

market trend update on industrial & light-commercial refrigeration



technology & innovation

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shecco Japan

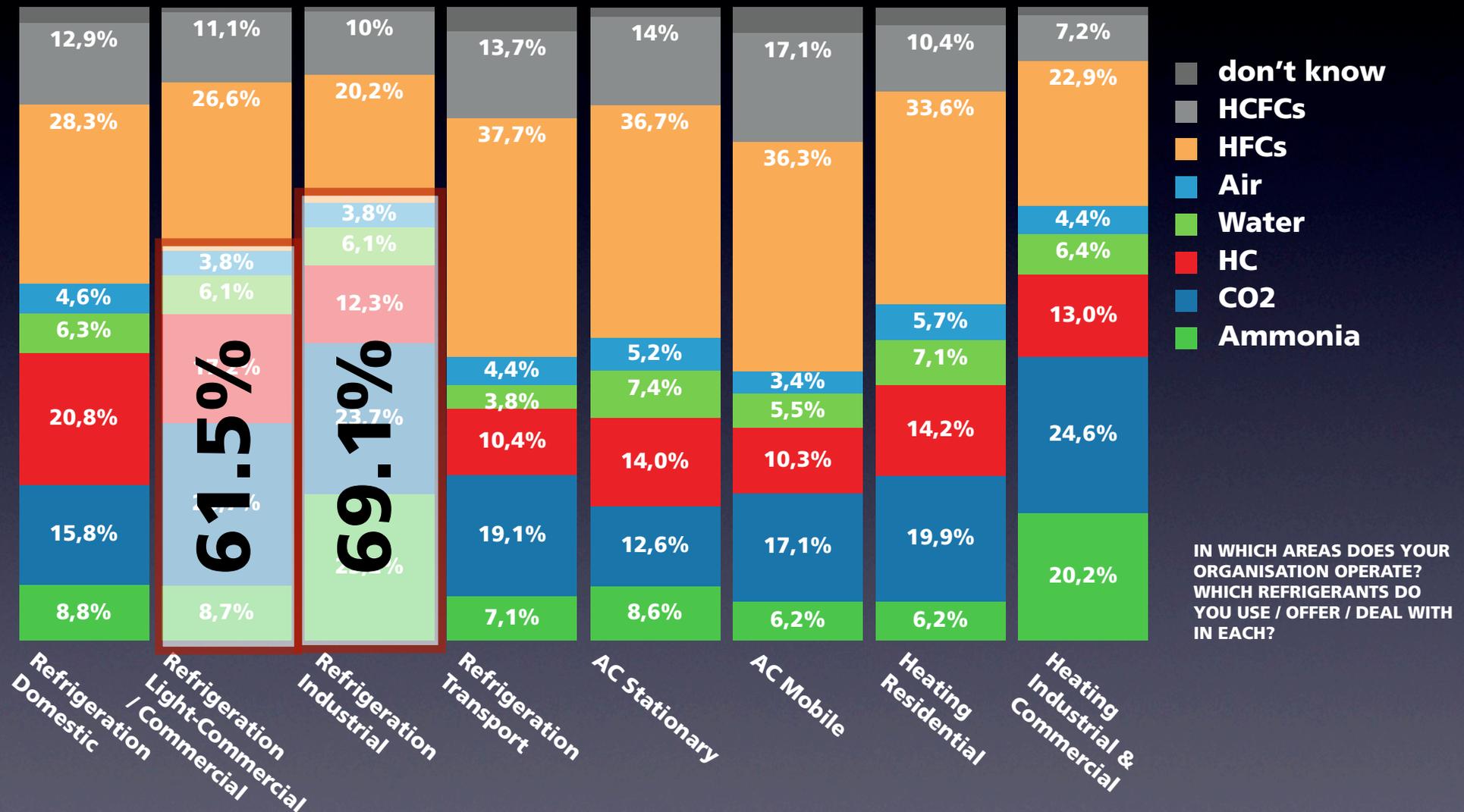


GUIDE Europe 2014



GUIDE North America 2013

"NR group" in Europe: use of natural refrigerants from total, per application



source: shecco survey among 248 European HVAC&R experts offering or using natural refrigerant-based solutions, 2013

world: HFC-free light-commercial refrigeration



GLOBAL
2013
Bottle Cooler
1,650.000+



GLOBAL
2013
Ice Cream Freezer
1,050.000+



EUROPE
2013
Bottle Cooler
1,250.000+



EUROPE
2013
Ice Cream Freezer
800.000+



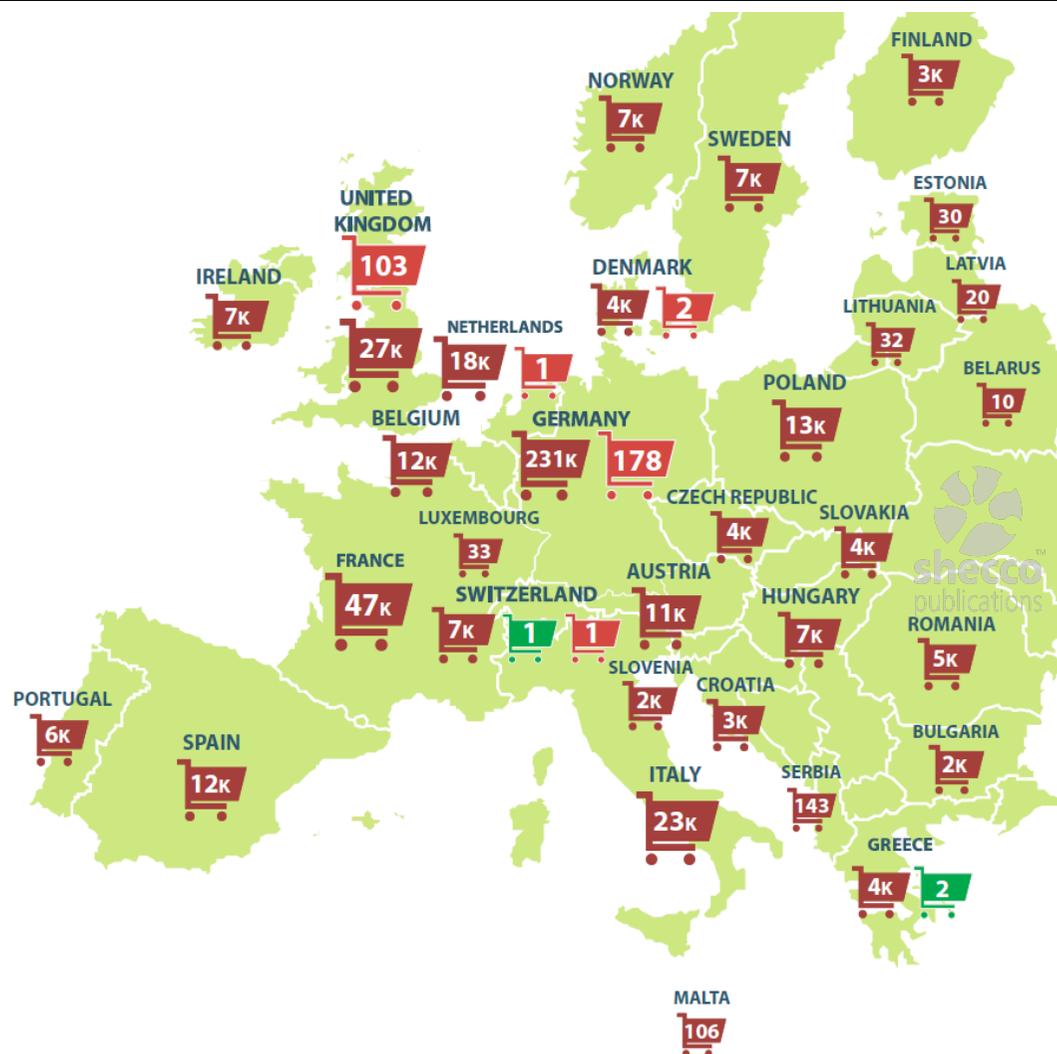
min. 2.7 million HFC-free units worldwide

europa: HC use in European supermarkets end-2013



HC plug-in units:

TOTAL
Hydrocarbon
Plug-in UNITS



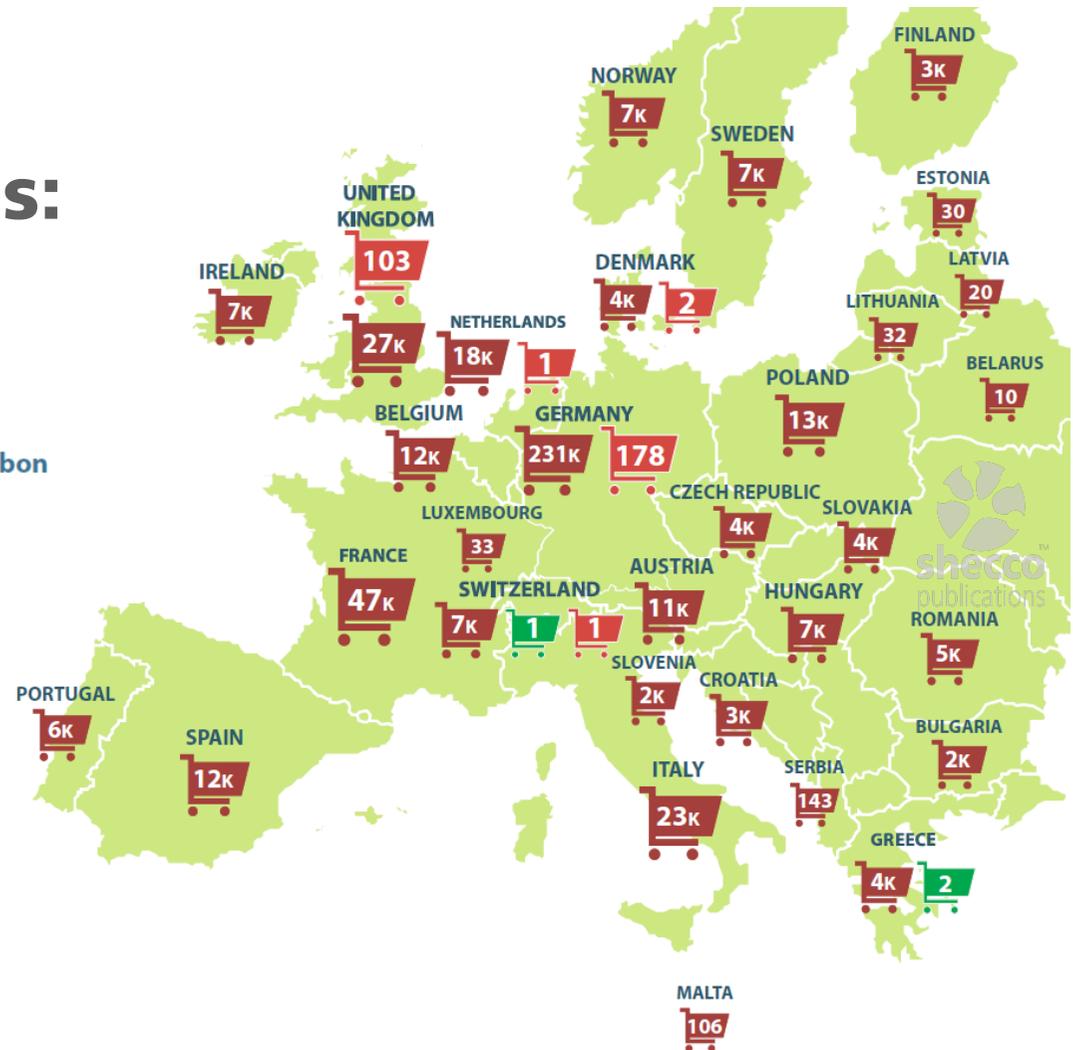
source: status Nov 2013, data from 11 system suppliers / contractors, 11 food retailers

europa: HC use in European supermarkets end-2013



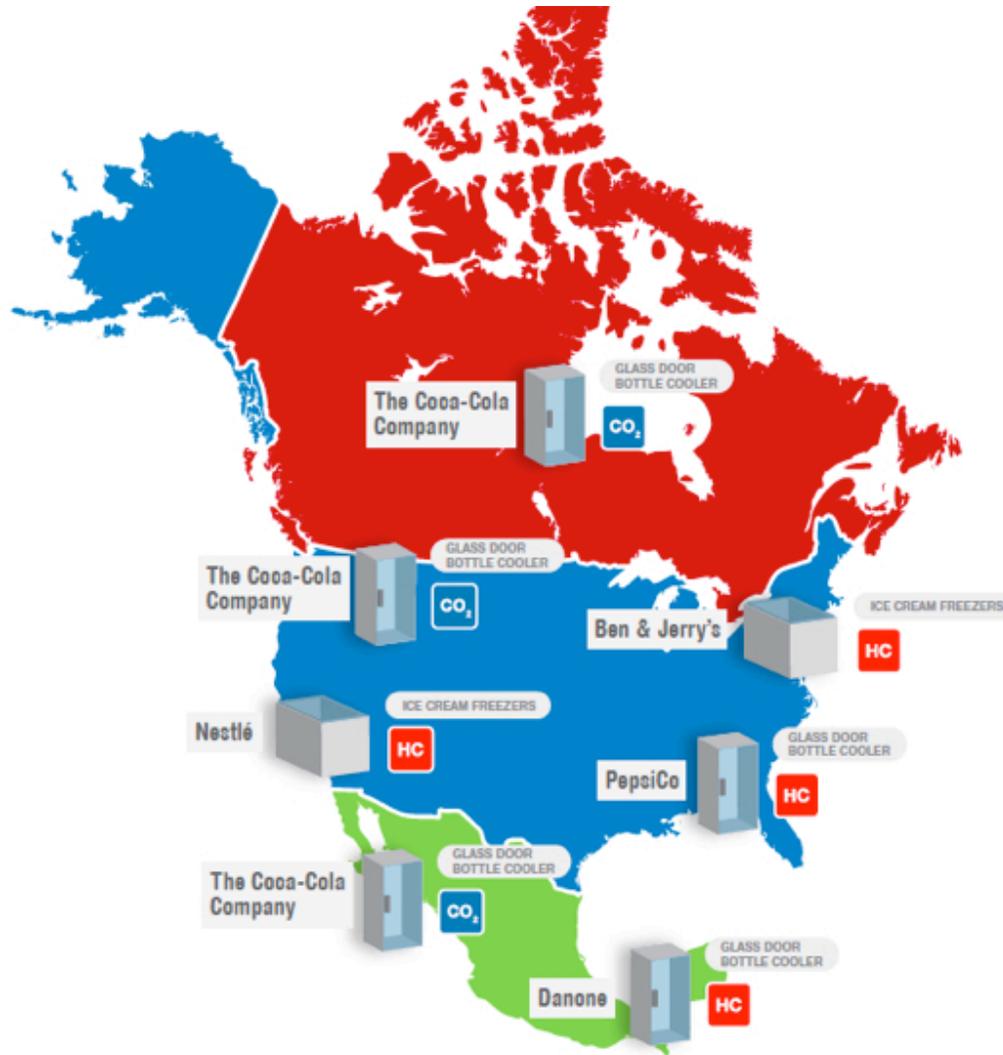
HC indirect systems:

TOTAL
Indirect Hydrocarbon
SUPERMARKETS



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

north america: HFC free light commercial systems, early 2013

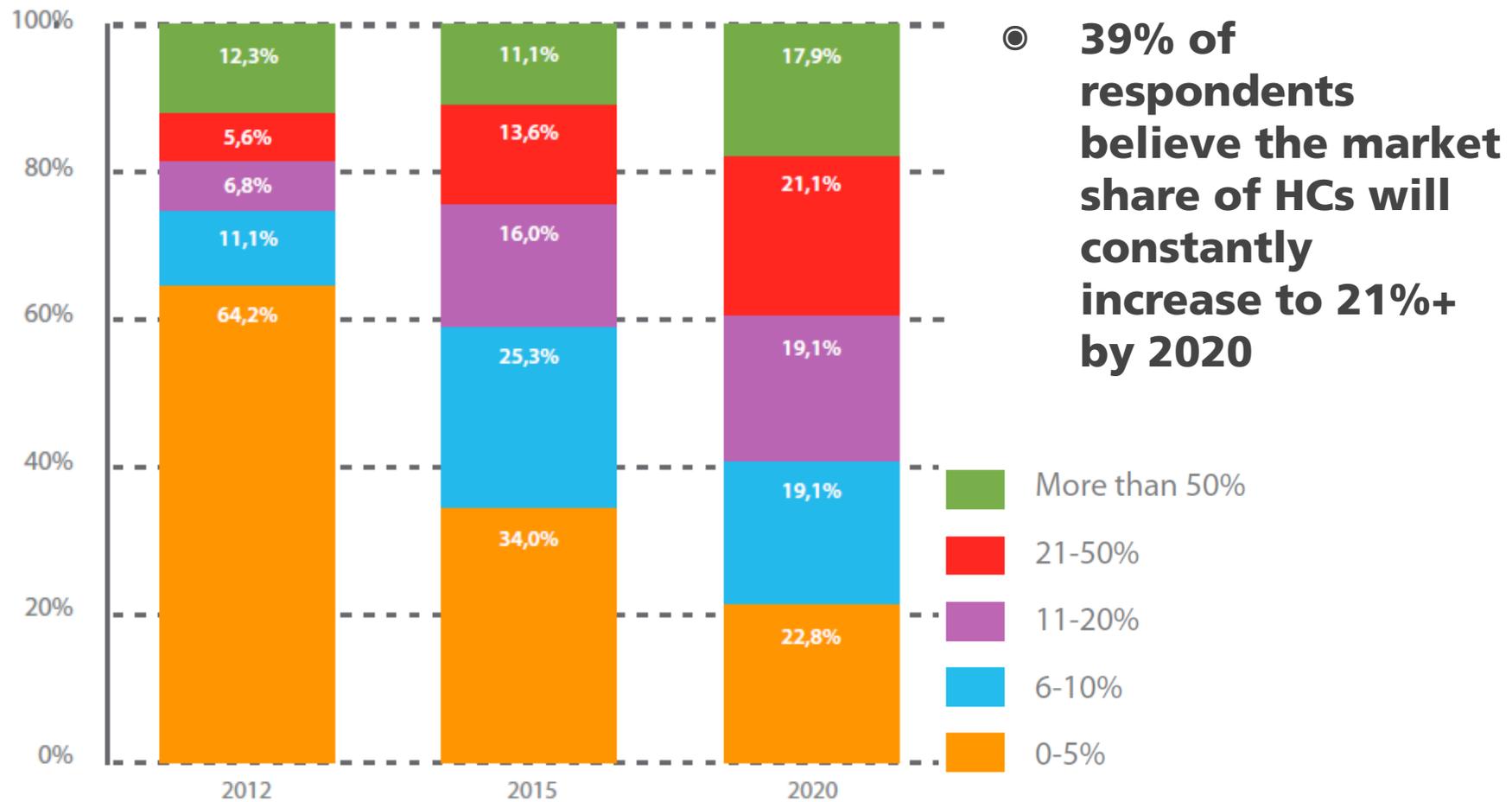


- ▶ situation one year ago:
- ▶ in North America: around 4,000 units (due to HC restriction in the USA before)
- ▶ PepsiCo: 35 HC bottle coolers + 58 CO₂ vending machines in North America
- ▶ Coca-Cola: 3,232 CO₂ bottle coolers in North America
- ▶ development driven by large consumer goods brands:



source: shecco, GUIDE 2013: Natural Refrigerants - Market Growth for North America, Feb 2013

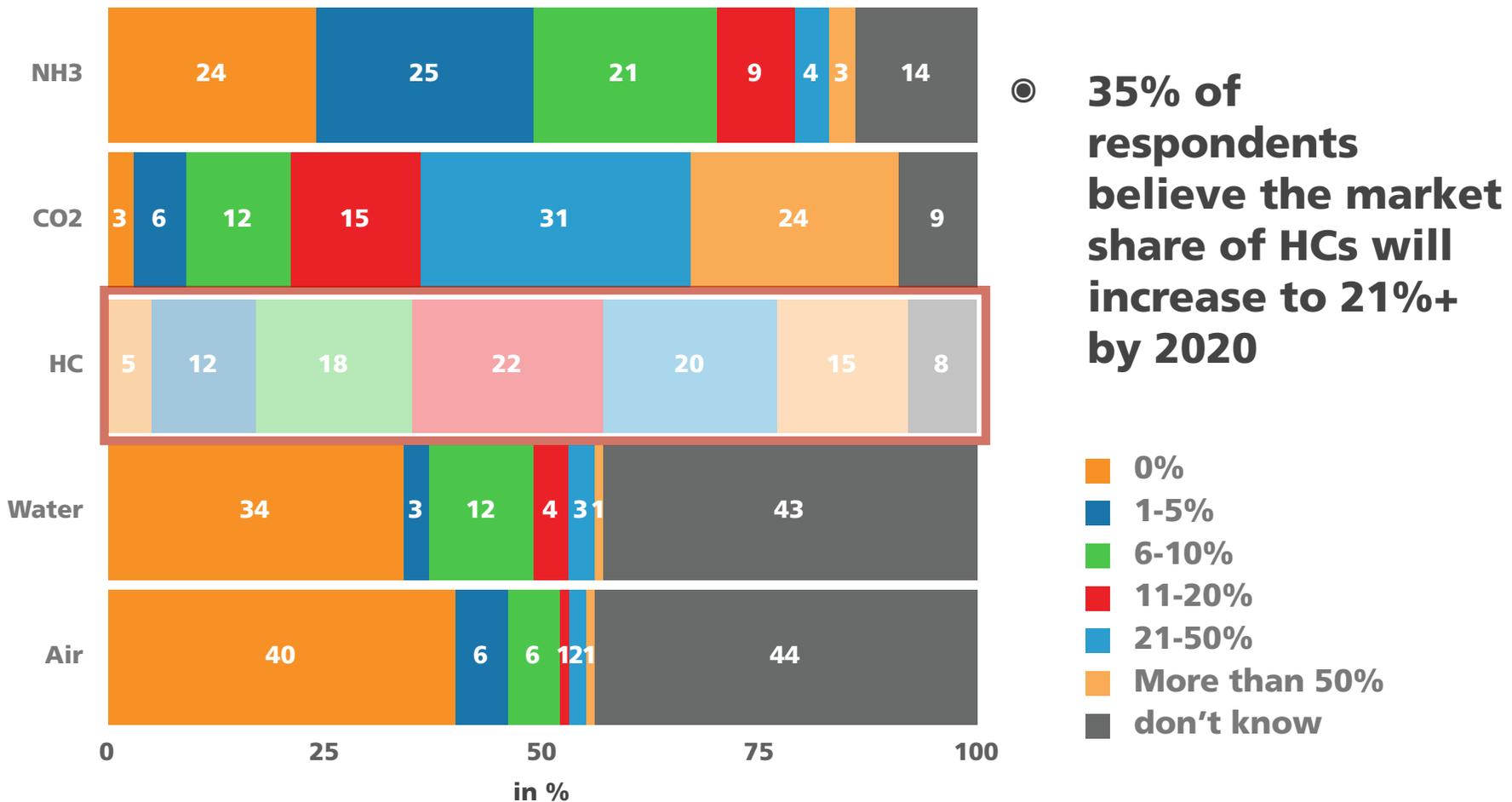
north america: market outlook HC light-commercial refrigeration



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

source: shecco, GUIDE 2013: Natural Refrigerants - Market Growth for North America, Feb 2013

europa: market outlook HC in light-commercial refrigeration



35% of respondents believe the market share of HCs will increase to 21%+ by 2020

source: shecco, GUIDE 2013: Natural Refrigerants - Market Growth for North America, Feb 2013

key messages: industrial refrigeration



- ◉ **Europe:** 75% of all European industrial refrigeration is installed in the food industry
- ◉ largely saturated market with lower growth rates for the coming years, but environmental concerns and legislative pressure will drive change towards more sustainable systems
- ◉ frozen and convenience food markets are expected to grow
- ◉ **USA:** world's largest cold storage market (24% of global capacity) continues to grow at slightly higher rates than Europe
- ◉ USA: food sector one of the largest ones - consumption of frozen food has increased by 50% over the last 10 years
- ◉ upcoming HCFC phase-out has provided further stimulus to the market uptake of more sustainable refrigeration choices

key messages: natural refrigerants



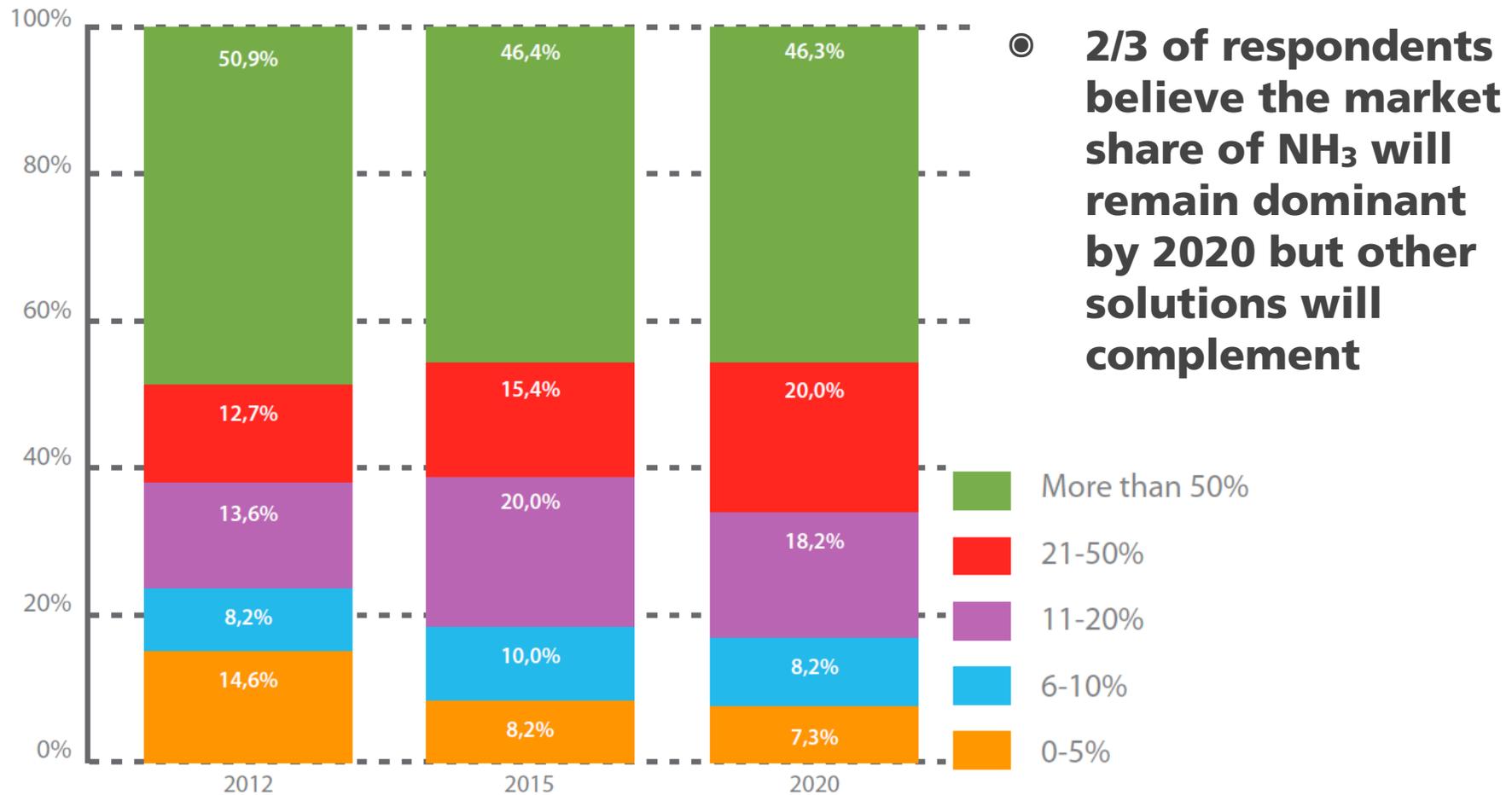
- ◎ **Europe:** NH₃ systems will remain mainstream solution (90% of large systems and 25% of smaller industrial systems are NH₃-only type) = 40% overall market share
- ◎ 55% of new systems will be NH₃ (European Commission)
- ◎ CO₂ is expected to grow in importance, especially in combination with NH₃
- ◎ **USA:** NH₃ will remain dominant solution (90% market share today) but strong regulatory pressure regarding safety will drive uptake of NH₃-CO₂/brine/glycol/water solutions to reduce refrigerant charge
- ◎ CO₂ gains in popularity due to movement in commercial refrigeration

key messages: legislative pressure



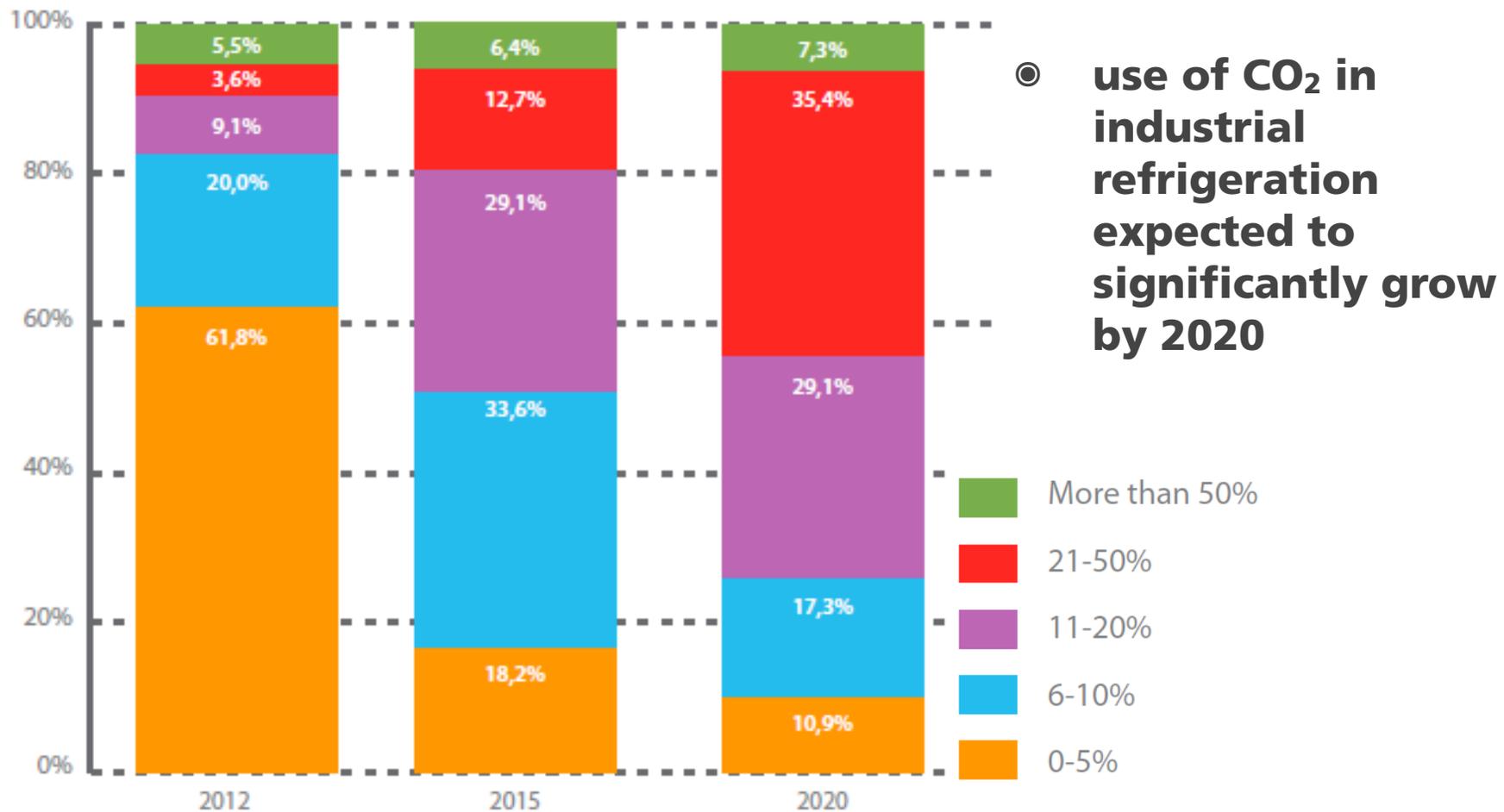
- **Europe:** 2015 HCFC phase out deadline will further drive move towards low-GWP and mostly NR solutions
- F-Gas Regulation review adds additional pressure + national incentive schemes encourage NR use
- legislative pressure is stronger in Europe than in the USA
- **USA:** HCFC phase out schedule with gradual phase down until 2030 + proposed HCFC leak repair regulations to also include HFCs + existing OSHA Process Safety Management standard with regular inspections + stricter State regulations (California) = significant financial burden for end-users using F-gases

north america: market outlook NH₃ industrial refrigeration



source: shecco, GUIDE 2013: Natural Refrigerants - Market Growth for North America, Feb 2013

north america: market outlook CO₂ industrial refrigeration

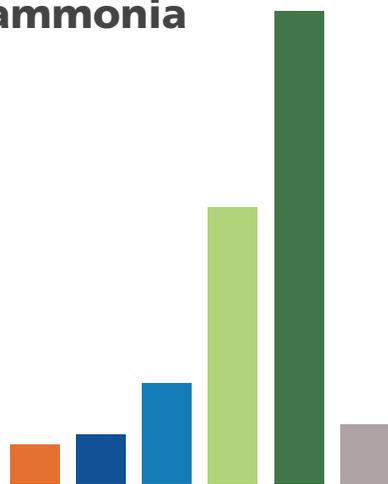


source: shecco, GUIDE 2013: Natural Refrigerants - Market Growth for North America, Feb 2013

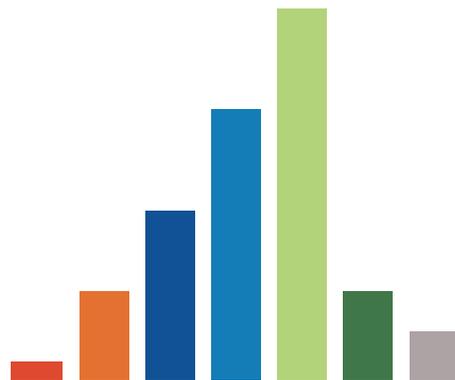
Europe: natural refrigerants in industrial refrigeration in 2020 (total market share)



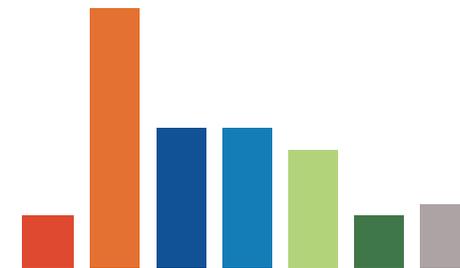
ammonia



carbon dioxide



hydrocarbons

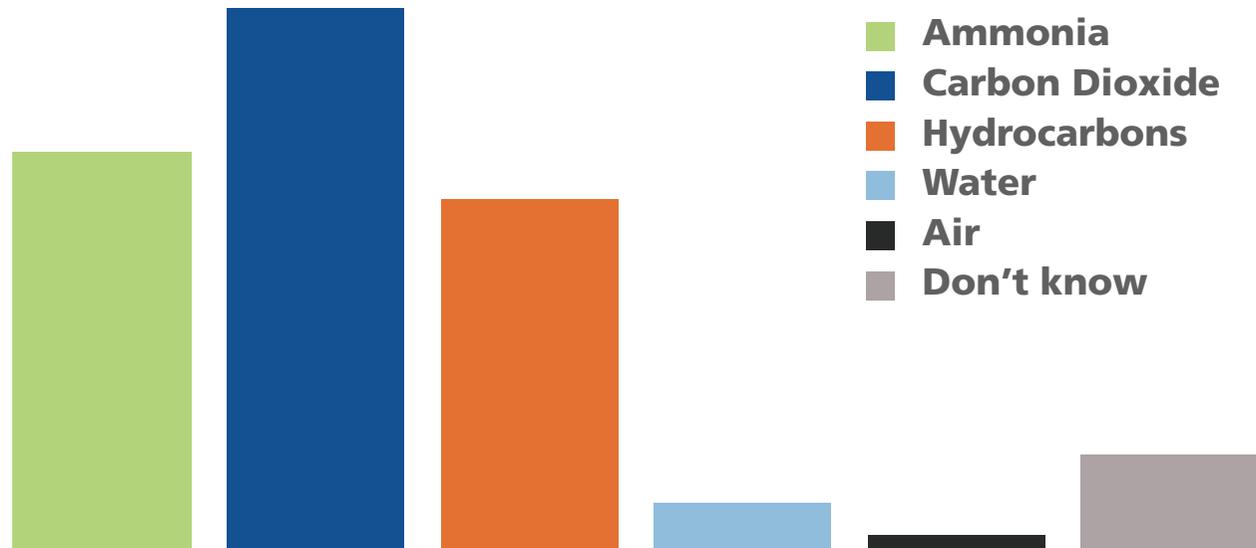


0% 1-5% 6-10% 11-20% 21-50% More than 50% Don't know

ammonia will defend its market-leading position in the next 7 years, followed by carbon dioxide especially in NH₃/CO₂ systems - the market share of hydrocarbons will remain rather small

source: shecco survey among 184 HVAC&R experts for European industrial refrigeration

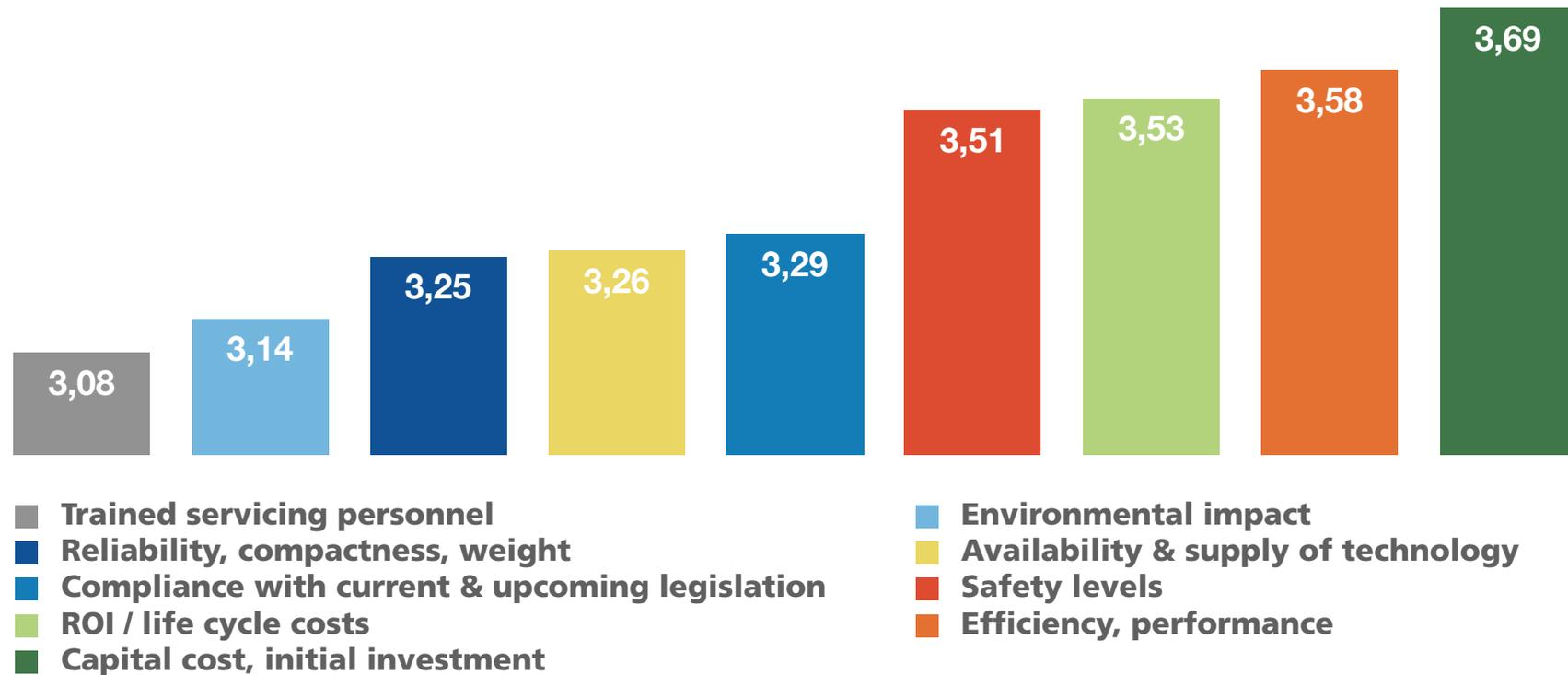
europa: natural refrigerants in industrial refrigeration 2020 (products & services)



carbon dioxide will significantly increase in popularity for planned products & services while ammonia will continue to play a major role. hydrocarbons is expected to be part of system suppliers' strategy.

source: shecco survey among 50 system suppliers for the European industrial refrigeration industry

Europe: purchasing criteria for commercial & industrial end-users



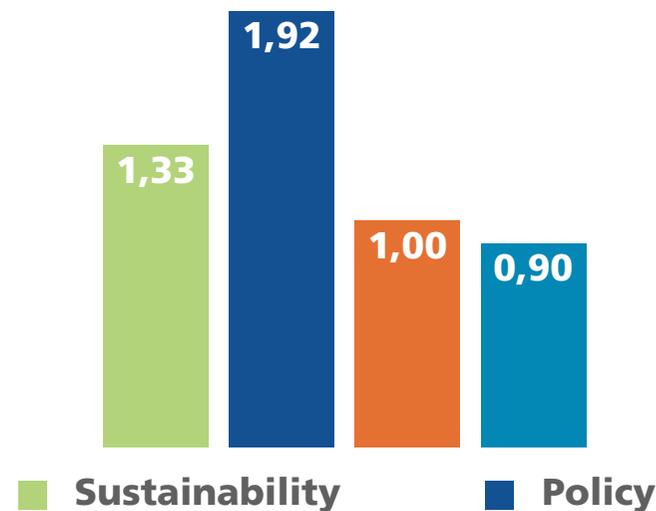
capital costs, efficiency, return on investment & safety most important purchasing criteria

source: shecco survey among 122 HVAC&R experts for European industrial refrigeration, scale: 1-4

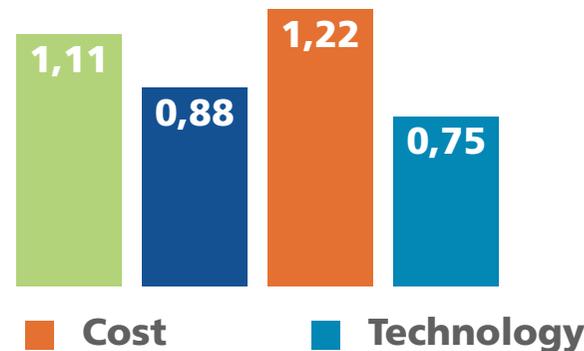
change in drivers to impact the industrial refrigeration industry



Europe



North America



“How do you evaluate the change in impact of the following drivers on the uptake of new industrial refrigeration equipment until 2020, from -3 (large decrease) to +3 (high increase)”

upcoming policy regulations are expected to have the highest increase in impact on the uptake of new industrial refrigeration technology in Europe. In the USA, the impact of cost drivers is expected to increase.

source: shecco survey among 19 industrial refrigeration suppliers & contractors in Europe and the USA

shecco - useful links



industry platforms

www.R744.com

www.ammonia21.com

www.hydrocarbons21.com

www.R718.com

publications (GUIDEs, ATMOsphere reports etc.)

<http://publications.shecco.com>

events: ATMOsphere

www.ATMO.org



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