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SUSTAINING OUR ATMOSPHERE

Natural refrigerant trends in EU, Japan & North America



Paris, 17 July 2014

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shecco

Agenda

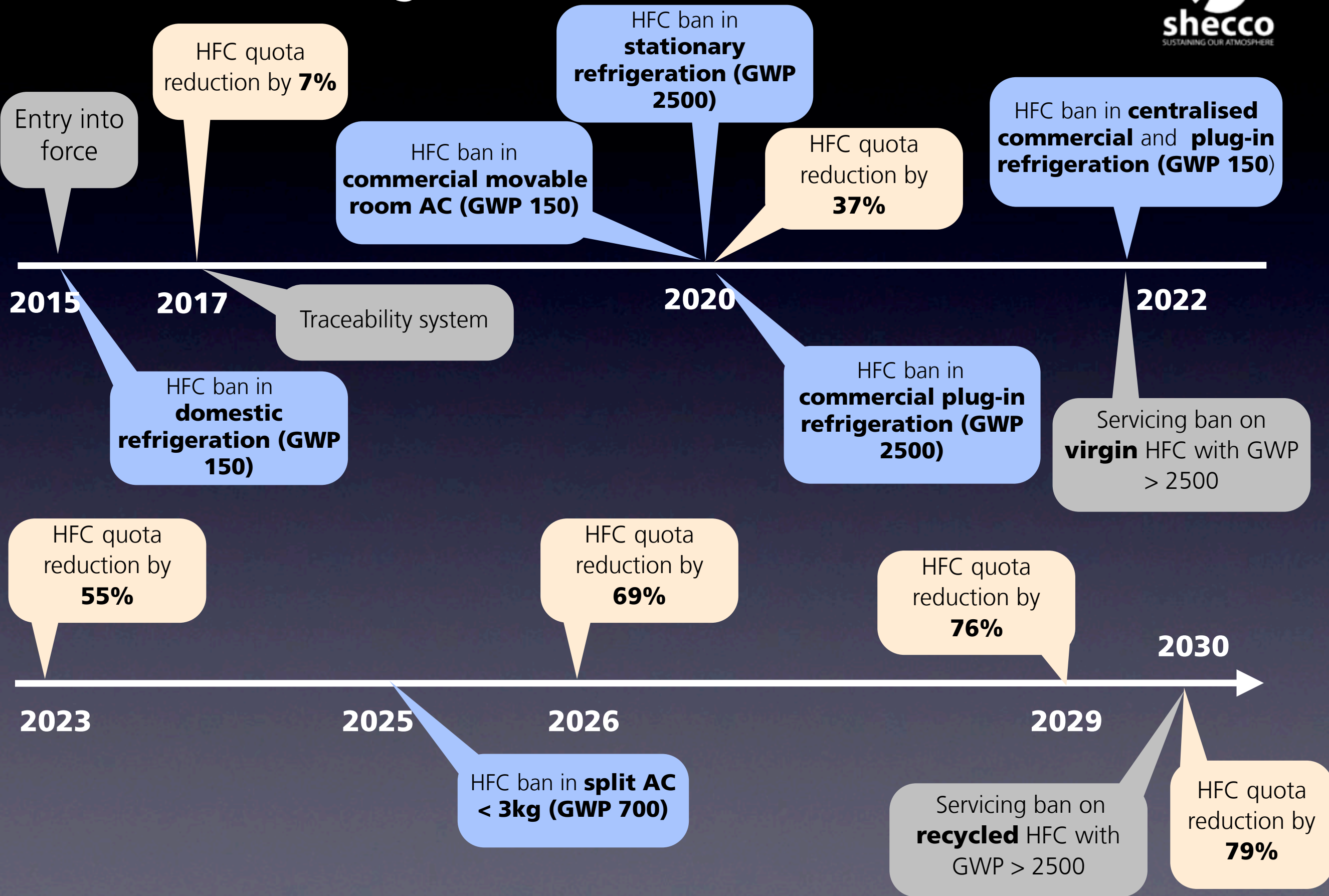


Policy action & market for natural refrigerants:

- ✓ **EU**
- ✓ **Japan**
- ✓ **North America**

Europe: policy update & market trends in commercial refrigeration

EU F-Gas II Regulation - effective as of 2015



EU F-Gas II Regulation - HFC bans



SECTOR (SUB-SECTOR)		GWP limit	As of (year)
1	Domestic refrigeration	150	2015
2	Refrigerators and freezers (hermetically sealed) for commercial use	2500	2020
		150	2022
3	Movable room AC (hermetically sealed)	150	2020
4	Stationary refrigeration, except equipment intended for application design to cool products to temperatures below -50°C	2500	2020
5	Multipack centralised commercial refrigeration systems with capacity ≥ 40 kW that contain f-gases with $GWP \geq 150$, except in the primary refrigerant circuit of cascade systems where f-gases with a $GWP < 1500$ may be used	150	2022
6	Single split AC systems containing less than 3 kg of f-gases	750	2025

EU F-Gas II Regulation - HFC bans

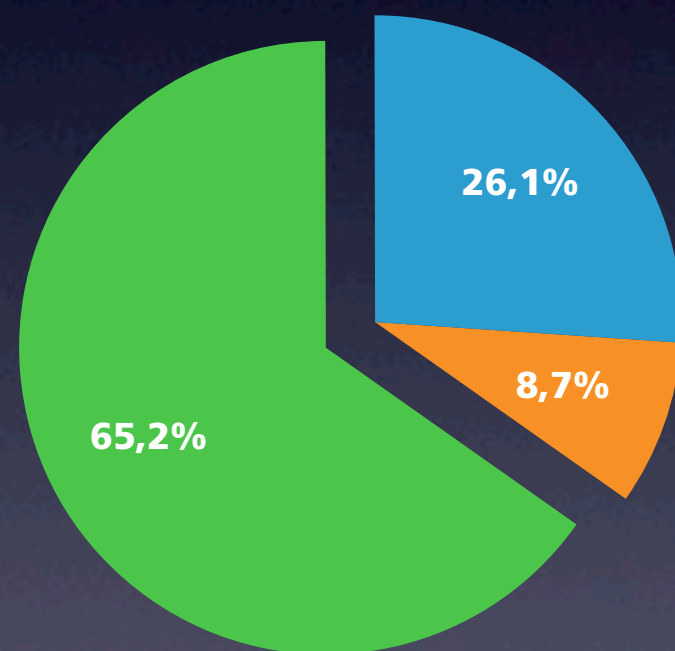


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Europe: impact of F-gas bans in centralised refrigeration systems as of 2022



- 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



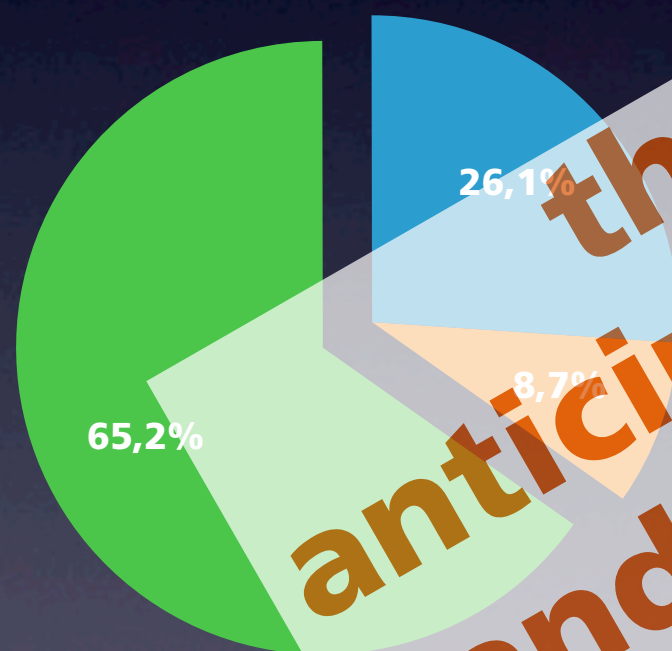
- they are well-positioned to combine long term legislative compliance with investment security, independent of upcoming F-gas rules
- without exception, all food retailers have already heard about the upcoming HFC bans and have developed an appropriate strategy

- 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.

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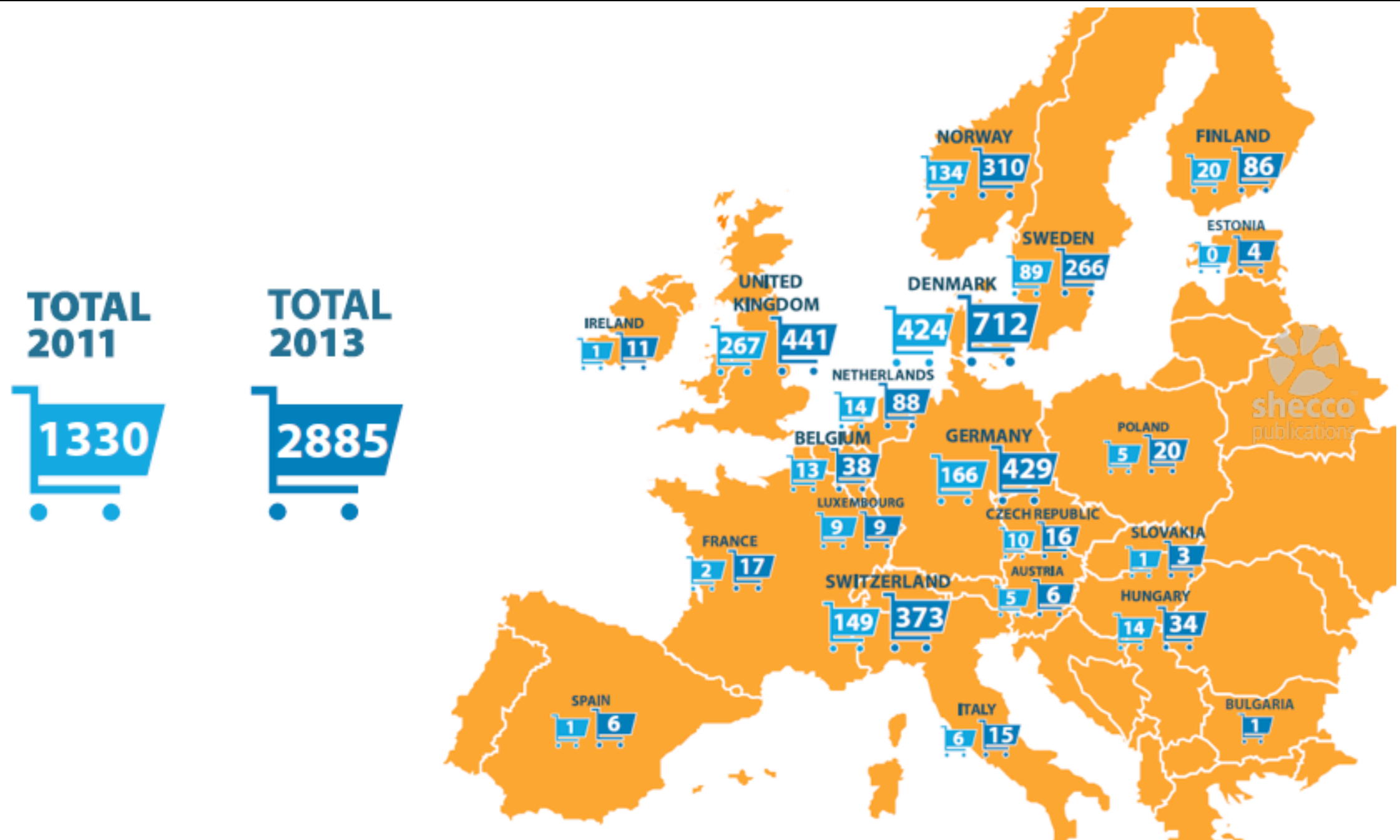
the market has anticipated policy change and has reacted in time

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europa: CO₂-only stores 2011-2013



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

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How to get there?

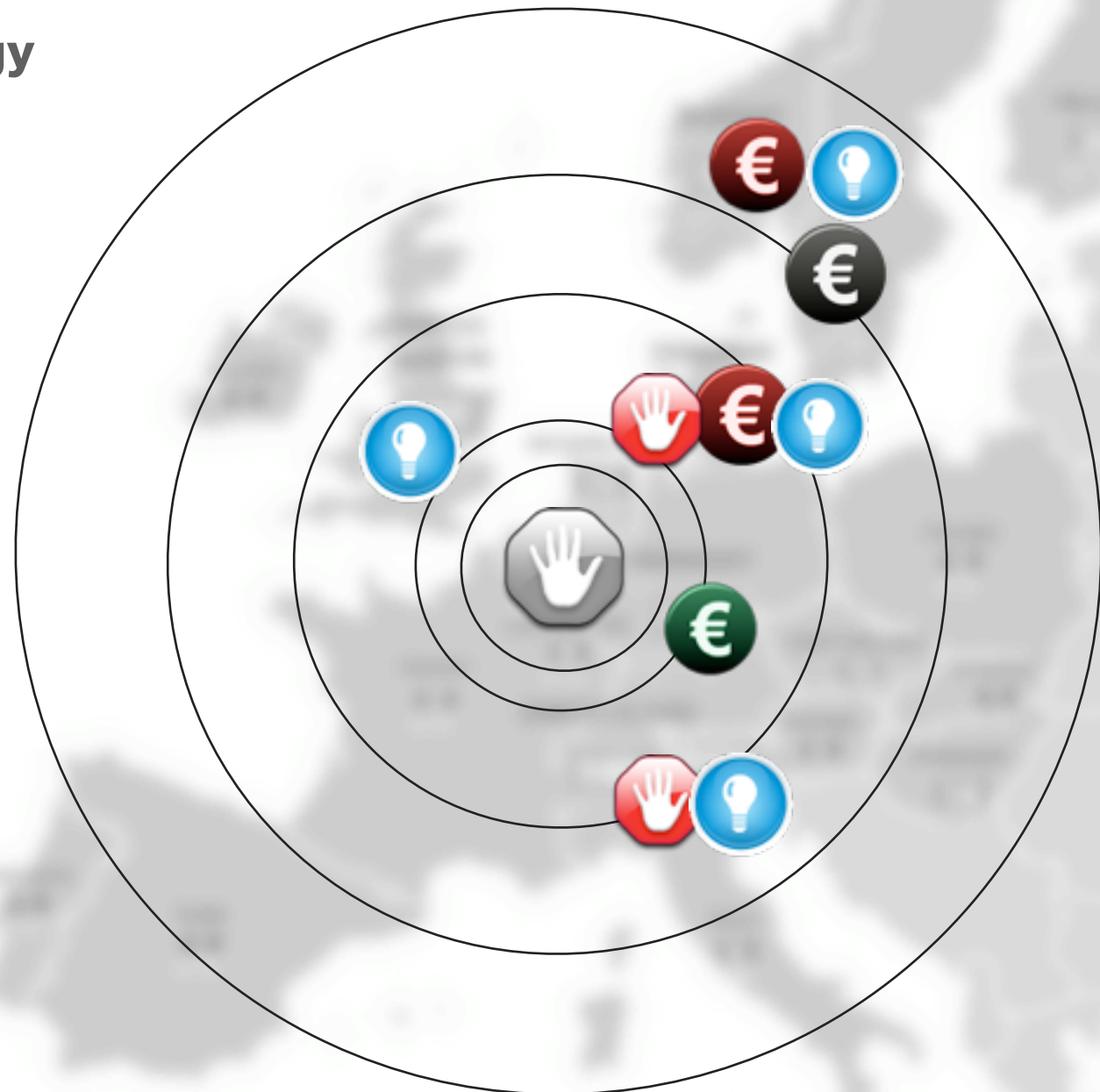
Denmark: HFC bans in new systems + HFC tax + active support of technology development

Switzerland: additional bans introduced as of December 2013

UK: voluntary industry commitment (business sense); strong food retail sector

Germany: federal incentive scheme for HFC-free commercial refrigeration

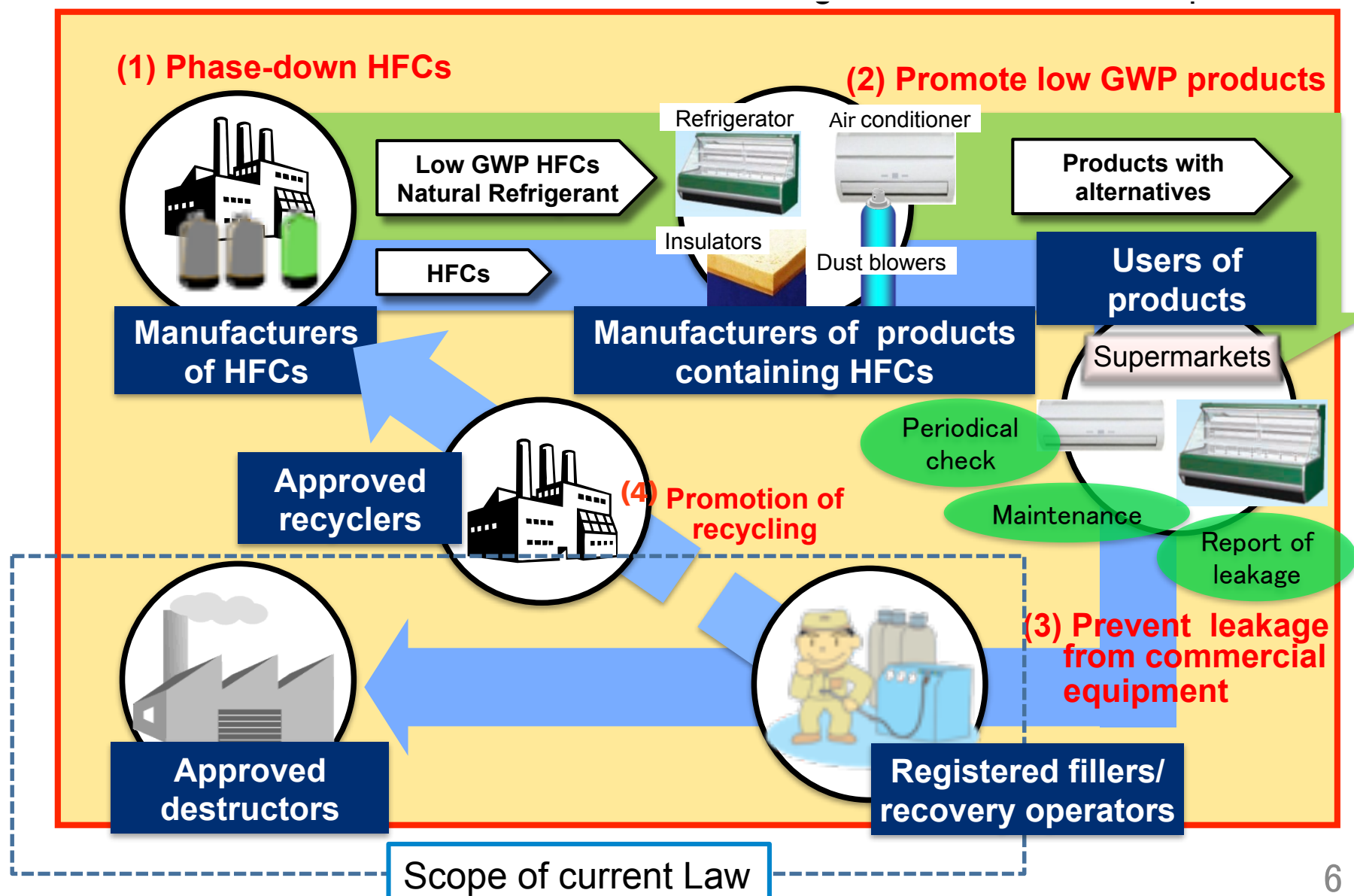
Norway: HFC tax scheme



Japan: policy update & market trends in commercial refrigeration

Japan's revised f-gas law covers entire lifecycle

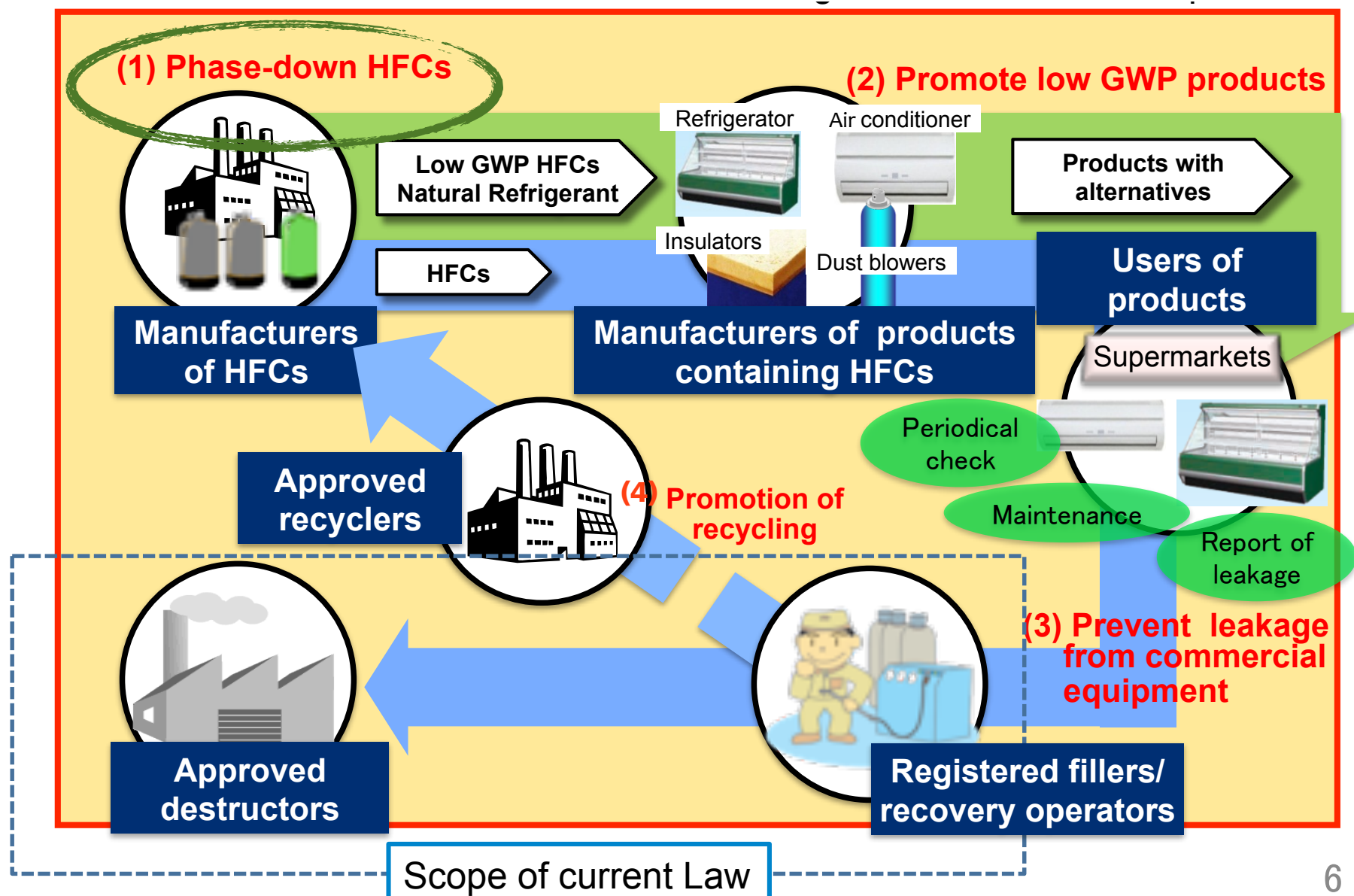
→ Framework law agreed in June 2013 foresees 4 types of measures



Source: METI presentation at ATMOsphere Asia 2014

Japan's revised f-gas law covers entire lifecycle

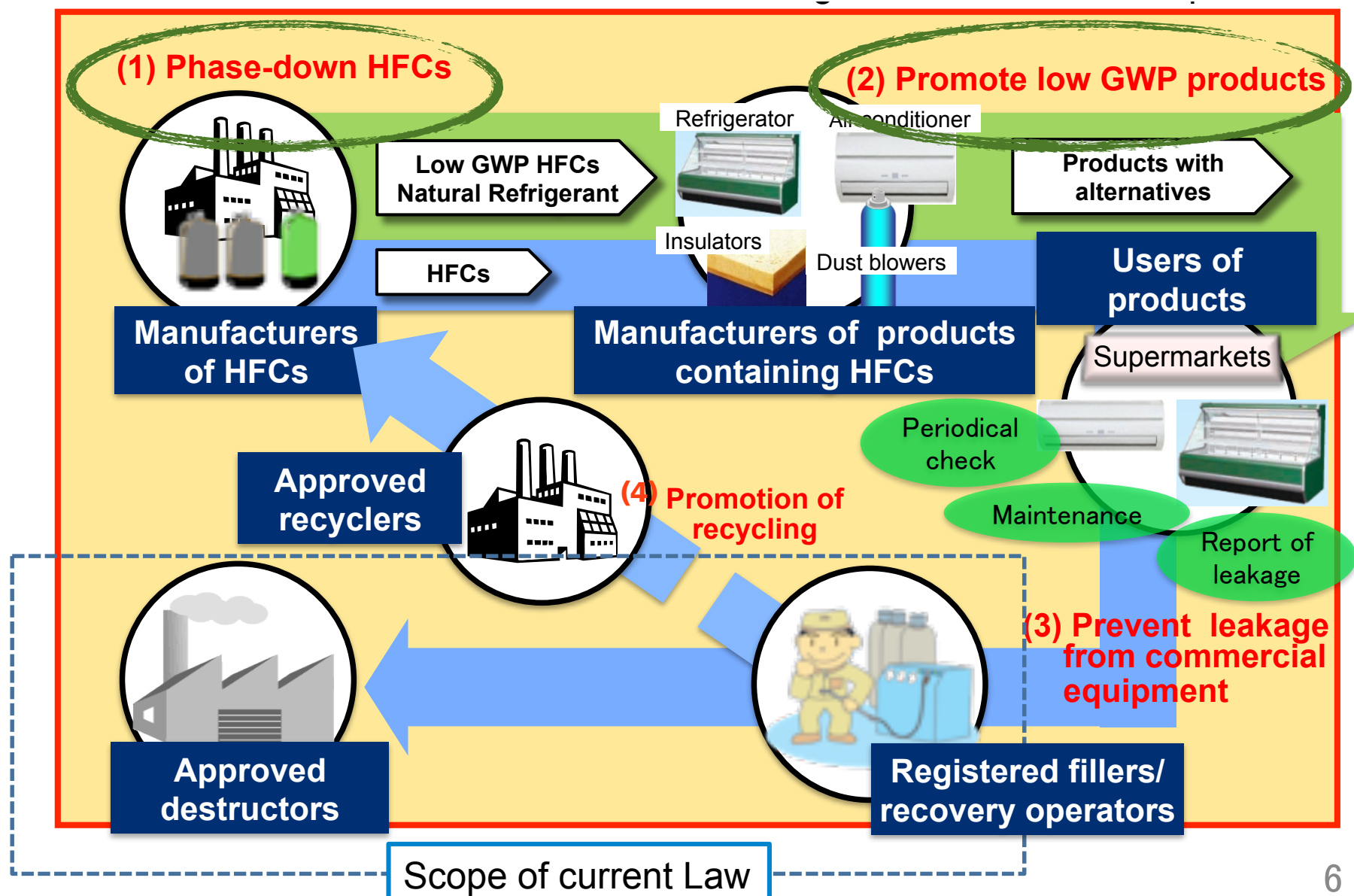
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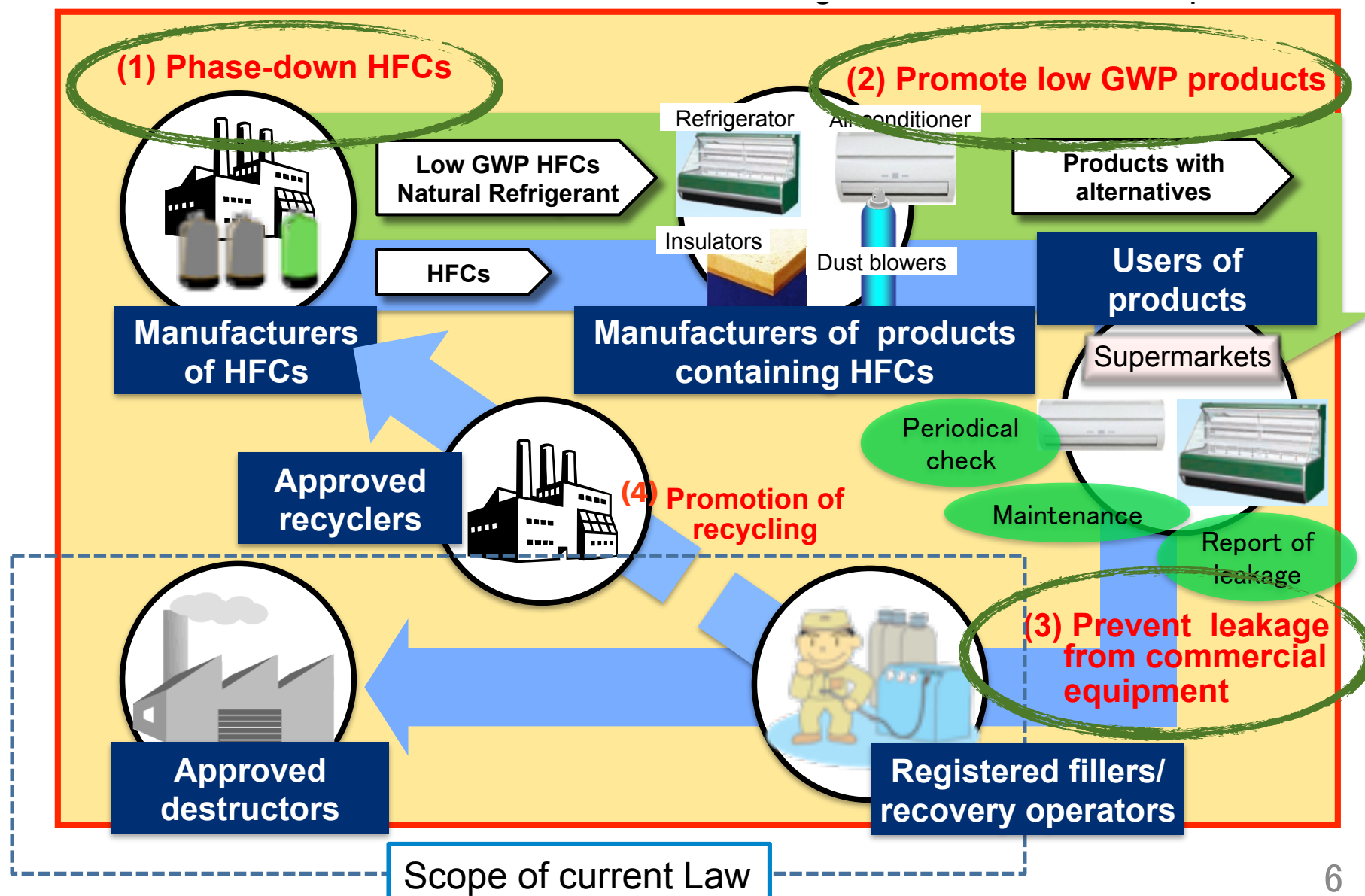
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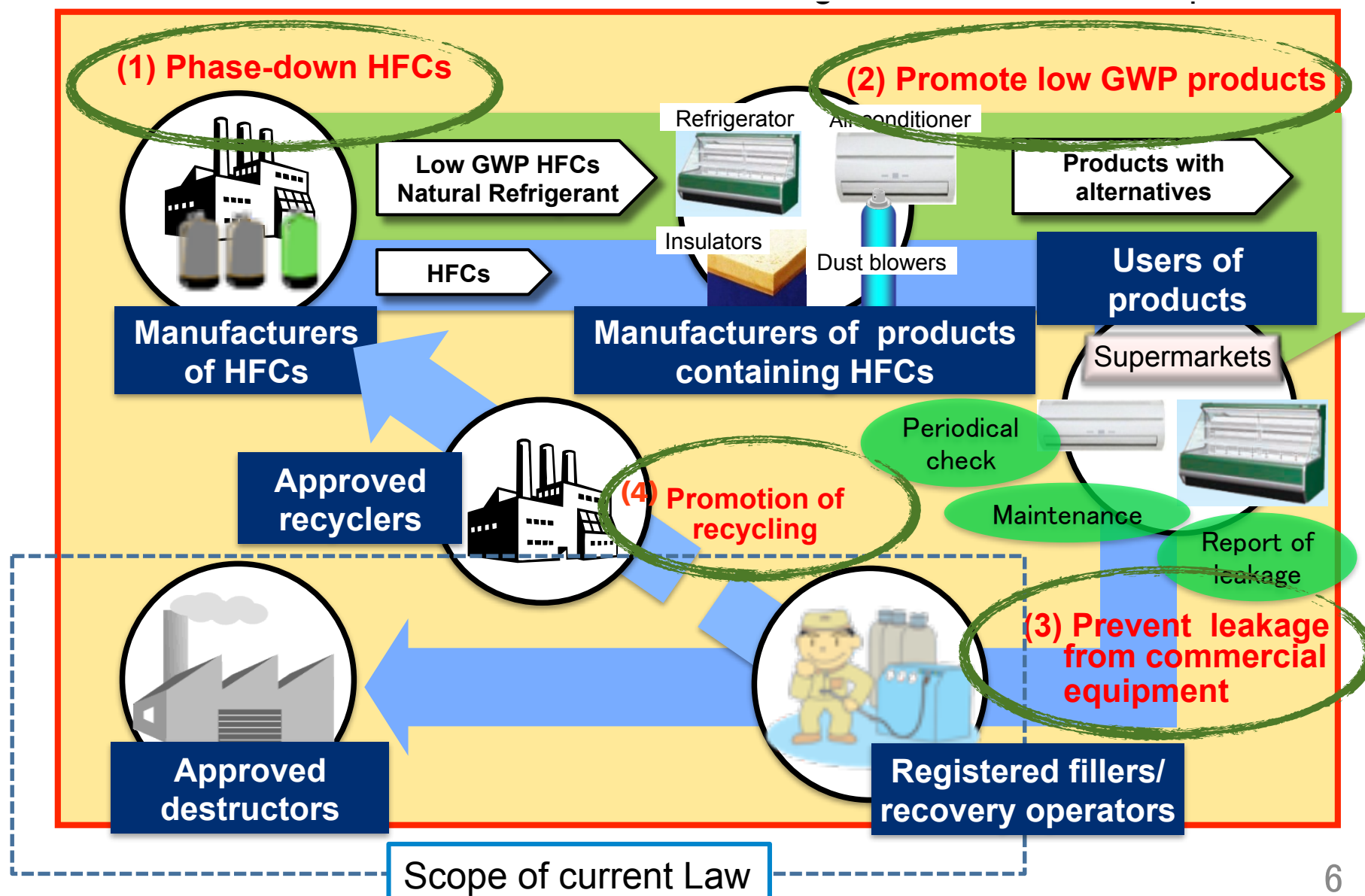
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Japan's measures to promote low-GWP refrigerants - likely targets per product group



Product group	GWP target	Target year
Residential AC	750	2018
Light commercial AC (e.g.office use)	750	2020
Condensing units > 1.5 kW - stationary refrigeration	1500	2025
Cold store (> 50,000m ³) central refrigeration systems	100	2019
Mobile AC (passenger cars)	150	2023

Japan - support for natural refrigerants

- ✓ Several government support schemes to encourage investment in natural refrigerants
- ✓ E.g. in FY 2014, a total of USD 50 million available to support the use of natural refrigerants in refrigerated warehouses, convenience stores and supermarkets
 - ✓ 249 CO₂ stores (18 companies)
 - ✓ 33 cold stores (31 companies)

japan: CO₂-only stores 2014 and 2015



**approx. 180 stores with
transcritical CO₂ systems
today**



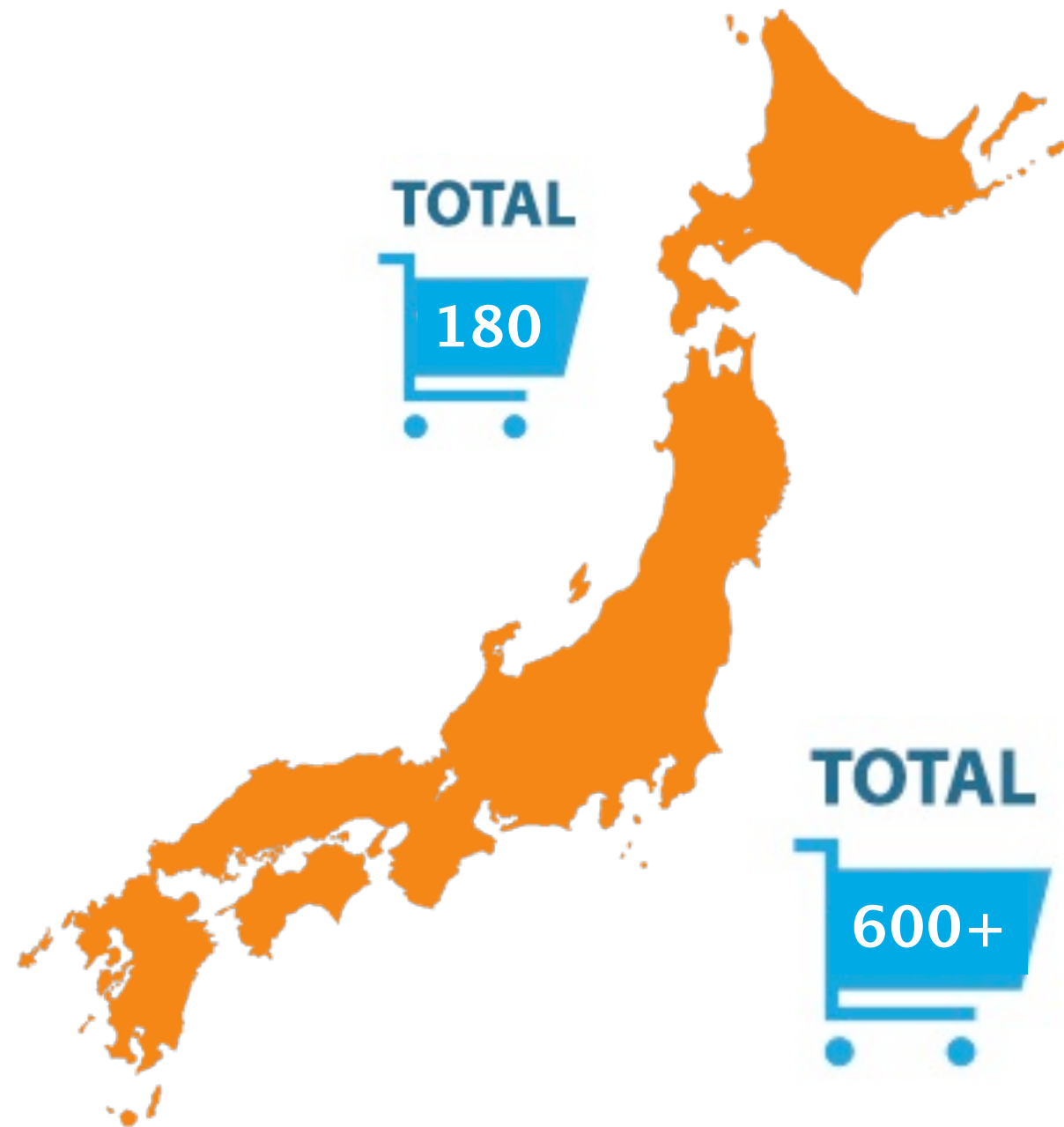
source: shecco Japan, status June 2014

japan: CO₂-only stores 2014 and 2015



approx. 180 stores with transcritical CO₂ systems today

by march 2015, more than 600 stores can be expected



source: shecco Japan, status June 2014

japan: CO₂-only refrigerant stores: end-users



source: shecco Japan, status June 2014

japan: CO₂-only refrigerant stores: end-users



expected:

the number of food retailers using CO₂ systems will increase from 14+ to 25+ brands by march 2015



source: shecco Japan, status June 2014

North America: policy update & market trends in commercial refrigeration

US EPA proposals to open up opportunities for natural refrigerants



June 2014: Proposal to allow use of **4 HC in 6 AC&R** applications (subject to use conditions)

AC&R application	Refrigerants proposed to be <u>allowed</u>
Retail food refrigeration (stand-alone)	isobutane (R600a) R441A
Vending machines	isobutane (R600a) propane (R290) R441A
Residential & light commercial AC and heat pumps	propane (R290) R441A R32
Very low temp refrigeration & heat transfer	ethane (R170)
Household refrigeration	propane (R290)

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July 2014: Proposal to list as **unacceptable certain high GWP refrigerants**

AC&R application	Refrigerants proposed to be <u>unacceptable</u>	Propose date
Mobile AC	R134a	2021
New retail food refrigeration (stand-alone) & vending machines	R134a, R404A, R407A, R407C, R507A, other blends	2016
Retrofit retail food refrigeration (stand-alone) & vending machines	R404A and R507A	2016
Retrofit & New supermarket refrigeration (direct and indirect systems)	R227ea, R407B, R421B, R422A, R422C, R422D, R428A, and R434A	2016

north america: accelerating market for natural refrigerants



- North American market shows **increased interest in natural refrigerants**
- **Policy action on HFCs** at federal and state level (California considering low-GWP requirements, HFC phase-down...)
- **68 CO₂ only stores** in North America and at least **27 more** planned in 2014, including in warmer regions (e.g. Georgia)
- North American companies starting to invest in European market

- 250 experts
- 60 presentations
- 13 HVAC&R sectors



ATMOsphere America 2014 - 18-19 June, San Francisco

north america: accelerating market for natural refrigerants



- **Target** officially announces shift to CO₂ hybrid systems
- **Sobeys** to have 64 CO₂ TC stores by end of 2014, investment cost decreased by 17% since 2011
- **Red Bull** placed order on 12,650 isobutane coolers in the US since EPA approved R600a in July 2013; 457,000 HC coolers globally
- **The Coca-Cola Company** placed 12,354 CO₂ cabinets in North America; 1.1 mil HFC-free equipment (CO₂ and HC) globally, representing around 80% of the purchase volume



Summary report available at
www.publications.shecco.com

closing remarks



- governments in different regions are **taking action on HFCs**
- **interest** in natural refrigerant solutions is **growing**
- **commercial availability, market growth** is typically greater in sectors for which regulatory measures are applicable
- ambitious policy action **drives innovation**, leads to increased availability and production capacities of alternatives



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