world natural refrigerants trends

market availability, technology trends & the impact of policy

San Francisco, June 18, 2014

Nina Masson, Deputy Managing Director

shecco

natural refrigerants world trends

north america: huge potential still untapped

north america: CO_2 TC / CO_2-HFC stores 2013/14

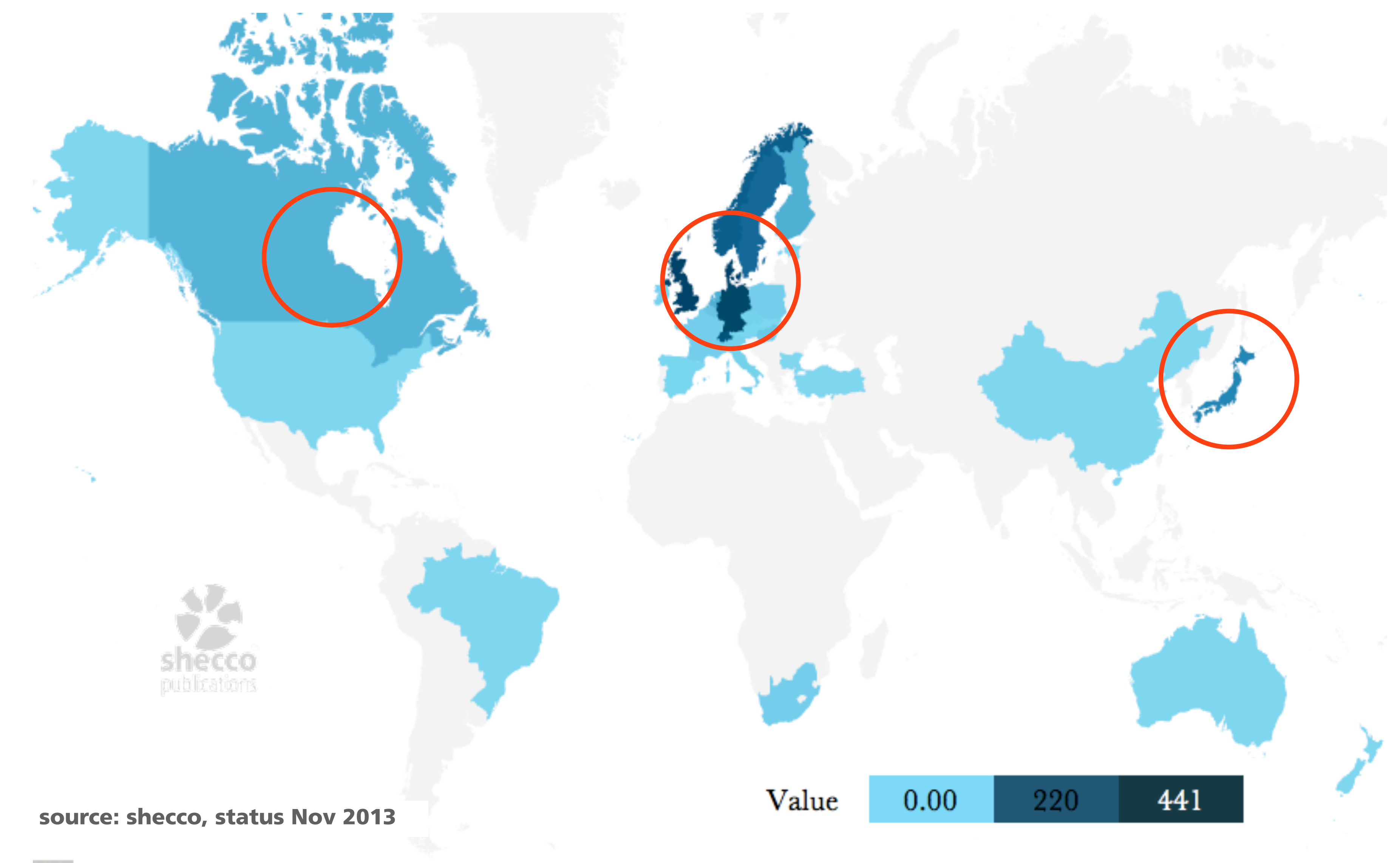
CO_2 TC stores, 2013/14

Value 9.00 42.0 86.00

CO_2-HFC / Secondary Systems, 2013/14

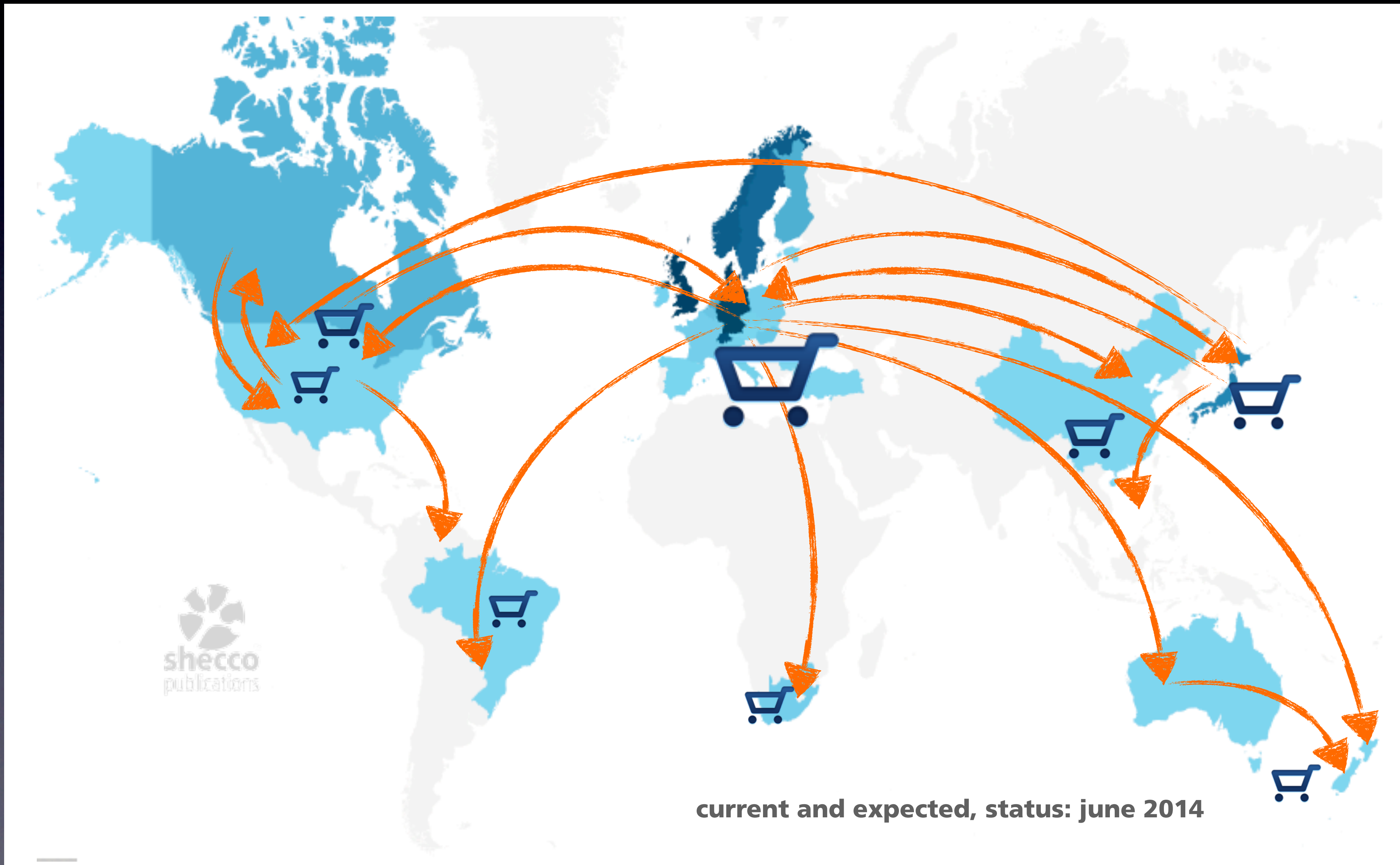
Value 12.0 57.0 200

world: CO_2 TC stores 2013/14 - leading world regions

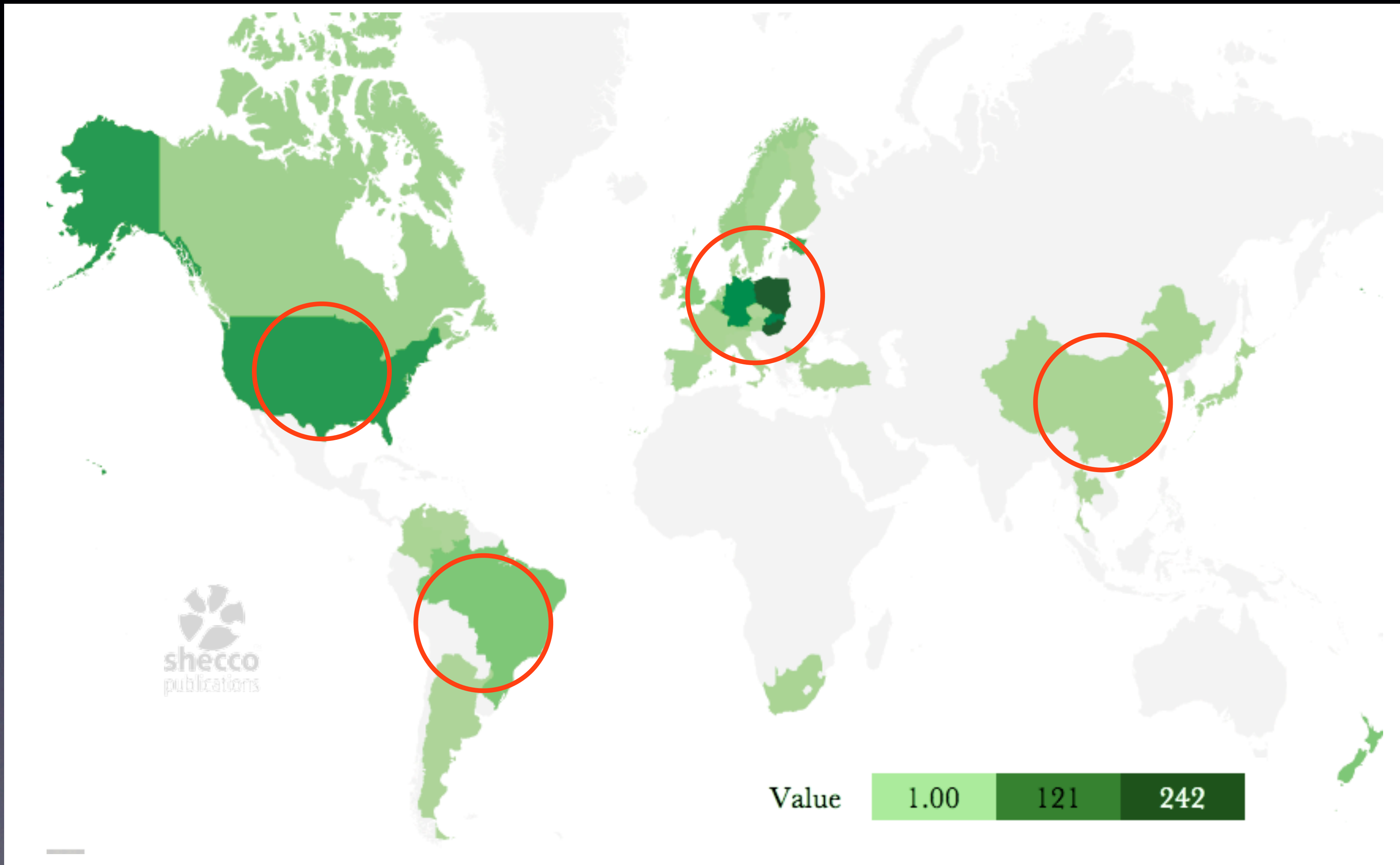


source: shecco, status Nov 2013

world: CO_2 TC suppliers active & exchange

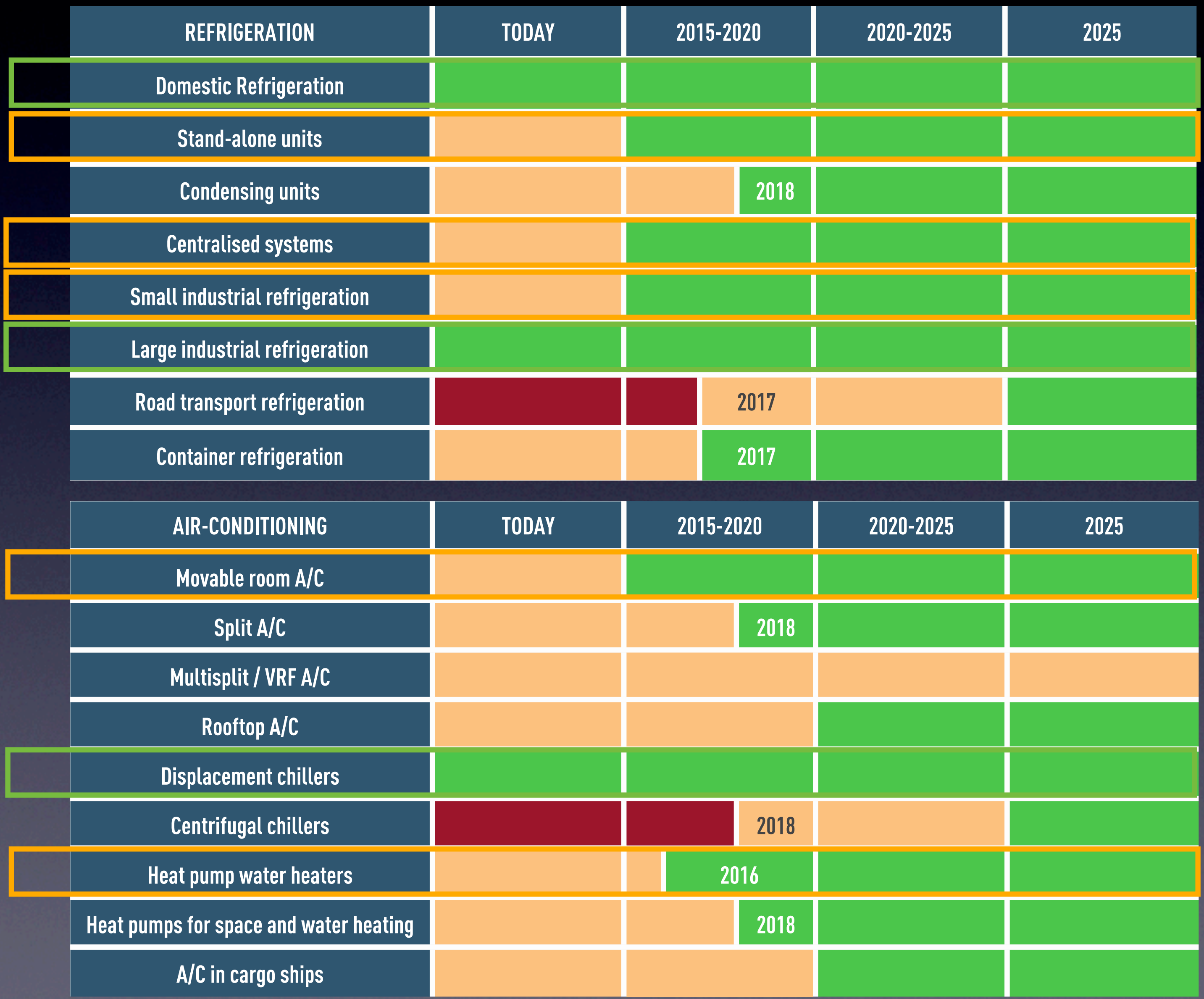


world: CO_2-HFC stores 2013 - leading world regions



europe: CO_2 and HC stores

europe: commercial availability of NR solutions with ambitious policy action



Commercially available across the EU with sufficient production capacity

Semi commercially available (low volume production)

Not yet commercialy available (R&D / demonstration projects)

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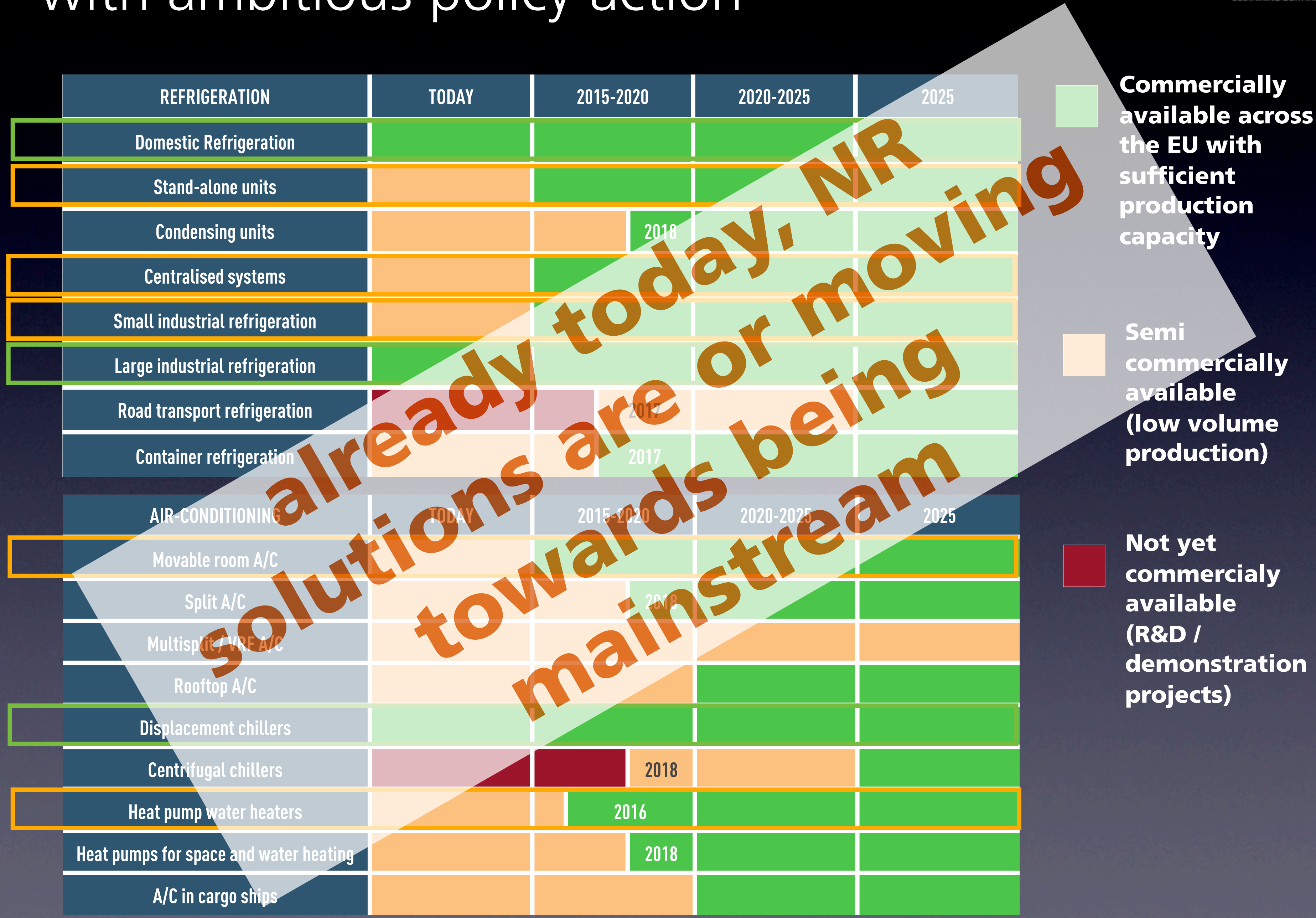
europe: commercial availability of NR solutions with ambitious policy action



europe: commercial availability of NR solutions with ambitious policy action

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REFRIGERATION	TODAY	2015-2020	2020-2025	2025
Domestic Refrigeration				
Stand-alone units				
Condensing units		2018		
Centralised systems				
Small industrial refrigeration				
Large industrial refrigeration				
Road transport refrigeration		2017		
Container refrigeration		2017		

AIR-CONDITIONING	TODAY	2015-2020	2020-2025	2025
Movable room A/C				
Split A/C		2018		
Multisplit / VRF A/C				
Rooftop A/C				
Displacement chillers				
Centrifugal chillers		2018		
Heat pump water heaters		2016		
Heat pumps for space and water heating		2018		
A/C in cargo ships				

industry ready with solutions for most sectors in 2018-2020 in europe

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europe: commercial availability of NR solutions with ambitious policy action

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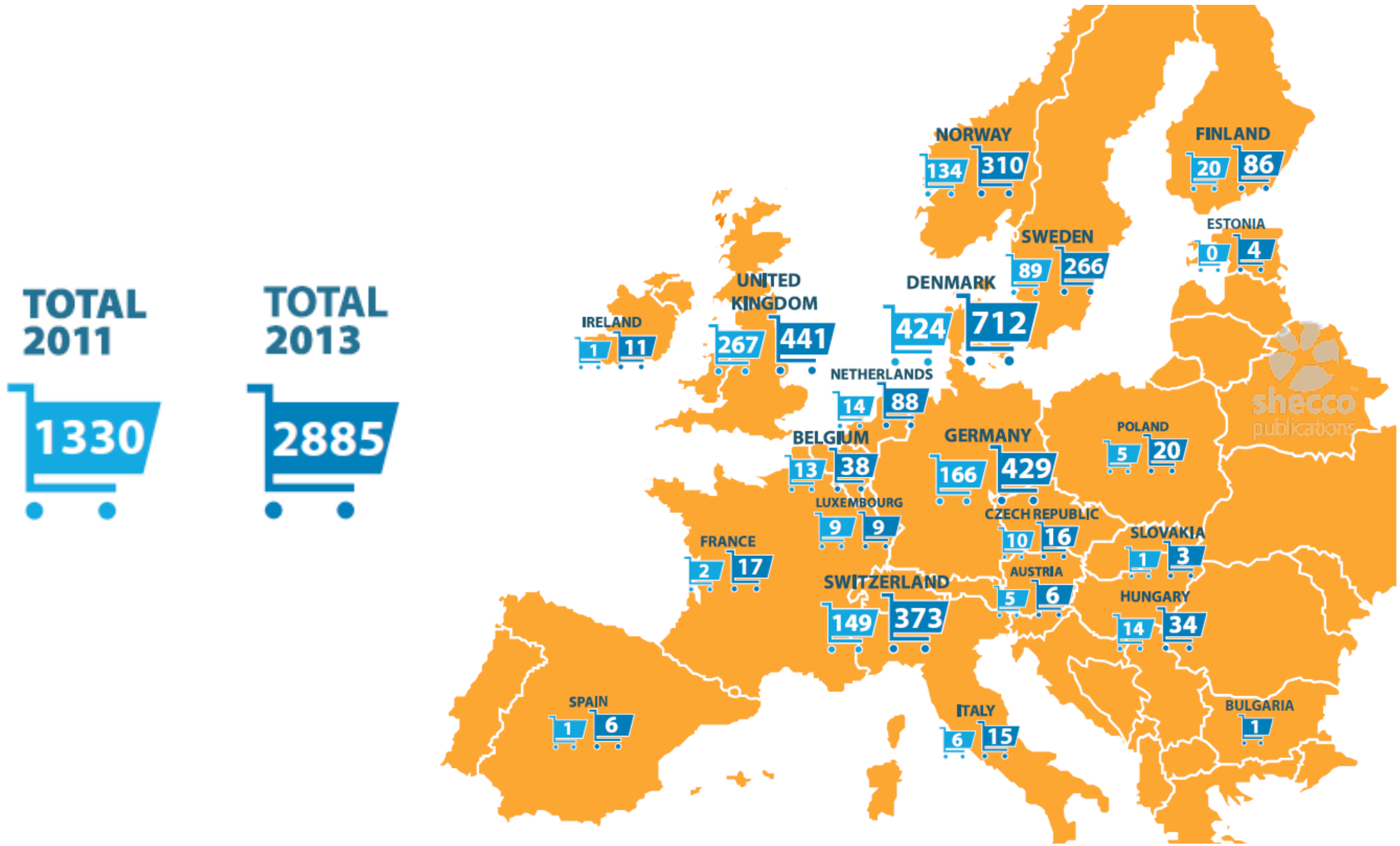
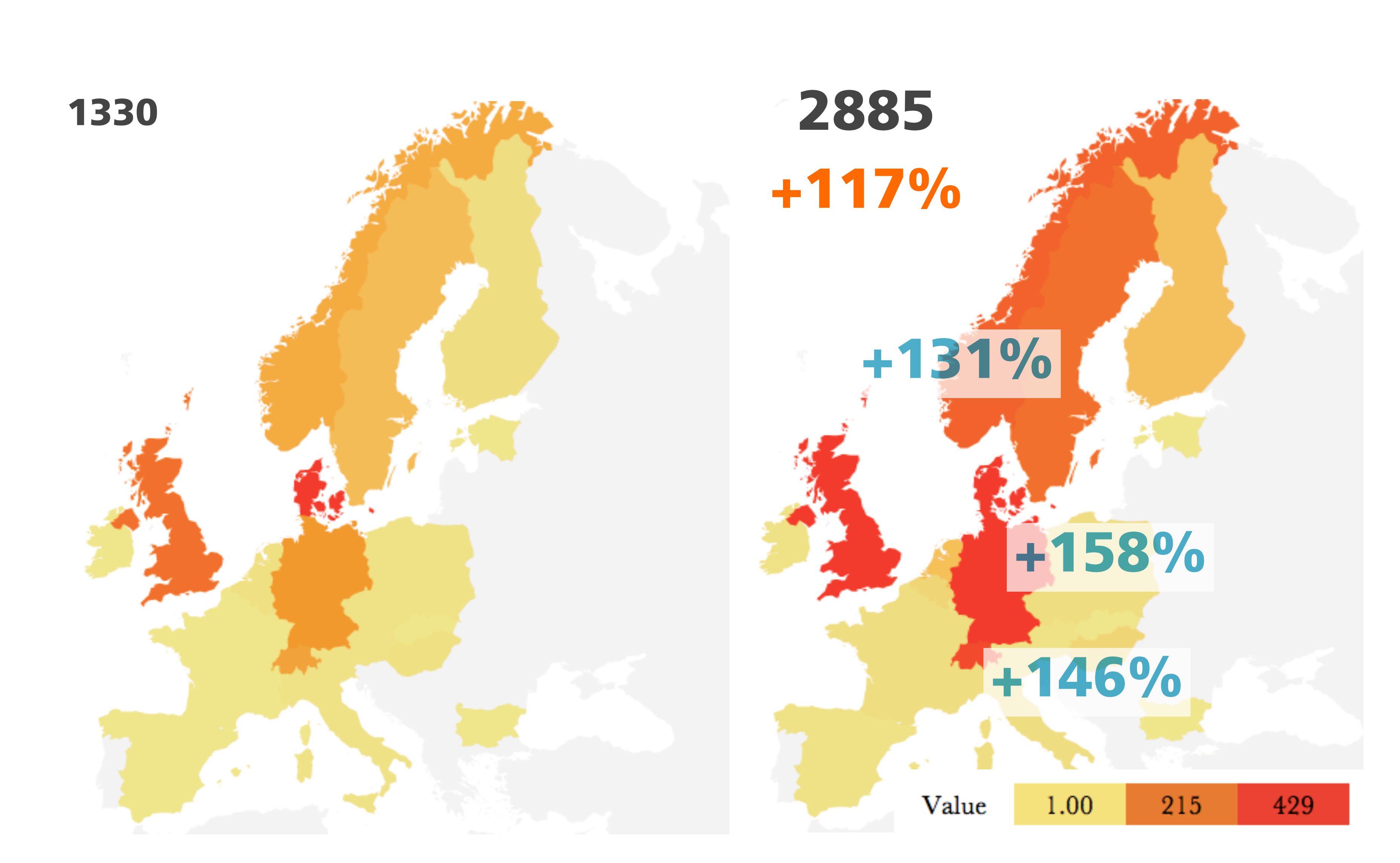
europe: CO_2 TC stores 2011-2013

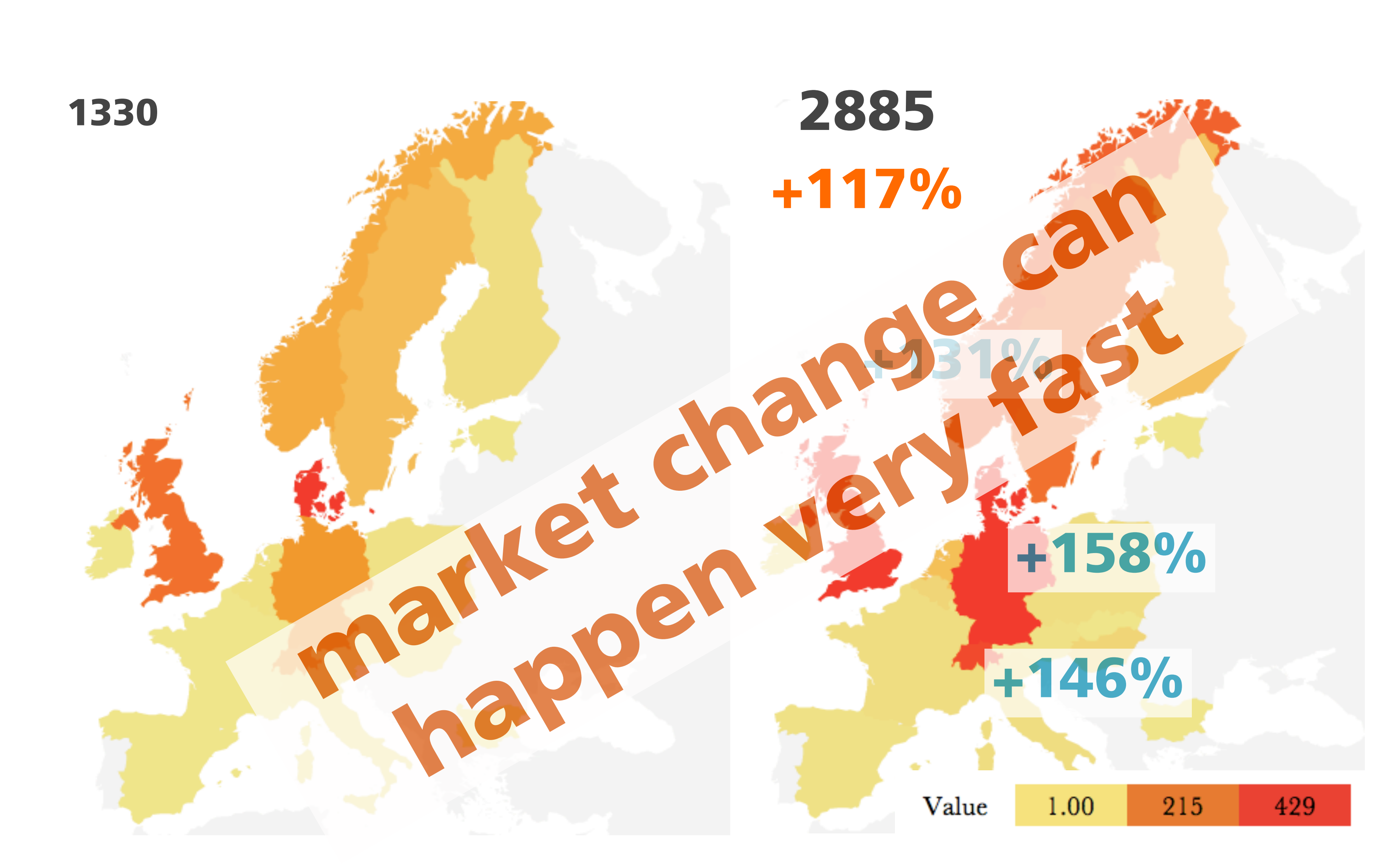


source: shecco, status Nov 2013, data from 14 system suppliers / contractors, 11 food retailers

europe: CO_2 TC stores 2011-2013



europe: CO_2 TC stores 2011-2013



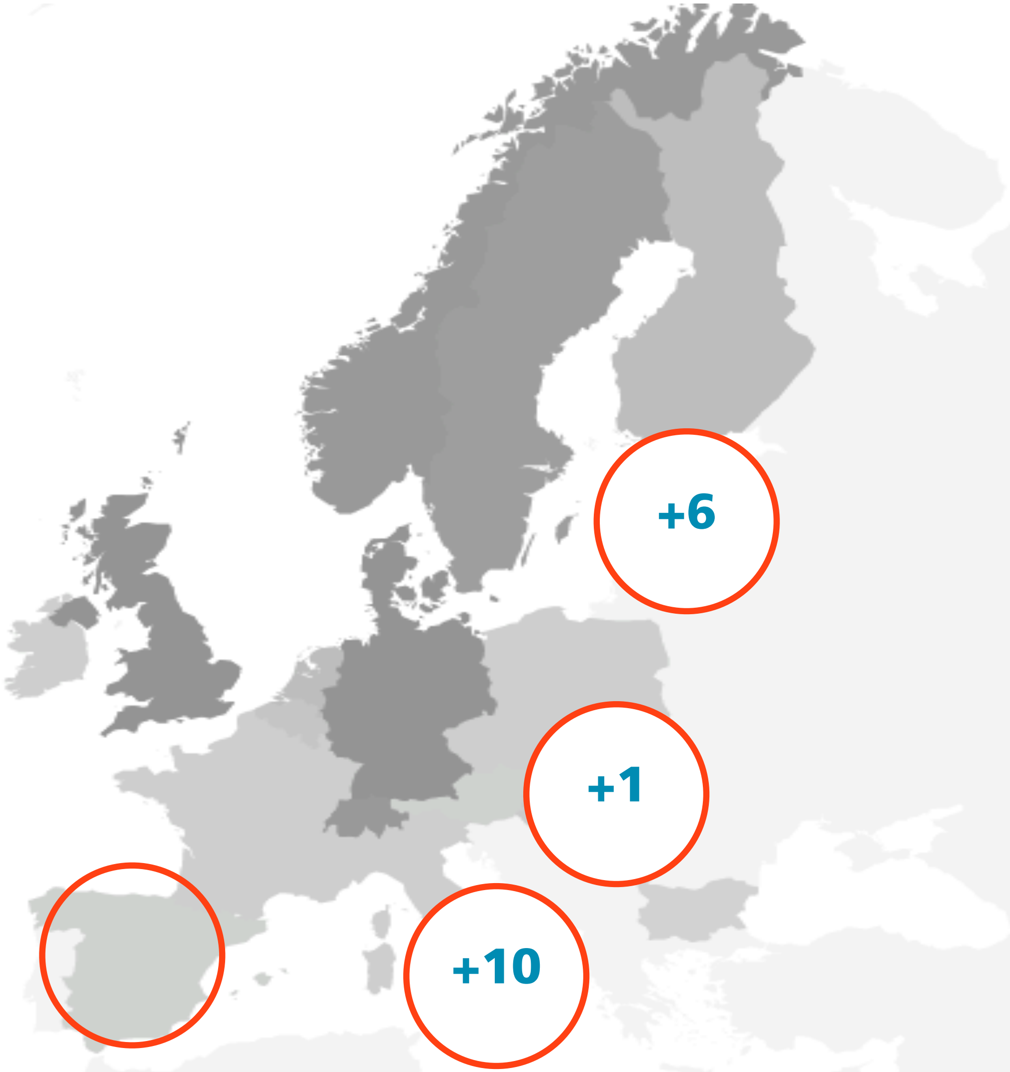
europe: technology drivers commercial refrigeration

3 major technology trends:

increased efficiency in warm climates = “CO_2 efficiency equator” disappears

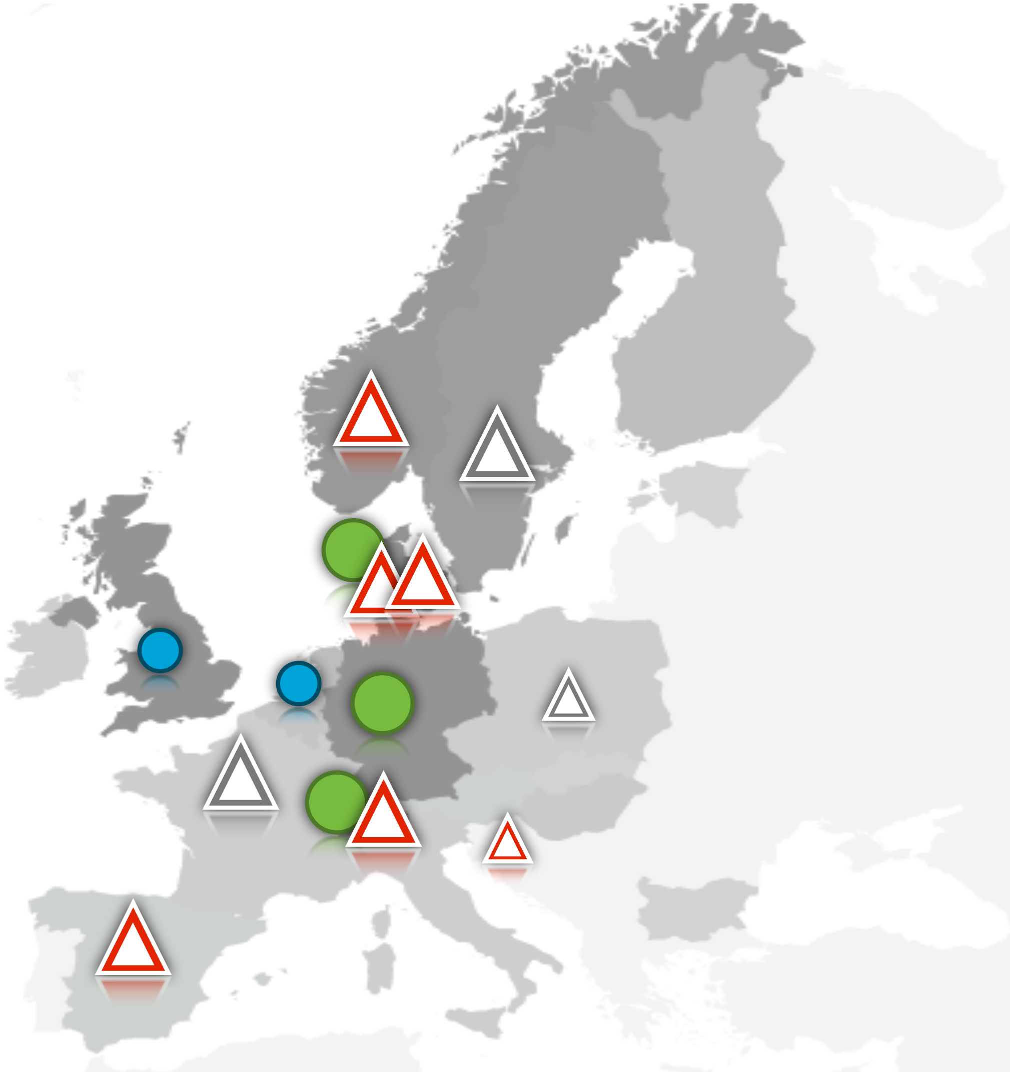
integrated solutions for heating & cooling

solutions for smaller store formats = move into convenience stores



europe: policy drivers commercial refrigeration

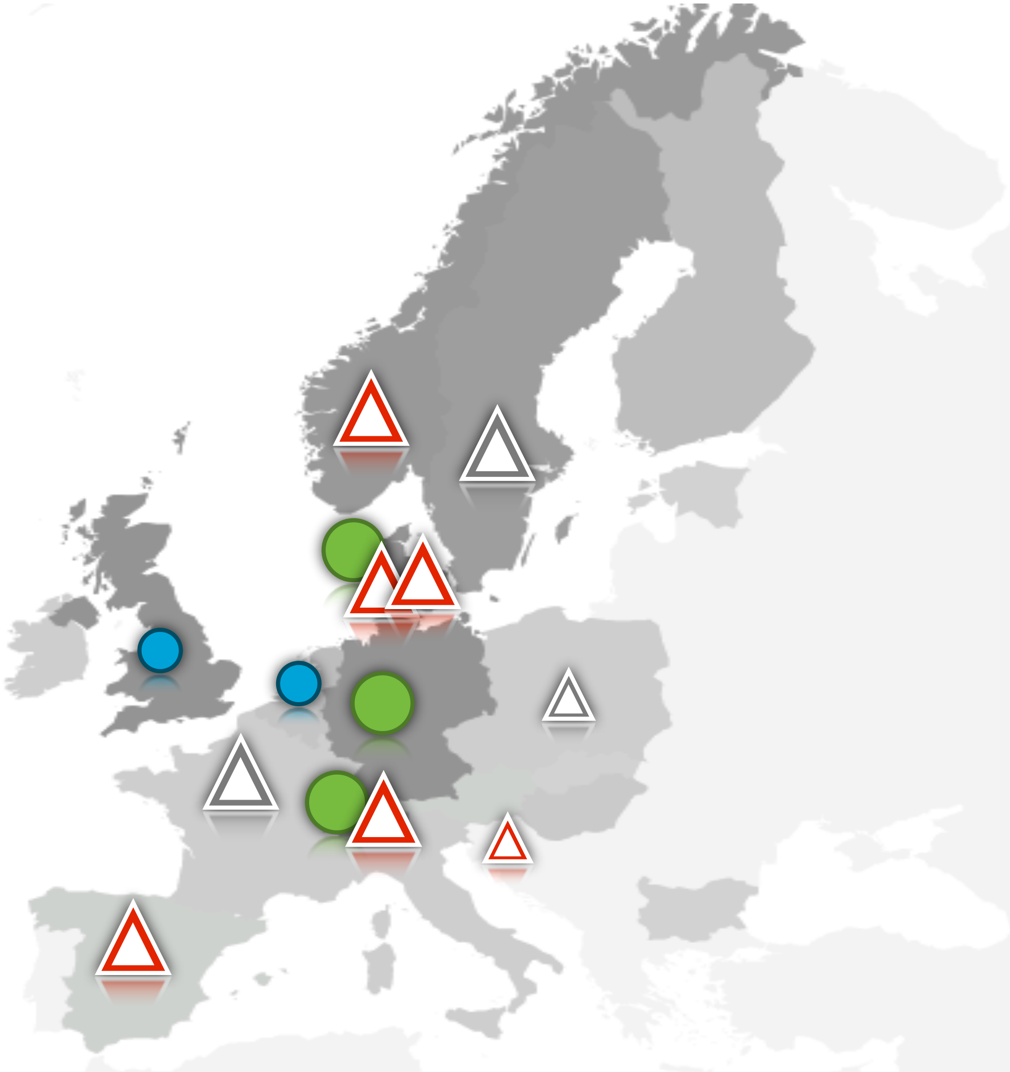
different european countries drive the market for natural refrigerants and/or against HFCs through taxes, bans, incentive schemes, direct support



europe: policy drivers commercial refrigeration

food retailers are aware of future HFC bans under the revised F-Gas Regulation

BUT: market leaders in natural refrigerants see no need to adapt their strategy anymore = secure investments



european food retail study

- interviews with 50 leading food retailers in Germany, France, Denmark, Norway, the UK + other mainly Western and Northern European countries
- supported by Carrier Commercial Refrigeration
- retailers that agreed to be mentioned (others opted to remain anonymous):

METRO GROUP MADE TO TRADE.

coop Norge

Dansk Supermarked

SPAR

MIGROS

TESCO

EDEKA

europe: impact of F-gas bans in centralised refrigeration systems as of 2022

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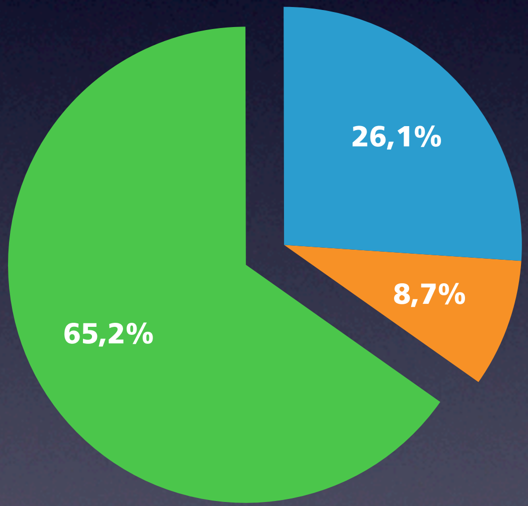
- more than 3 out of 5 food retailers anticipated upcoming bans on the use of HFCs to adapt their refrigeration strategy and use non-fluorinated (natural refrigerant) gases



- they are well-positioned to combine long term legislative compliance with investment security, independent of upcoming F-gas rules
- without exception, all food retailers have already heard about the upcoming HFC bans and have developed an appropriate strategy

- I need to adapt my refrigeration strategy already today/or as soon as the f-gas agreement becomes official.
- I need to adapt my refrigeration strategy, but closer to the 2022 date.
- The f-gas agreement does not change my strategy as I am already implementing f-gas alternatives in new systems.
- I have not heard about the f-gas rules and/or I have no clear strategy yet regarding the use of f-gases in my store.

europe: impact of F-gas bans in centralised refrigeration systems as of 2022

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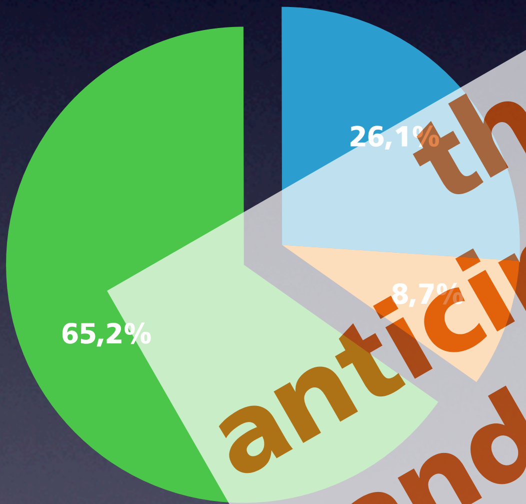

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the market has anticipated policy change and has reacted in time

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willingness to reduce investment cycles to promote the uptake of more environmentally-friendly refrigeration

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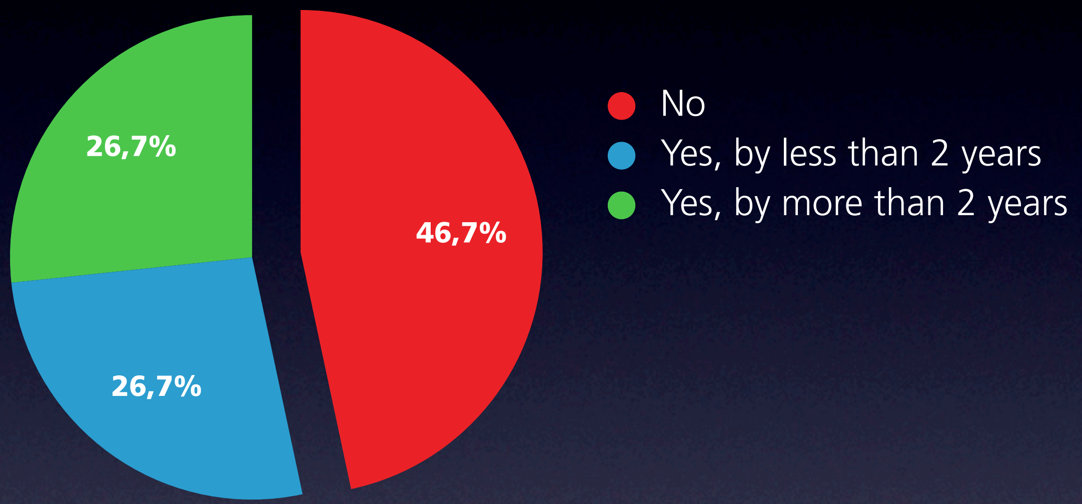
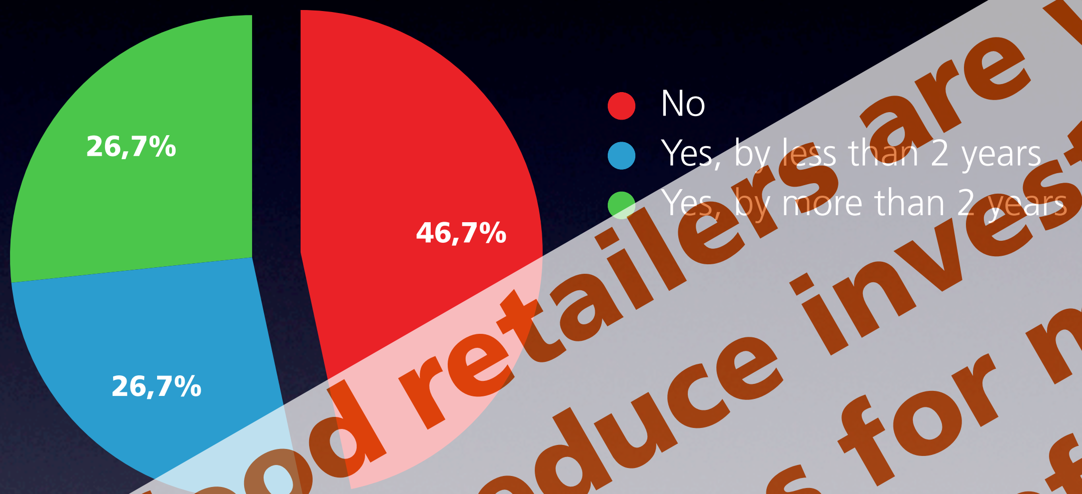


- more than half would be willing to reduce their normal investment cycles to promote the uptake of more environmentally-friendly refrigeration technology
- half of this group would even be willing to reduce investment cycles by more than 2 years
- the average investment cycle for refrigeration systems in surveyed food retailers is mostly between 9-15 years

willingness to reduce investment cycles to promote the uptake of more environmentally-friendly refrigeration



food retailers are willing to reduce investment cycles for more sustainable refrigeration

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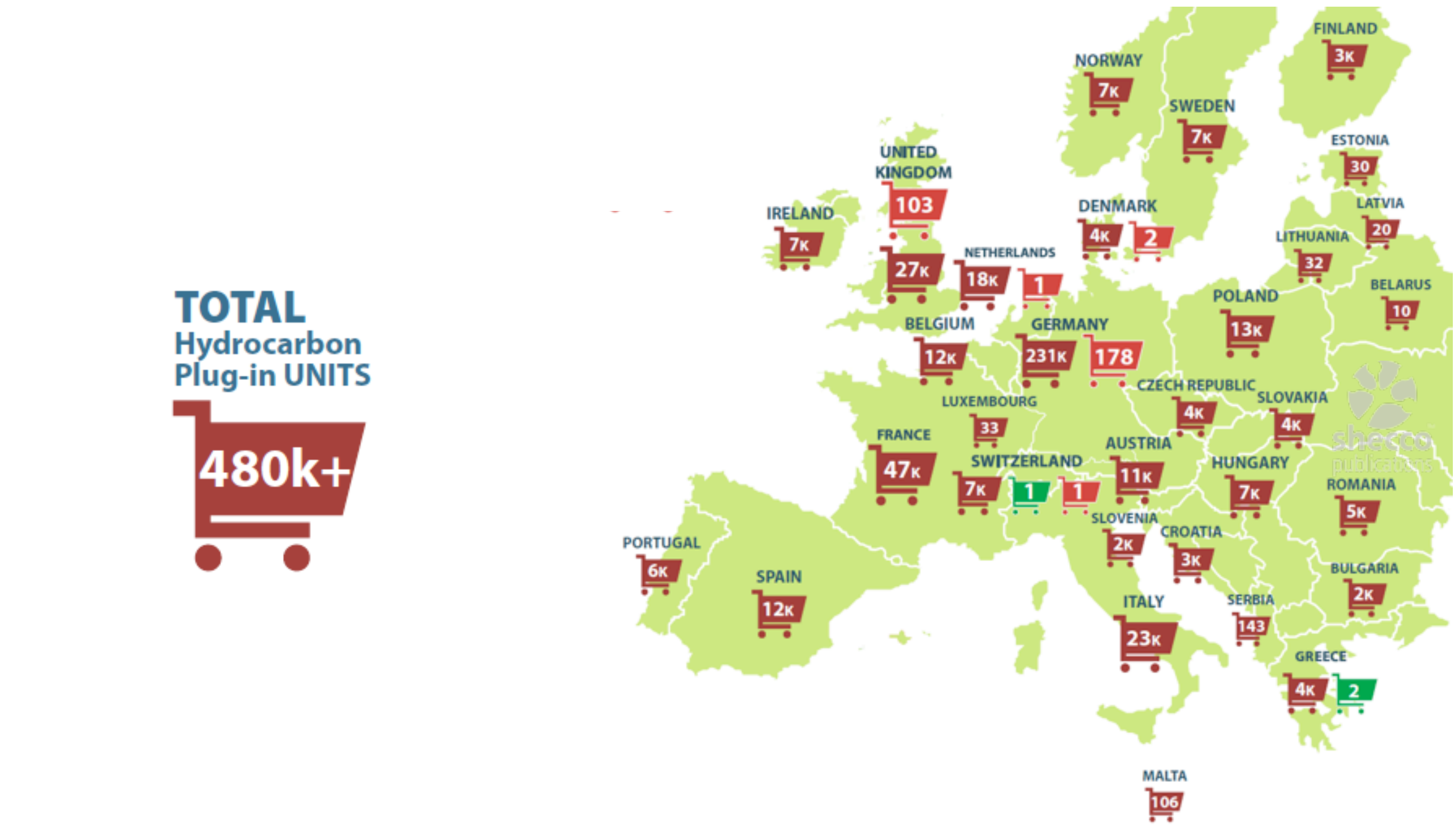
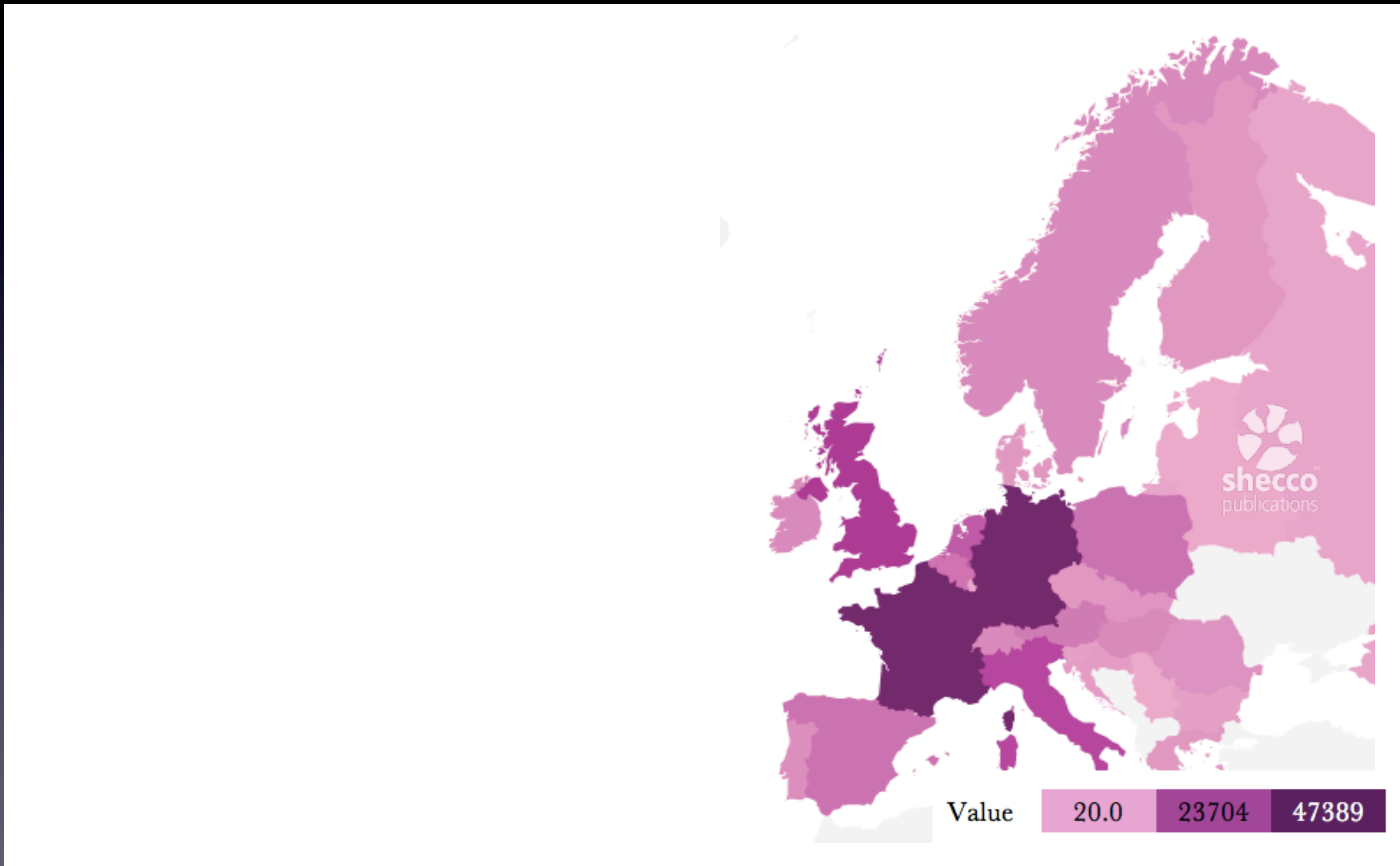
europe: HC plug-in units in european stores 2013



source: status Nov 2013, data from 11 system suppliers / contractors, 11 food retailers

europe: technology & market drivers HC in commercial refrigeration



europe: technology & market drivers HC in commercial refrigeration

major trends:

market driven by proactive food retailers to expand the use of HCs beyond smaller units

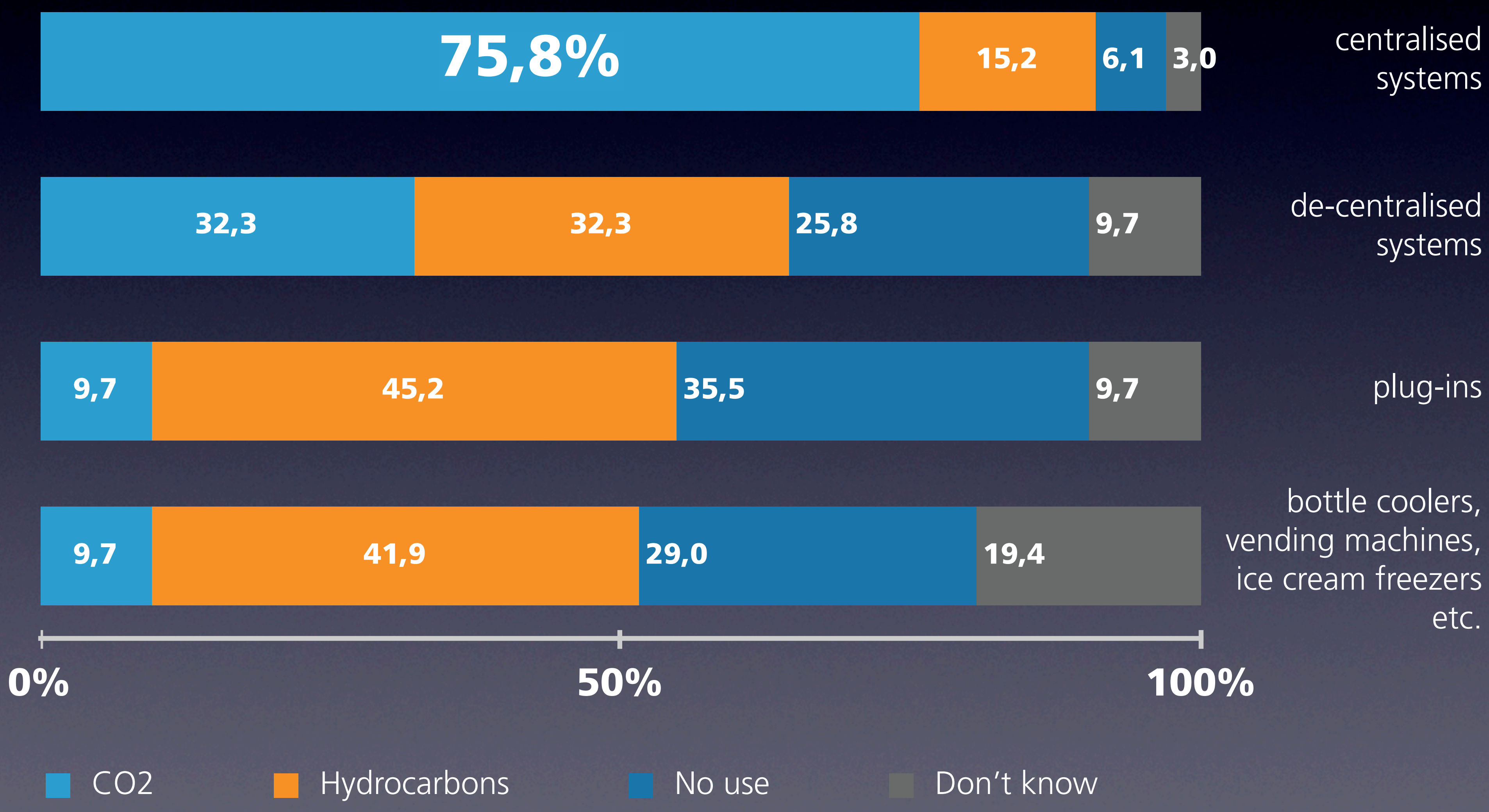
results from EU food retail study:

most retailers are cautious about the use of HCs in systems with a charge of 150+ grams

most retailers think standards are appropriate and would welcome a broader choice of HC solutions for larger systems

the use of HCs in larger applications has untapped potential

use of natural refrigerants among western & nothern european food retailers



use of natural refrigerants among western & nothern european food retailers

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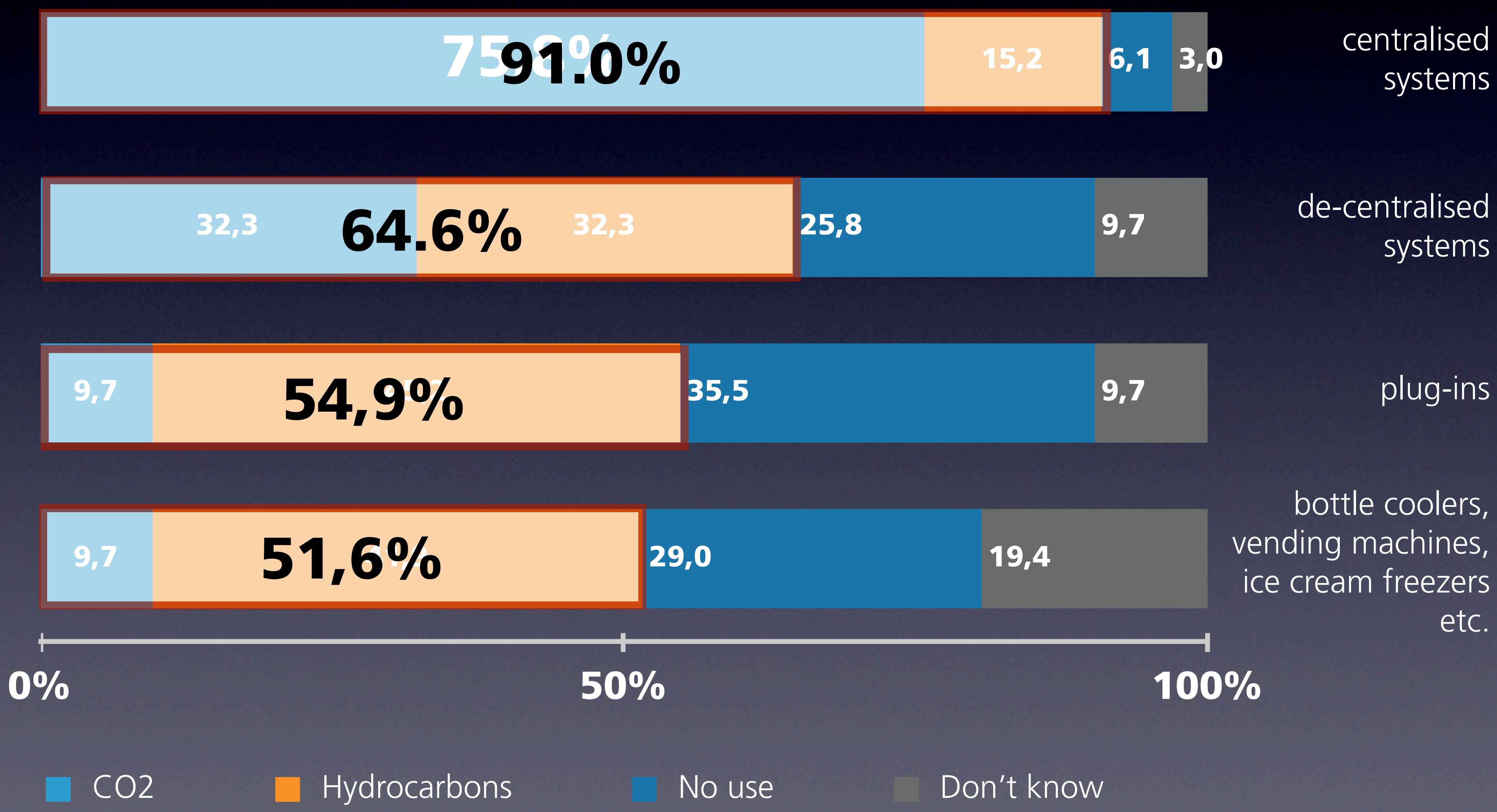


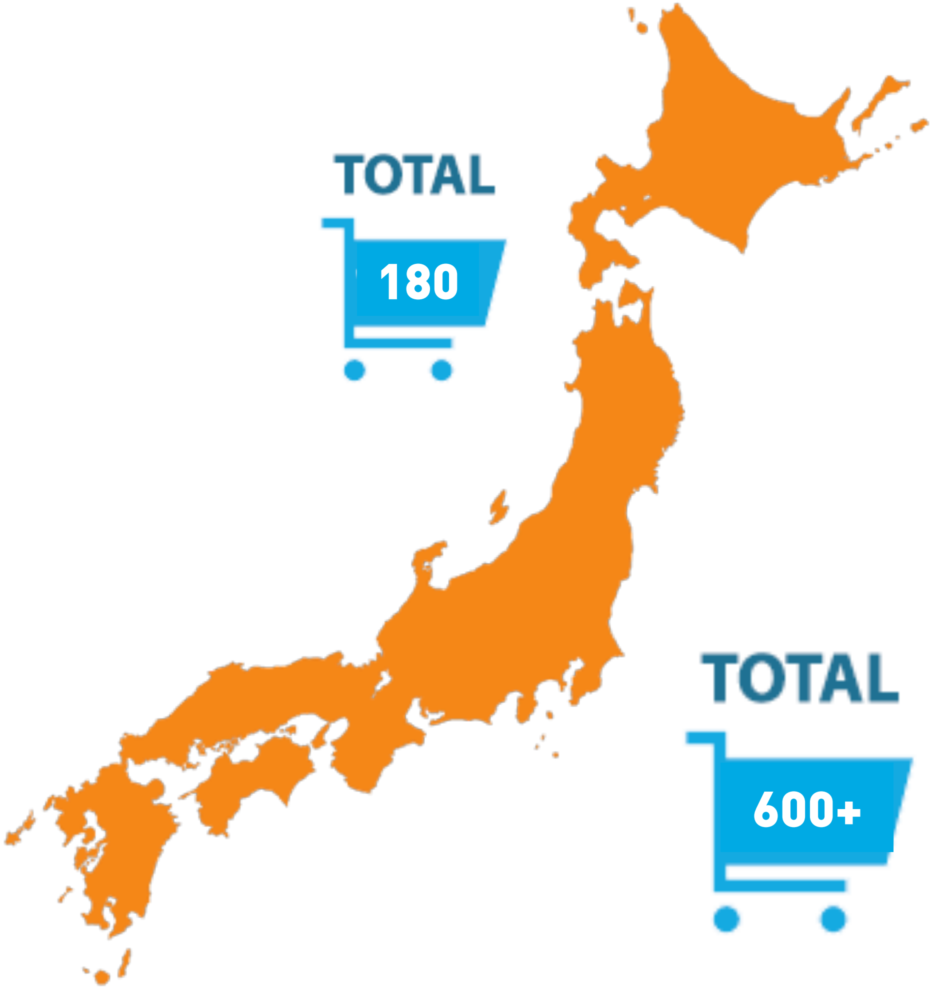
japan: CO_2 TC convenience stores & eco cute

japan: CO_2 TC stores 2014 and 2015

approx. 180 stores with transcritical CO_2 systems today

by march 2015, more than 600 stores can be expected

pushing japan into the top 4 worldwide in the uptake of transcritical systems CO_2 in stores



source: shecco Japan, status June 2014

japan: market, technology & policy drivers commercial refrigeration

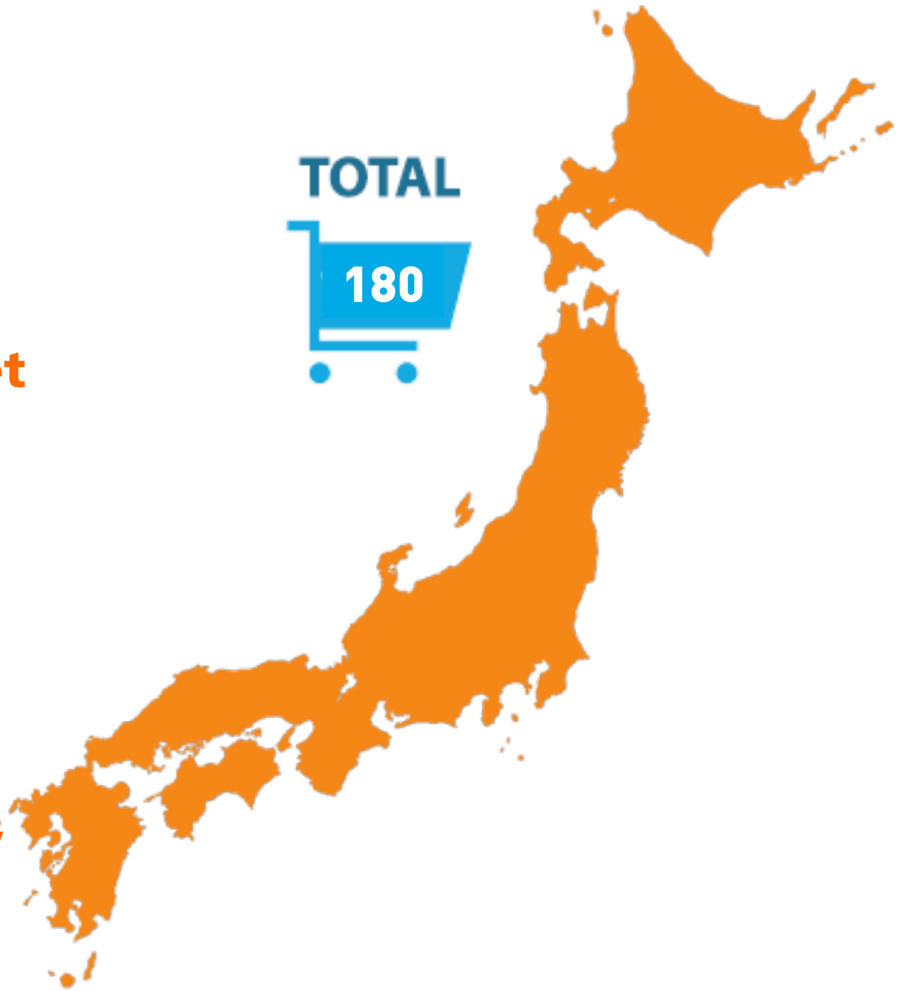
major trends:

clear focus on transcritical systems

strong focus on convenience stores (with a few supermarket chains also using CO_2 already)

the market will grow quickly thanks to:

NR subsidies, more competition, rising awareness, F-gas law discussion



source: shecco Japan, status June 2014

japan: CO_2 TC refrigerant stores: end-users

expected:

the number of food retailers using CO_2 systems will increase from 14+ to 25+ brands by march 2015

source: shecco Japan, status June 2014

japan: CO_2 TC refrigerant stores: suppliers

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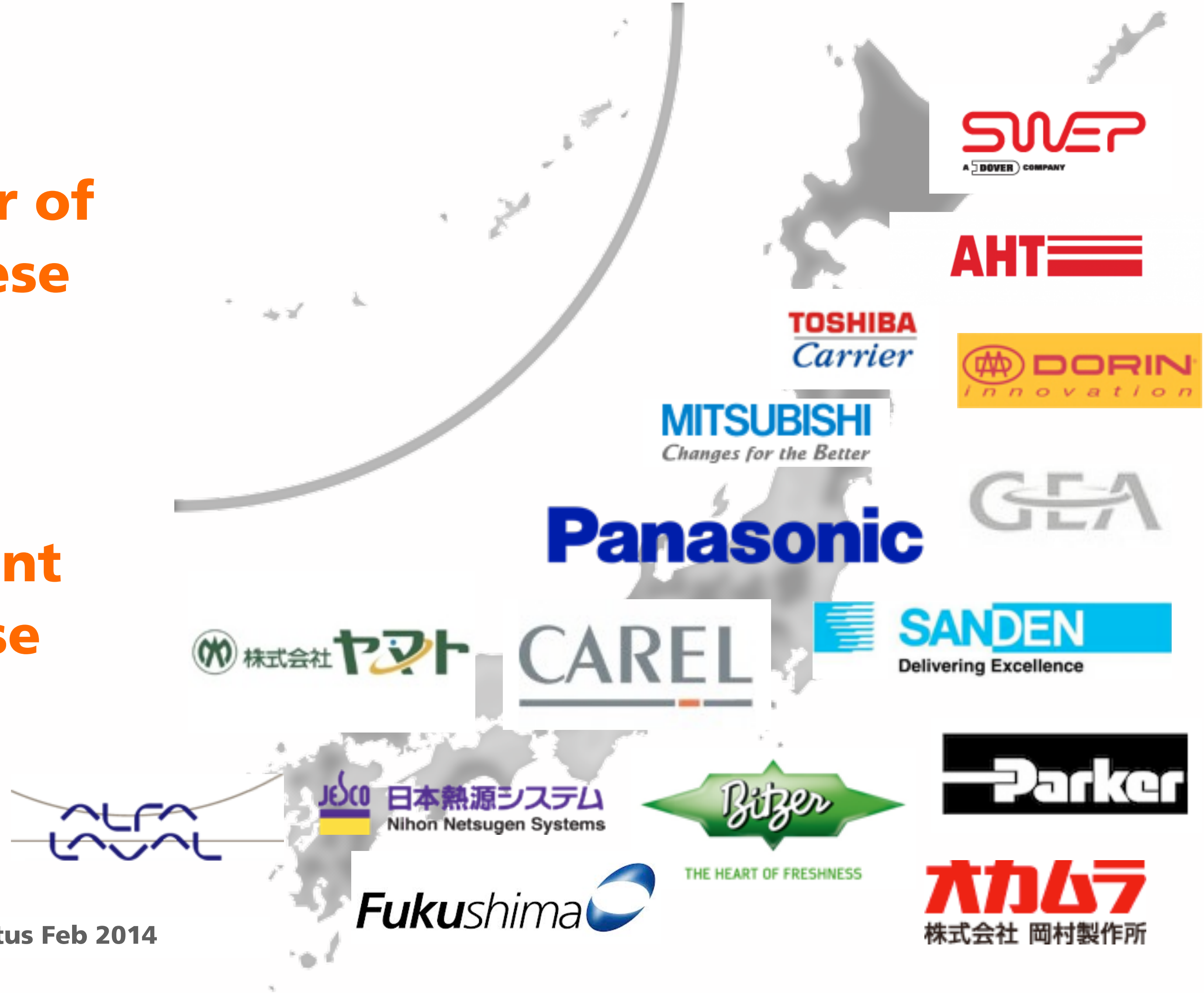
trend:

the number of non-Japanese companies involved in system development will increase



source: shecco Japan, status Feb 2014

japan: eco cute - a success story

10 years of Eco Cute

residential 4 million

98% market share

commercial 10k

production capacity
500k/year

japan: eco cute - suppliers

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GUIDEs: new editions in 2014

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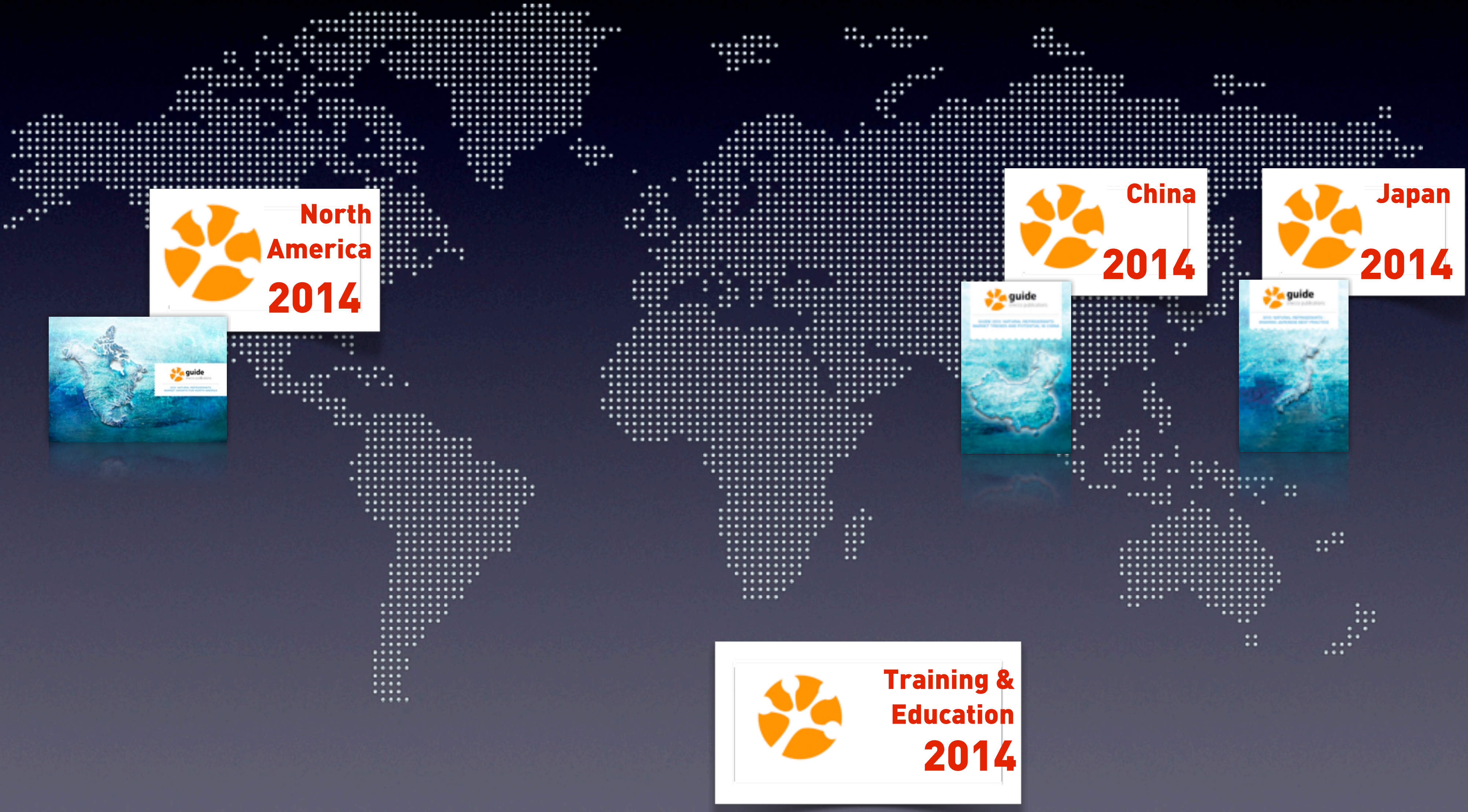

GUIDEs: published

GUIDE Europe 2014

GUIDE North America 2013

GUIDE UNIDO 2013

http://publications.shecco.com

shecco - useful links

Industry Platforms:

http://www.hydrocarbons21.com

http://www.R744.com

http://www.ammonia21.com

http://www.R718.com

GUIDES (Europe 2012 + Europe 2014; North America 2013; CO_2/ NH_3 industrial refrigeration 2013; GUIDE UNIDO 2013) + ATMOsphere Summary Reports

http://publications.shecco.com

ATMOsphere conferences, side-events & network meetings:

http://www.ATMO.org

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