

# **shecco publications**

upcoming GUIDEs and GUIDE+



**Brussels, 15 October 2013 - Side Event**

**Nina Masson & Alexandra Maratou**

**shecco**

# shecco publications



- shecco has been active in public affairs, market research and events management for up to 10 years
- besides tailor-made services shecco offers dedicated publications:
- basic: the regular **ATMOsphere reports** inform about latest discussions from our main conferences and networking events
- advanced: the **“GUIDE”** format as free reports to inform industry and policy decision-makers about market and technology trends
- expert: a new **“GUIDE+”** format will be launched very soon, as a more detailed format focusing on one topic of special interest to the natural refrigerants industry
- other publication formats are planned, including newsletters for specific world regions and topics





# existing shecco publications



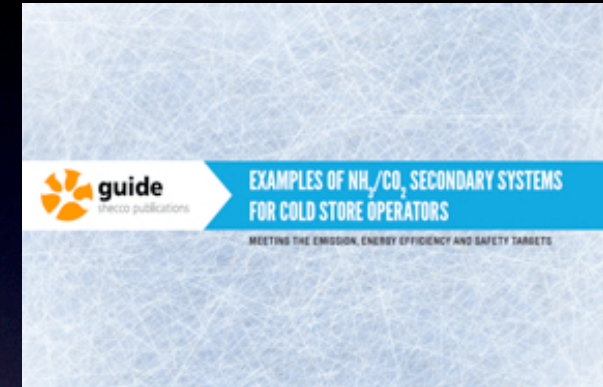
**GUIDE Europe**

**Feb 2012**



**GUIDE North America**

**March 2013**



**GUIDE: Examples of  
NH<sub>3</sub>/CO<sub>2</sub> Secondary  
Systems for Cold  
Store Operators**

**March 2013**

**<http://guide.shecco.com>**

# GUIDE UNIDO

natural solutions for developing countries



**Nina Masson, Head of Market Research**

**shecco**



# GUIDE UNIDO - overview



- **done in collaboration with United Nations Industrial Development Organization UNIDO**
- **official launch: Montreal Protocol Meeting in Bangkok, 24 october**
- **objectives:**
  - current & future market share for natural refrigerants & foams in developing countries - global survey
  - barriers and how to address them, best practice
  - summary of UNIDO ATMOSphere Technology Summit held in June 2013

# GUIDE UNIDO - overview



- supported by UNIDO and selected industry partners:

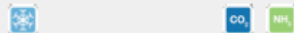




# GUIDE UNIDO - content



## DANFOSS: VALVES FOR LANDMARK CO<sub>2</sub> SYSTEM IN ZHANGZI COLD STORAGE



Danfoss's award winning valve station for industrial refrigeration, called ICF Flexline™, recently achieved a major milestone in China. The whole Flexline™ family of valves were extensively applied in a landmark CO<sub>2</sub> refrigeration project at the scallop & sea cucumber processing centre of the Dalian Zhangzi Island Fishery Group.

After comprehensively considering safety, the environment, and efficiency, the Zhangzi Island group decided to use CO<sub>2</sub> as the refrigerant for this project. Danfoss was subsequently selected as the valve supplier due to its industry leading CO<sub>2</sub> technology, vast experience with CO<sub>2</sub> and high-quality products.

In the newly developed seafood processing centre, the freezing plant utilizes a NH<sub>3</sub>/CO<sub>2</sub> cascade system for refrigeration, which lower the NH<sub>3</sub> charge amount by over 90% and limits the NH<sub>3</sub> refrigerant inside of the refrigeration control room, fully satisfying the safety requirements of Zhangzi Island group.

The cold storage plant utilizes a CO<sub>2</sub> brine system and uses the abundant sea water as the cooling medium for the high level ammonia refrigeration. The setting up of the condenser heat recovery appliance prior to the cooling process, realized a good balance between safety and environment protection.



Seafood processing depends heavily on reliable refrigeration systems. This is the main reason why Danfoss CO<sub>2</sub> solutions and components were used for the Zhangzi Island project. With leading TDR technology, Danfoss AKS 4100U series radar liquid level sensor was adopted for liquid level controlling of the NH<sub>3</sub>/CO<sub>2</sub> cascade system, working together with the ICM series motor control valve for precise control of the refrigeration liquid level control. The feeding line of the freezing room uses the Danfoss premier product ICF series valve station, which compressed the installation area by 2/3 and reduced the welding time by 80%. The newly launched SVL Flexline™ series of refrigeration line components were also widely used.



*In a landmark project in China, the new Zhangzi sea food processing centre uses a NH<sub>3</sub>/CO<sub>2</sub> cascade system for refrigeration. This has lowered the NH<sub>3</sub> charge amount by over 90% and limits the NH<sub>3</sub> refrigerant inside of the refrigeration control room. The cold storage plant utilizes a CO<sub>2</sub> brine system and uses the abundant sea water as the cooling medium for the high level ammonia refrigeration.*

*Danfoss supplied its Flexline™ valve station for CO<sub>2</sub> solutions extensively throughout the entire system, raising safety and reliability while reducing welding time by 80%.*

Carsten Dahlgaard  
Industrial Refrigeration  
Global Marketing Director

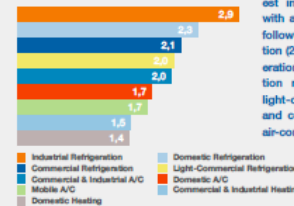
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<http://www.danfoss.com/IR>

50+ case studies

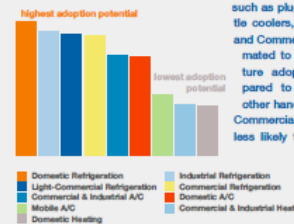
## SURVEYS: MARKET SHARE & ADOPTION POTENTIAL OF NATURAL SUBSTANCES

In the UNIDO survey among 207 respondents from developing countries and emerging economies respondents were asked to rate the Market share of natural refrigerants per industry sector, with options ranging from "none" (1) to "very high" (5). Their market share is, according to respondents, currently highest in Industrial Refrigeration with a value of 2.9 out of 5.0,



followed by Domestic refrigeration (2.3) and Commercial refrigeration. Similar market penetration rates are estimated for light-commercial refrigeration and commercial and industrial air-conditioning, with values of 2.0 out of 5.0.

Participants were next tasked to rank application sectors from "lowest" (1) to "highest" (9) according to their Adoption potential for natural refrigerants within the next 5 years. The application sector with the highest potential for natural refrigerants compared to other industry sectors is the Domestic refrigeration sector, pointing to an already widespread and growing use of hydrocarbons in domestic refrigerators and freezers. This is followed by Industrial refrigeration, mainly dominated by the use of ammonia. Light-commercial refrigeration, such as plug-in display cabinets, bottle coolers, vending machines, etc., and Commercial refrigeration are estimated to have a similarly good future adoption potential as compared to other sectors. On the other hand, Domestic Heating, and Commercial & industrial heating are less likely to experience a rapid increase in natural refrigerant use, respondents estimate.



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*Sectors with a continued use of natural refrigerants in different world regions, such as the use of ammonia in industrial refrigeration or the quickly increasing application of hydrocarbons in domestic refrigerators, will continue to be responsible for growing markets in developing markets in the near future. The simultaneous introduction of HFC-free appliance foams plays an important role in this respect. Other applications, among them small-size commercial plug-in display refrigeration equipment and centralised food retail refrigeration systems also show promising prospects. Domestic, as well as commercial and industrial heating, on the other end, currently enjoy less trust among respondents.*

survey among 200+ individuals from developing countries

# 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. 2.5 million HFC-free units worldwide**



# HFC-free domestic refrigeration



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



# HFC-free industrial refrigeration



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



# (HFC-free) commercial refrigeration



**TOTAL**  
CO<sub>2</sub> TC  
SUPERMARKETS



**TOTAL**  
CO<sub>2</sub> CASCADE/  
SECONDARY  
SUPERMARKETS



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





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



14 brands



# training & know-how



**Grenada: HC training workshops**

**Brazil: compressor & system training centre**

**Benin: training for A/C conversion**

**Ghana: HC training workshops**

**Central Asia: online training courses**

**Turkmenistan: NR workshop**

**Pakistan: Natural Fluids Refrigeration Center**

**India: AARI - new ammonia refrigeration association**





# safety standards



**Chile: good practices manual for NH3 refrigeration system**

**India: AARI advising government on NH3 safety standards**

**India: safety standards for HC in production lines**

**China: national safety standards for flammable refrigerants**

**China: collaboration with EU, USA to develop CO2 compressor standards**

**China: safety standards for cold stores**





# pioneering projects



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

**South Africa: CO2 cascade in supermarket saves 51% energy**

**Africa: small capacity 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 cascade refrigeration system for seafood processing plant**

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

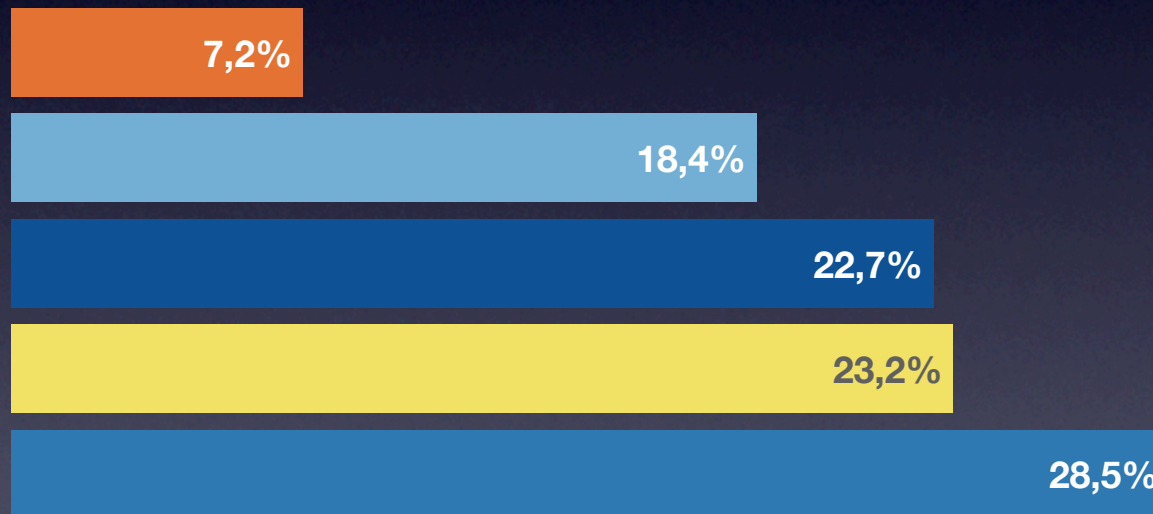




# surveys in the GUIDE UNIDO



- 2 surveys taken into account: UNIDO (May-July 2013) among 207 respondents
- UNEP (May-July 2012) among 95 National Ozone Unit Officers

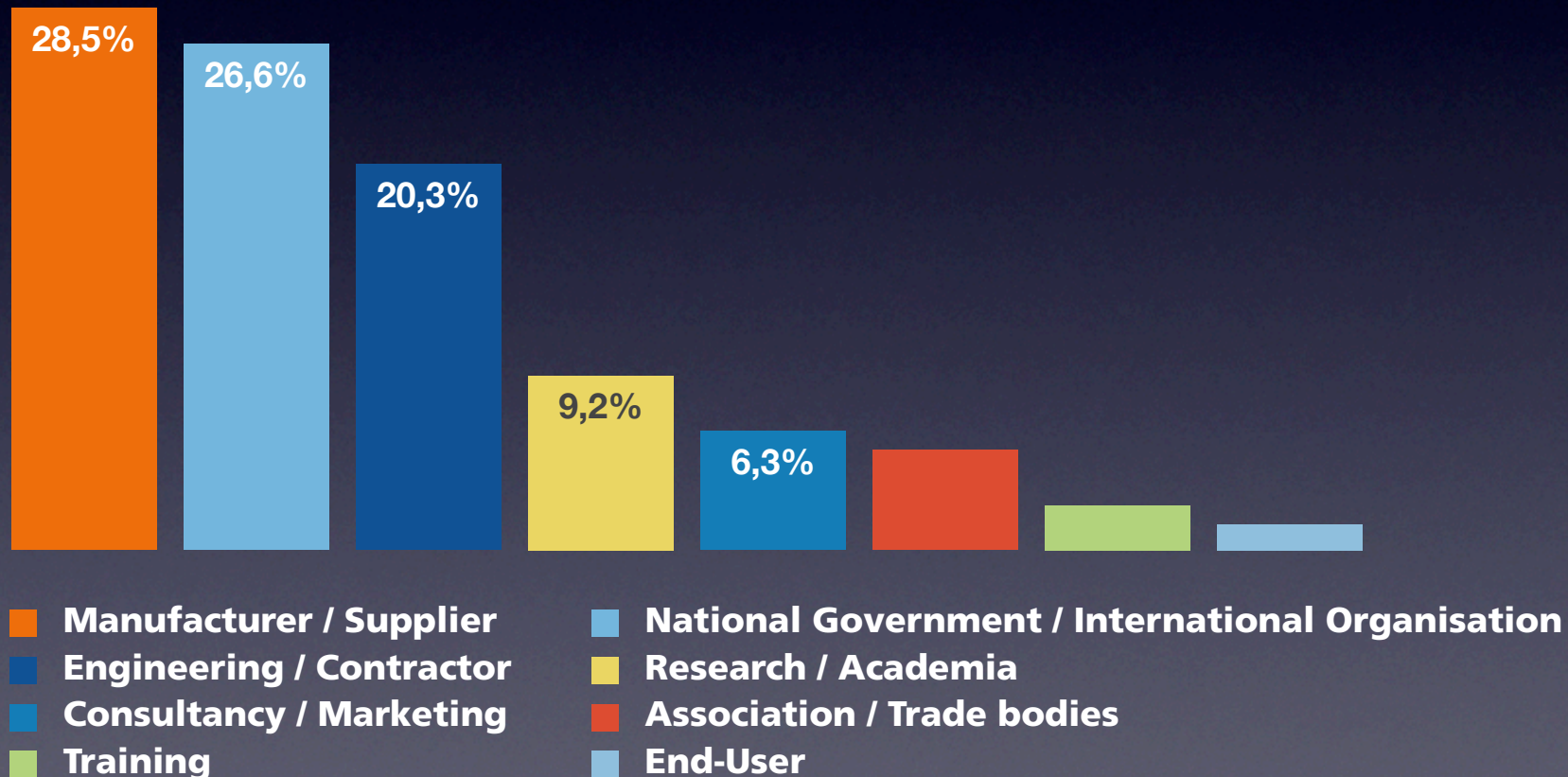


- Arab States
- Africa
- Europe and NIS
- Latin America and the Caribbean
- Asia and the Pacific

# UNIDO survey: respondents



- manufacturers & suppliers, national governments and engineering / contractors are the main response groups

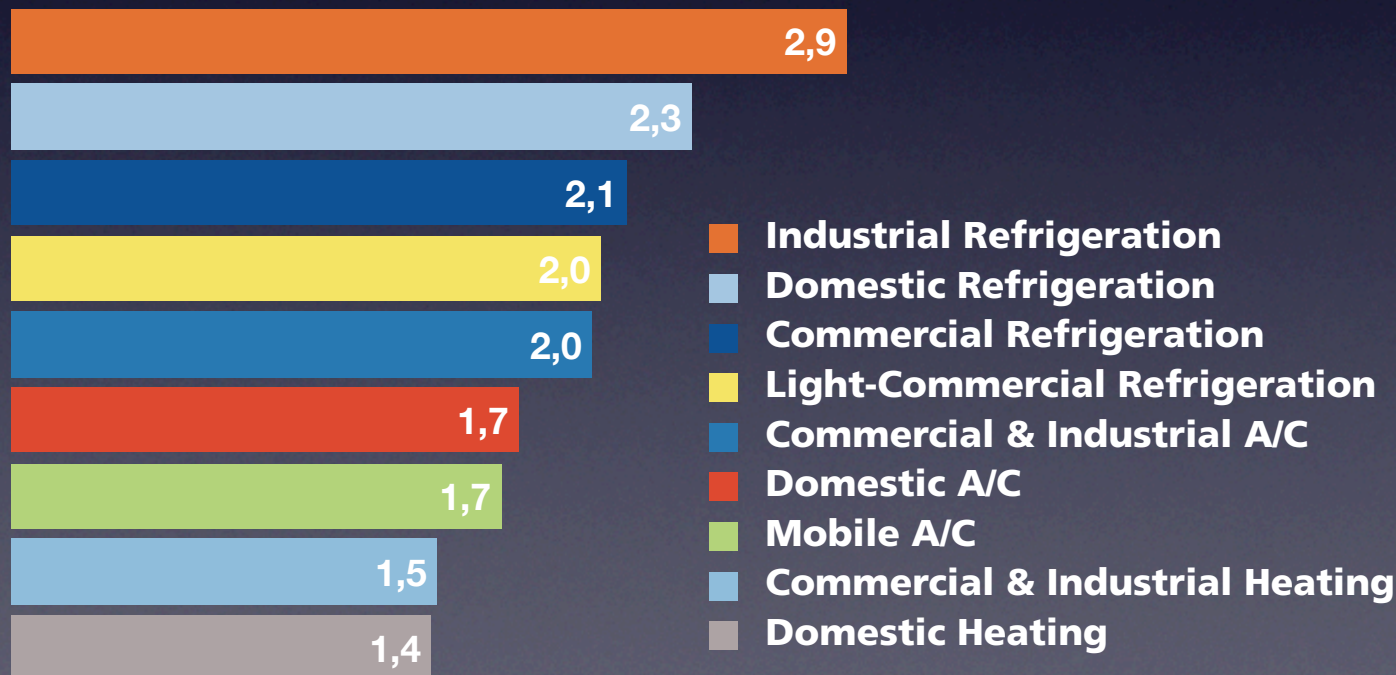




# current market share of NR



- natural refrigerants are currently mostly used in industrial refrigeration
- domestic refrigeration, commercial refrigeration, light-commercial refrigeration, and commercial / industrial AC in developing countries have promising adoption
- overall, market shares are still small on a scale from 0 ("none") to 5 ("very high")



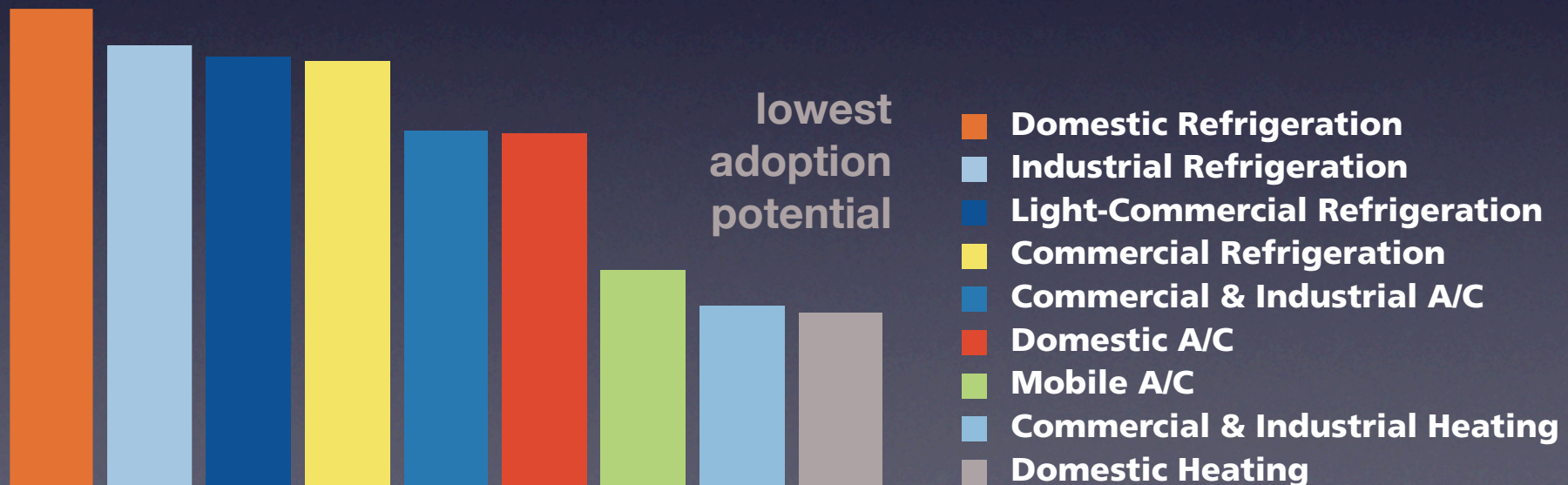
source: shecco / UNIDO survey, scale: 0 ("none") to 5 ("very high")

# NR adoption potential in the next 5 years



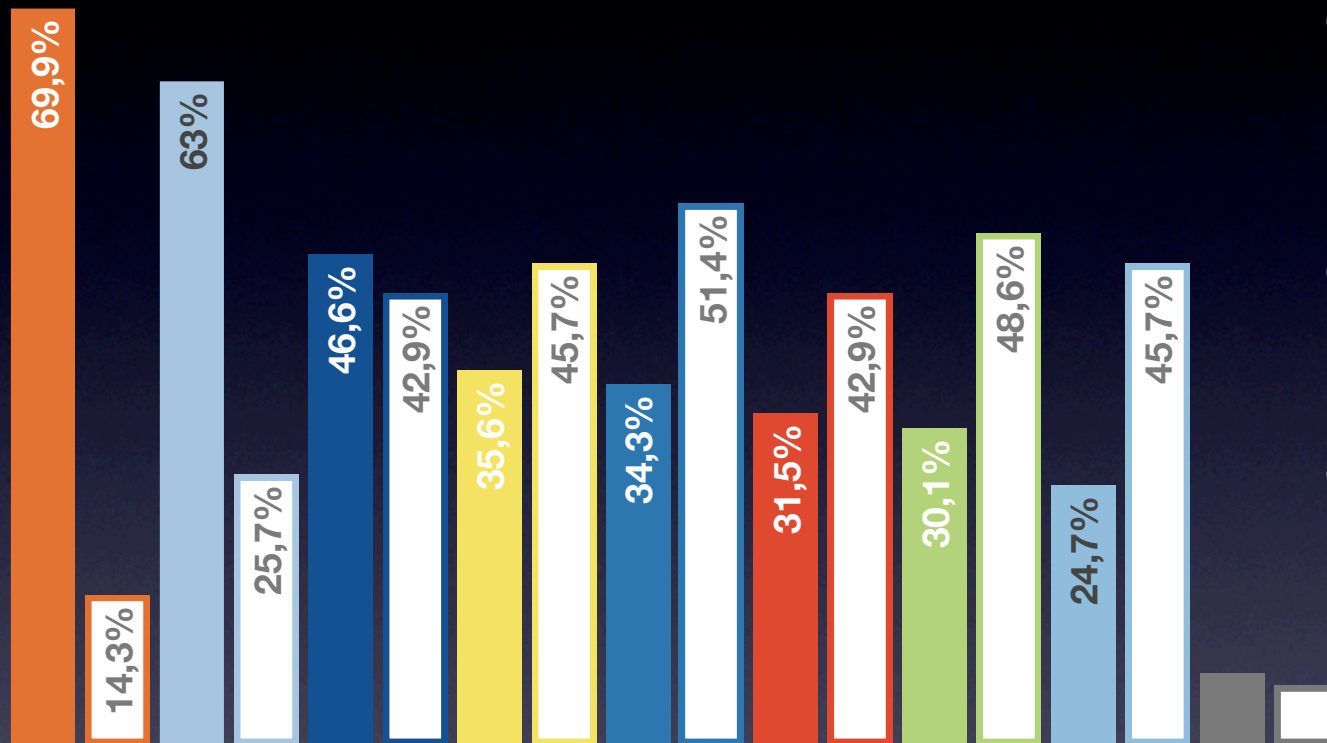
- ◉ domestic refrigeration will show the largest increase in adoption in the next 5 years in developing countries (proven technology with 650 million HC units)
- ◉ industrial refrigeration, light-commercial and commercial refrigeration will be very promising

**highest adoption potential**





# reasons for and against adopting NR



- Environmental impact - driver
- Efficiency & reliability - driver
- Training & knowledge - driver
- Safety & standards - driver
- Market demand - driver
- Cost of substance - driver
- Availability & supply - driver
- Cost of technology - driver
- Other - driver

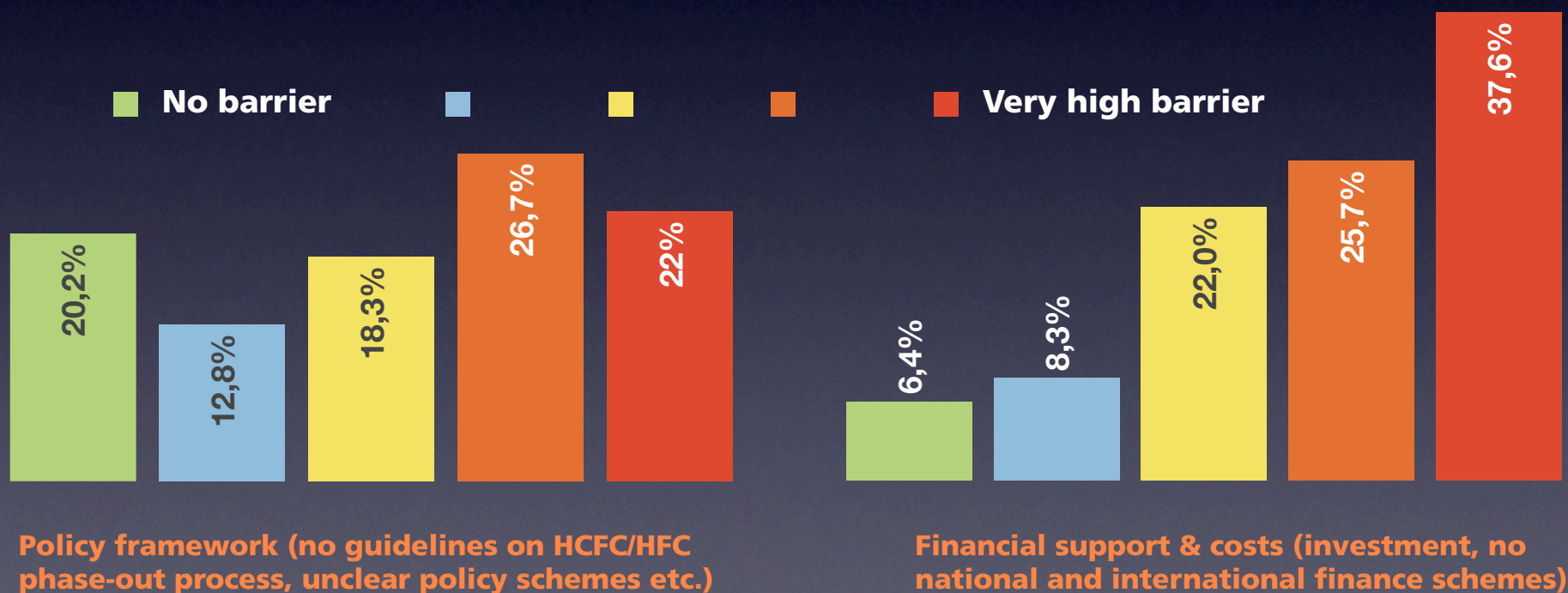
- Environmental impact - barrier
- Efficiency & reliability - barrier
- Training & knowledge - barrier
- Safety & standards - barrier
- Market demand - barrier
- Cost of substance - barrier
- Availability & supply - barrier
- Cost of technology - barrier
- Other - barrier

- the environmental impact is a clear driver, together with efficiency & reliability
- training & knowledge is both a driver and a barrier
- the cost of technology, availability & supply, and market demand are areas of concern (= largest discrepancy between driver and barrier)

# the importance of clear policy frameworks & incentives



- nearly half of all respondents believe unclear policy frameworks to be a high to very high barrier in the HCFC phase-out process
- lack of financial incentives and currently too high costs for HFC-free technology is the single strongest barrier out of a list of 8





# GUIDE+: HFC taxes & fiscal incentives for natural refrigerants in europe



**Alexandra Maratou, Klára Skačanová**

# growing number of countries consider national measures to address HFCs

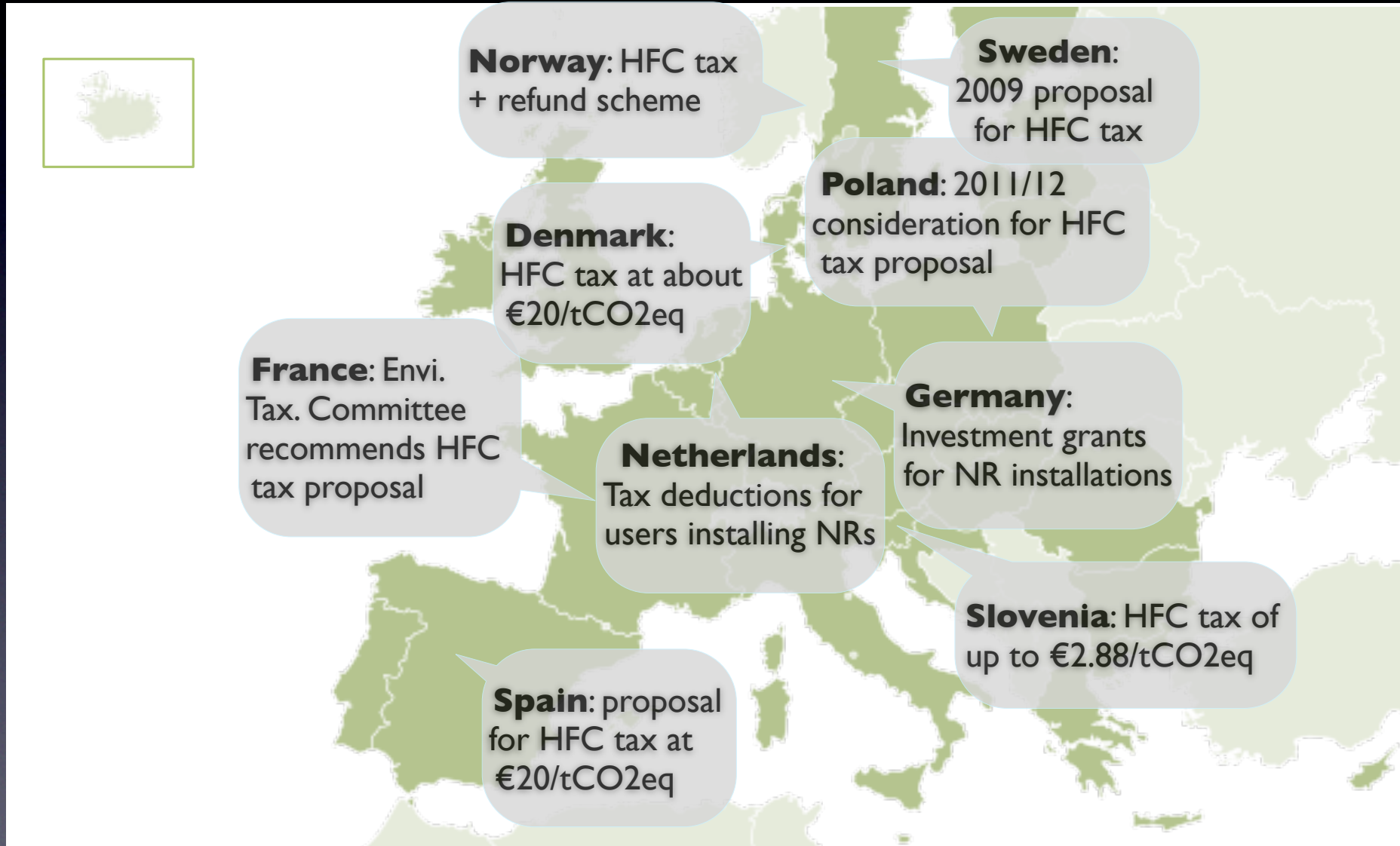


## Recent developments at national level:

- ✓ June 2013 - Environmental Taxation Committee recommends the **French** government to propose HFC tax
- ✓ July 2013 - **Spanish** government proposes HFC tax, with the view of implementation as of January 2014
- ✓ ...



# HFC taxes & financial incentives for natural refrigerants in europe

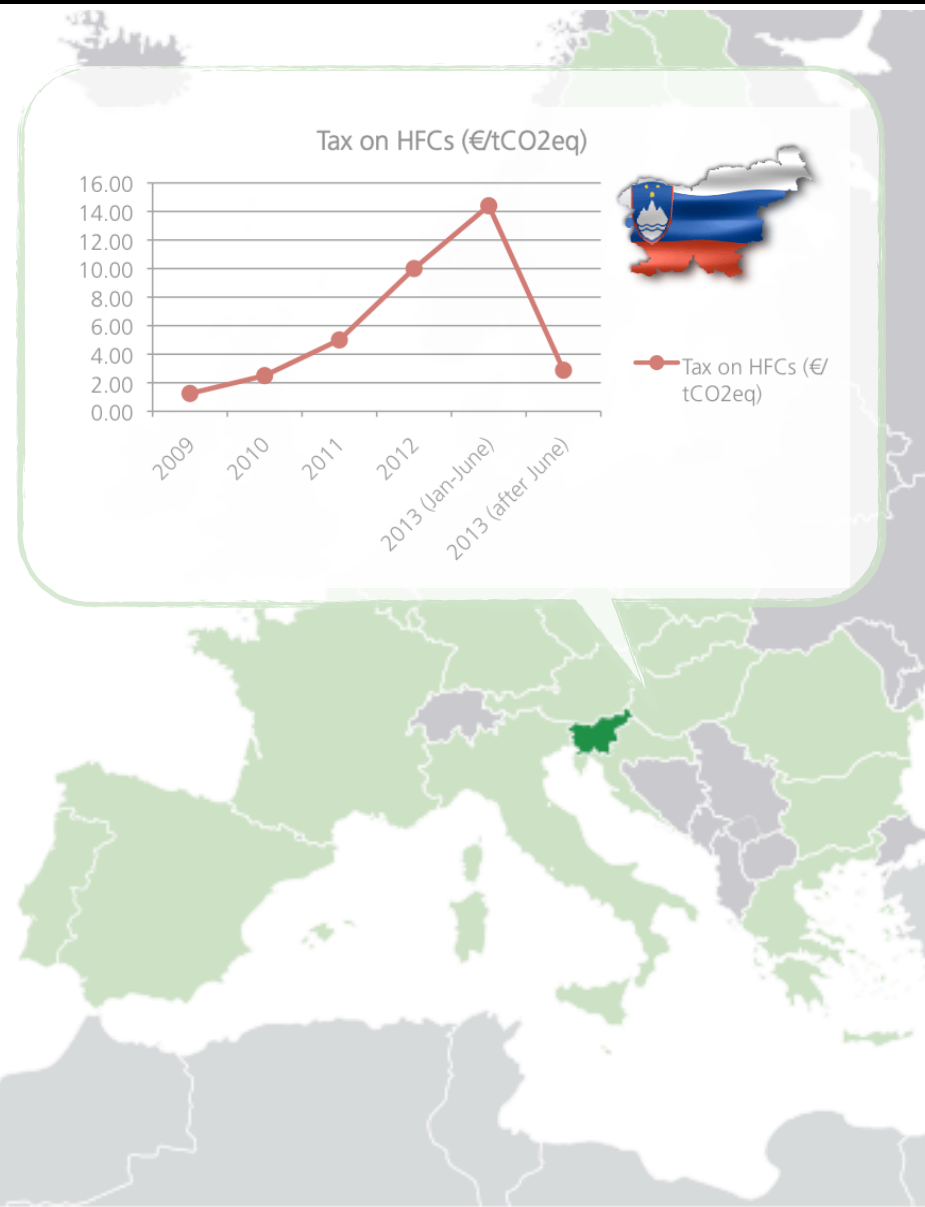






# the case of slovenia

- ✓ HFC tax since **2009**
- ✓ **current** tax level: up to **2.88€/tCO<sub>2</sub>eq**
- ✓ **differentiated tax levels** for **1<sup>st</sup> charge** and **service & maintenance**
- ✓ gradually increasing tax level until end of May 2013
- ✓ significant drop of tax level since June 2013 (at about 2010 levels)



# GUIDE+ HFC taxes & fiscal incentives for natural refrigerants in europe



## HFC TAXES & FISCAL INCENTIVES FOR NATURAL REFRIGERANTS IN EUROPE

LAUNCH: November 2013

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 ATMOSphere 2013 participants

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# GUIDEs editions in 2013/14



**Europe**  
**2013**



**China**  
**2014**





**North America**  
**2014**



**Europe: HFC taxes & incentives**  
**2013**



**Japan**  
**2014**



**Developing Countries**  
**2013**



**Training & Education**  
**2014**



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The screenshot shows the shecco publications website interface. At the top left is the shecco logo. A navigation menu includes 'home', 'guides', 'surveys', 'topics', 'about', and 'contact us'. A search bar and a shopping cart icon with 'you have items' are at the top right. The main content area features a large blue banner for 'THE 2<sup>ND</sup> IN THE SERIES OF GUIDES TO HIGHLIGHT MARKET TRENDS FOR SUSTAINABLE REFRIGERANTS', with a sub-headline '2013 NATURAL REFRIGERANTS MARKET GROWTH FOR NORTH AMERICA' and a 'JUST PUBLISHED' badge. Below this is a filter system with 'Latest' selected and options for 'Natural Refrigerants' and 'Electric Vehicles'. The main content is divided into sections: 'Examples of NH3/CO2 secondary systems for cold store operators' (dated 2013), 'UNIDO Atmosphere Natural Solutions for Developing Countries' (dated 2013), 'Natural Refrigerants Market Growth for Europe' (dated 2012), and 'Natural Refrigerants Europe 2013' (dated 2013). Each item has a 'Description', 'More info', and 'Add to cart' link. At the bottom, a 'Forthcoming titles' section shows two 'GUIDE 2014 Europe 2<sup>nd</sup> Edition' items, both marked 'UPCOMING' with a date of '13.03 2014'.

Featured GUIDEs and other publications

Filter system for published GUIDEs and reports

upcoming publications & links to surveys

# shecco publications - preview



The screenshot shows the shecco website interface. At the top left is the shecco logo. A navigation bar includes 'home', 'guides', 'surveys', 'topics', 'about', and 'contact us'. The main content area features a publication titled 'Natural Refrigerants Market Growth for North America' with a cover image of a globe. Below the title, it lists publication details: 'Published: 18 September 2013', 'Author: Nina Masson, Marc Chasserot', 'Size: 11mb', and 'Keywords: Natural refrigerants, Market, North America'. A quote states: 'More than one in four respondents to an industry survey conducted for this GUIDE believe that North America has the potential to become a world leader in natural refrigerant technology.' Below this are tabs for 'Description', 'Table of contents', 'Case studies', 'Request sample', and 'Authors'. The 'Description' tab is active, showing a paragraph about the guide's purpose and a list of bullet points under the heading 'Inside the GUIDE:'. To the right of the main content is a sidebar with sections: 'Cost details' (Total price: Free, Total items: 1, Currency: GBP EURO USD, Multi-user License, and an 'add to basket' button), 'Contact us' (shecco Market Research team, contact info for Nina Masson, and mailing address), 'Share publication' (with social media icons for Twitter, LinkedIn, and Facebook), 'Download' (with checkboxes for Case studies, Individual case studies, and Images), 'People also consulted' (listing other guides), and 'Supporters' (a grid of logos for various companies like ALFA, MYGOM, EcoThermics, EMERSON, EVAPCO, CARNOT, Danfoss, DORIN, THERMINT, CIMCO, Tecumseh, Temprite, and Hillphoenix).

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