
CO₂ TC supermarkets: europe (est.)



verified: 1,331 transcritical CO₂ stores by mid-2011 for Europe

estimated: 1600+ CO₂ supermarkets by end-2012

estimated: 3000+ supermarkets using NR



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

CO₂ TC supermarkets: japan

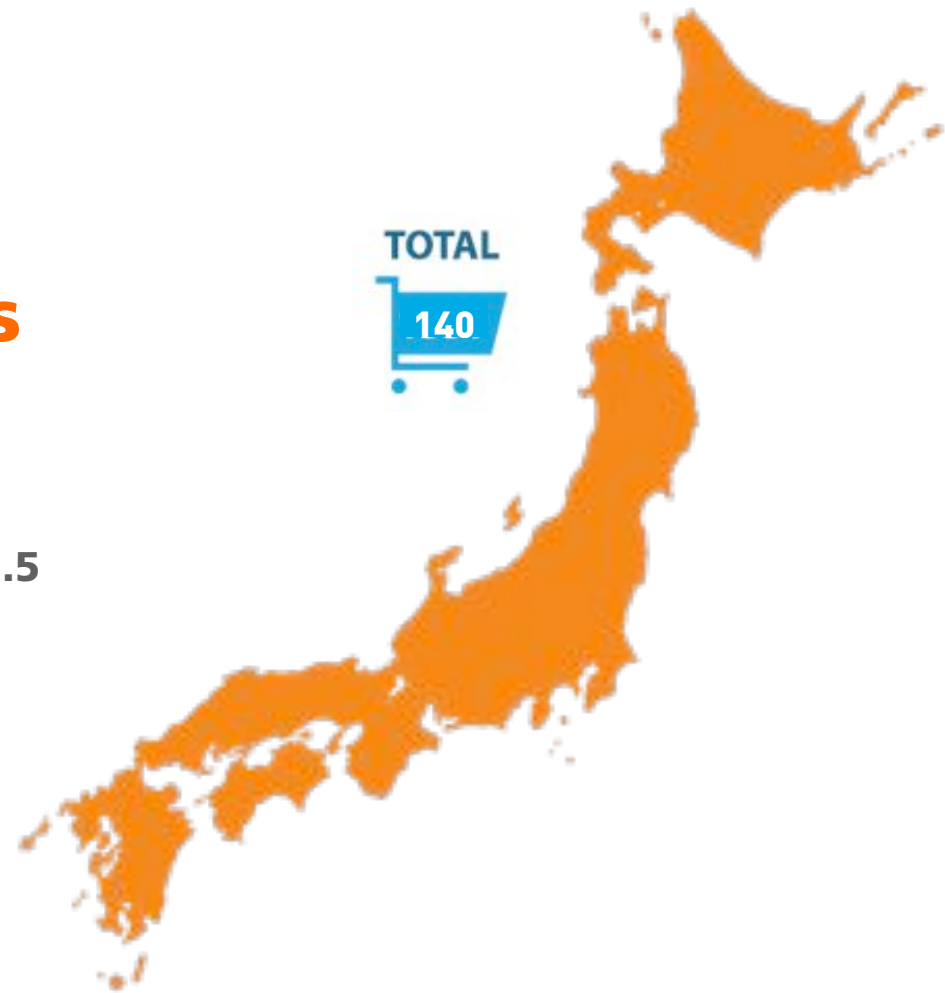


140+ stores with transcritical CO₂ systems today

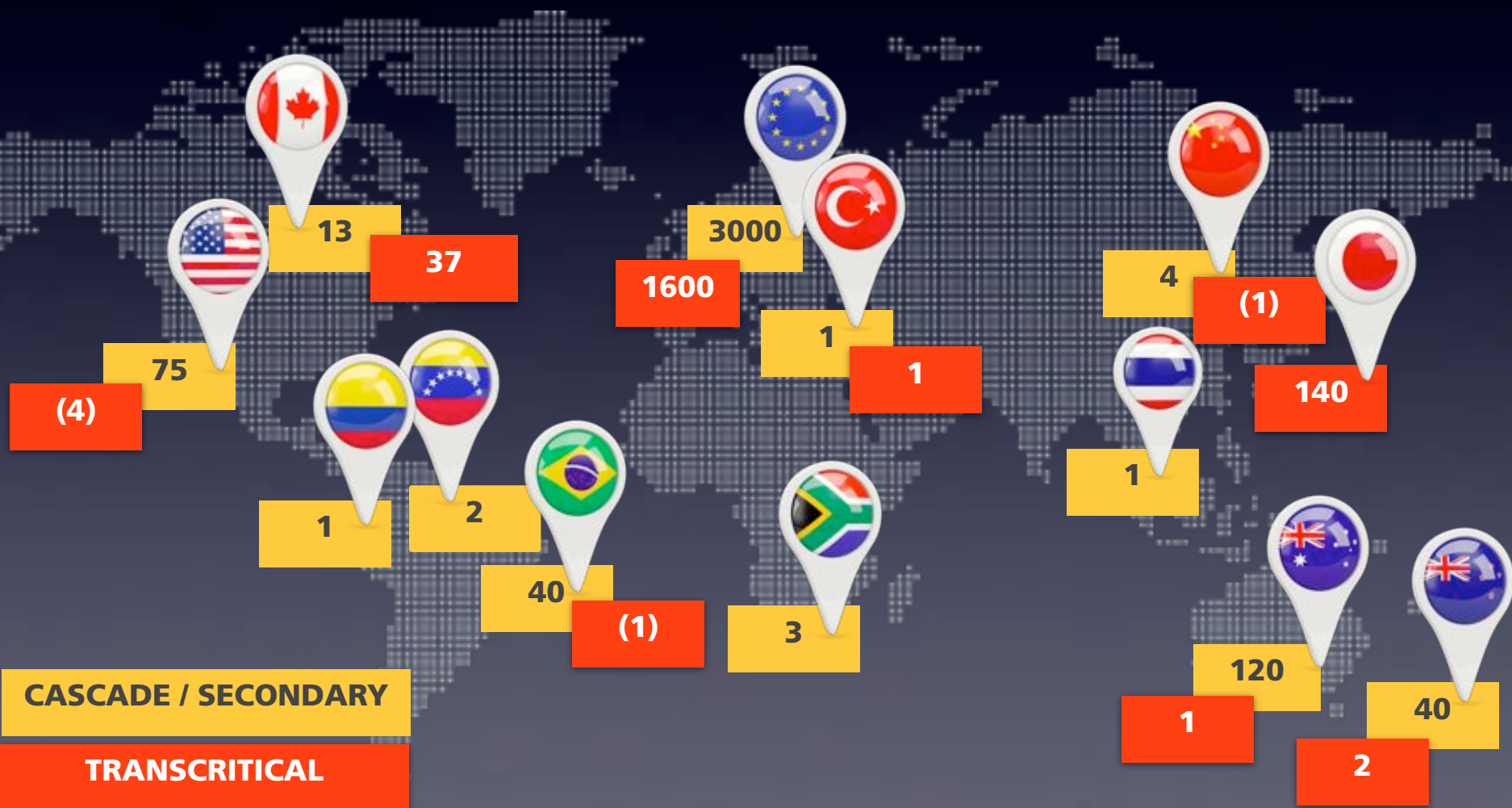
Transcritical systems dominate

CO₂ TC experience gained through 3.5 million CO₂-only heat pumps = 98% market share for residential heat pump water heaters

annual production: 500,000 units



estimated CO₂ systems in the world - status: May 2013 (incl. outlook for 2013)



global CO₂ transcritical stores



**approx. 1800 CO₂
transcritical stores**

technology moving from north to south

CO₂ TC systems in food retail - today



National ranking (estimate):

1. Denmark (500+)
2. United Kingdom (300+)
3. Germany (300+)
4. Switzerland (200+)
5. Norway (150+)
6. Japan (140)
7. Sweden (100+)
8. Canada (40+)

CO₂ TC systems in food retail - trends



**Japan: 600 CO₂ TC by
2014/15**

**Europe will remain the CO₂
leader for a while**

USA could game-change the market

CO₂ cascade systems in food retail - today



National ranking (estimate):

1. European Union countries - approx. 3,000 units - now a standard solution not separately calculated by some suppliers



2. Australia (120+)

3. USA (75+ cascade & secondary)

4. New Zealand (40+)

5. Brazil (40)

6. USA (20 cascade)

CO₂ refrigerant supermarkets: usa



CO₂ refrigerant supermarkets: usa



source: shecco, GUIDE 2013: Market Growth for North America

CO₂ refrigerant supermarkets: canada



METRO GROUP

Sobey's

Cooper's Foods

Walmart

IGA

save on foods
SO MUCH *more* IN STORE

Loblaws

Overwaitea Food Group

CO₂ refrigerant supermarkets: canada



METRO GROUP

Sobey's

Cooper's Foods

Walmart *

IGA

save on foods
SO MUCH *more* IN STORE

Loblaws

Overwaita Food Group

min. 12 brands

CO₂ refrigerant supermarkets: europe



CO₂ refrigerant supermarkets: europe



min. 55 brands



source: shecco, GUIDE 2012: Market Growth for Europe

CO₂ refrigerant supermarkets: brazil



CO₂ refrigerant supermarkets: brazil



14 brands



CO₂ refrigerant supermarkets: japan



CO₂ refrigerant supermarkets: japan



6 brands



source: shecco Japan, Japanese food retailers

food retail brands using CO₂ (May 2013)



min. 113 brands

conclusions: the business case for natural refrigerants in north america

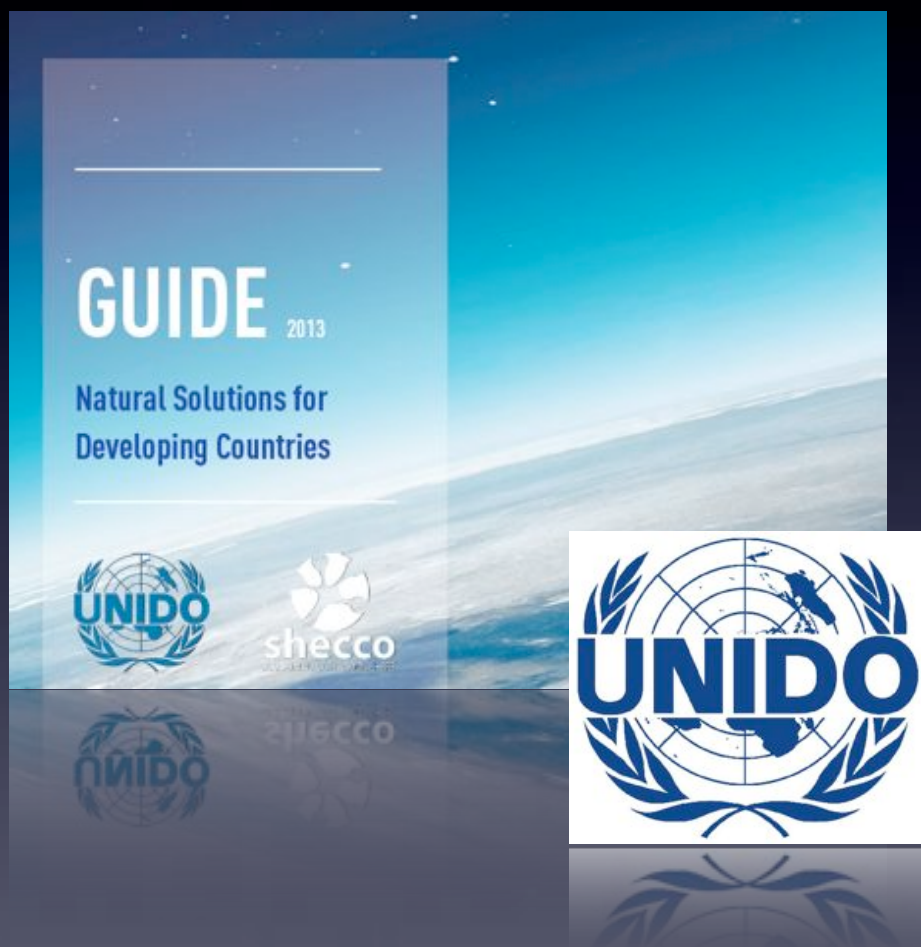


MESSAGE 1: The current Natural Refrigerant use in North America is still low in most end-use applications, and as compared to other world regions!

MESSAGE 2: Major NA corporations are actively working on the introduction & drive for the Natural Refrigerant technology market!

MESSAGE 3: North America has the potential to transform the industry globally, if it takes a leadership role!

GUIDE UNIDO - Natural Solutions for Developing Countries



- ◎ **in collaboration with the United Nations Industrial Development Organization**
- ◎ **launch: Aug / 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**

GUIDE North America 2nd edition



2nd

- launch: 2014
- verify market progress in commercial refrigeration, light-commercial refrigeration, domestic refrigeration, heat pumps

GUIDEs: published



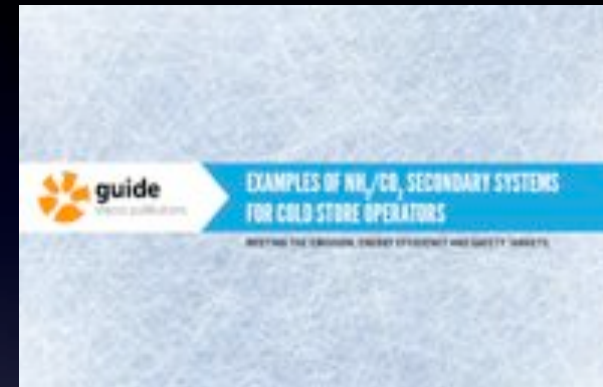
GUIDE Europe

Feb 2012



GUIDE North America

March 2013



**GUIDE: Examples of
NH₃/CO₂ Secondary
Systems for Cold
Store Operators**

March 2013

<http://guide.shecco.com>

shecco - useful links



Industry Platforms:

<http://www.hydrocarbons21.com>

<http://www.R744.com>

<http://www.ammonia21.com>

<http://www.R718.com>

GUIDEs:

<http://guide.shecco.com>

ATMOsphere 2012 Report / ATMOsphere Europe 2013:

<http://www.ATMO.org>

contact details:

Nina Masson

nina.masson@shecco.com

+32 2 230 3700

+32 473 468 194