



solutions for europe  
**natural refrigerants**

16-17 March 2015 in Brussels

## Refrigeration Natural Refrigeration current status

Guest star > Alzira Valencia case



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Director  
International  
Support

## Being a responsible retailer

### Corporate commitments

- The Group has set itself a particularly ambitious objective: reducing its CO<sup>2</sup> emissions by 40% by 2020, compared to 2009 levels\*.
- It committed to reducing energy consumption by 30% per sqm of store sales area by 2020 compared to 2004 levels.

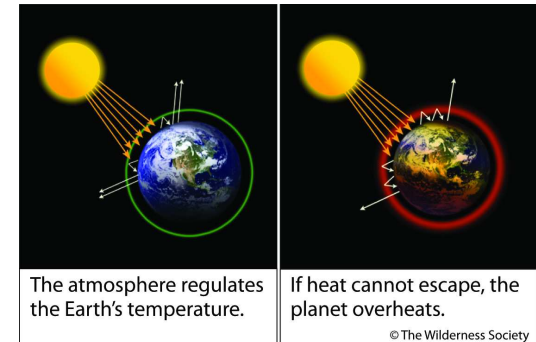
\* Belgium, France, Italy, Spain



## Ensuring responsible & sustainable refrigeration operations

### Vision

- Ambition for lower green house gases
- Ultimate target > operations run HFC-free
- No trap for future artificial refrigerant regulation
- Seize the opportunity to use clean efficient technology



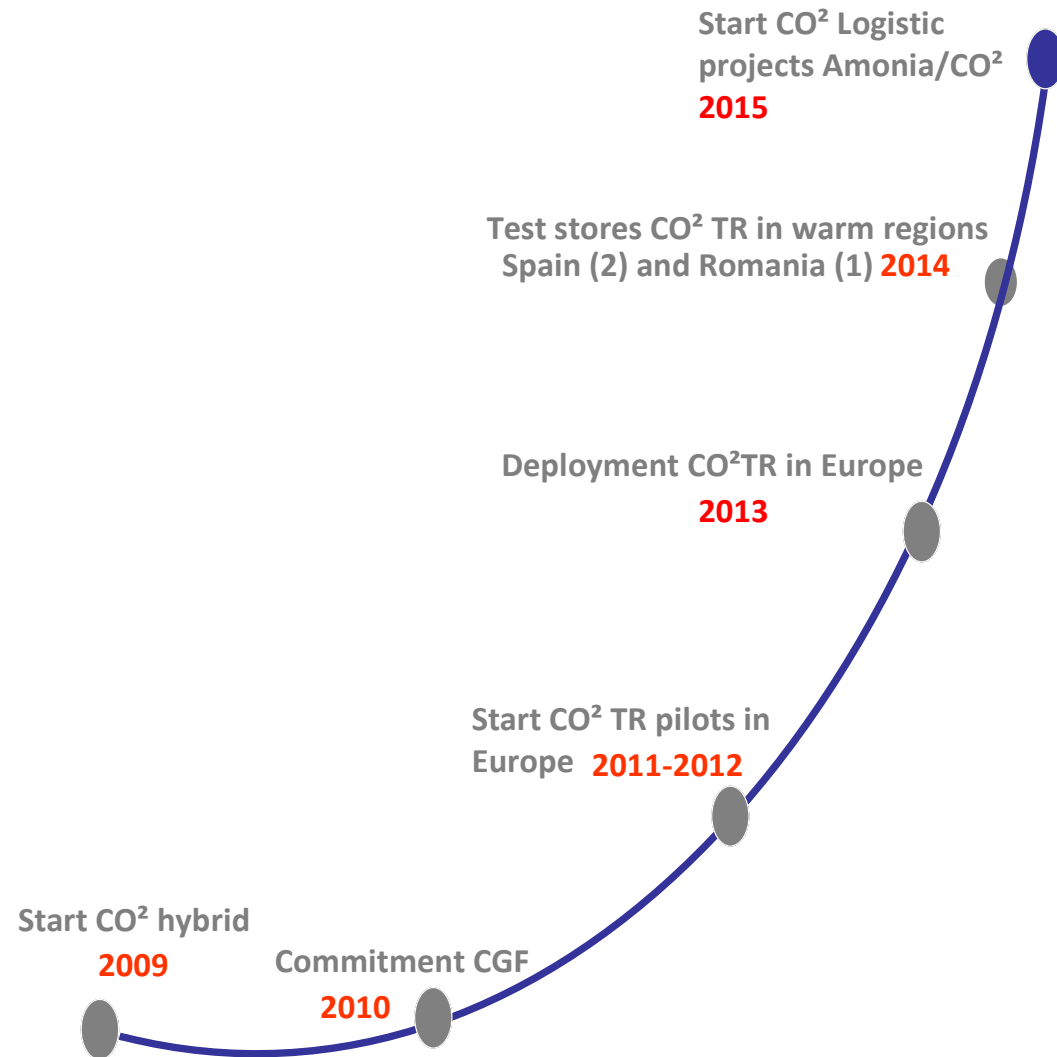
## Roadmap of refrigeration

### Natural refrigeration strategy

Improvement in the  
profitability of investments  
through TCO

Show the energy efficiency to  
countries by using pilots

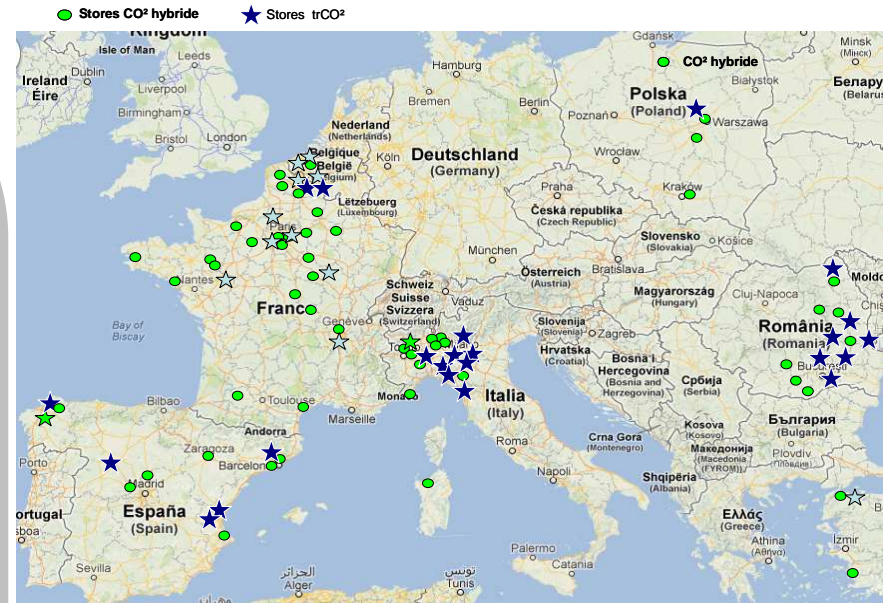
Provide support and expertise  
to countries whose  
refrigeration is lagging behind



## First focus in refrigeration



### Existing sites



### Projects

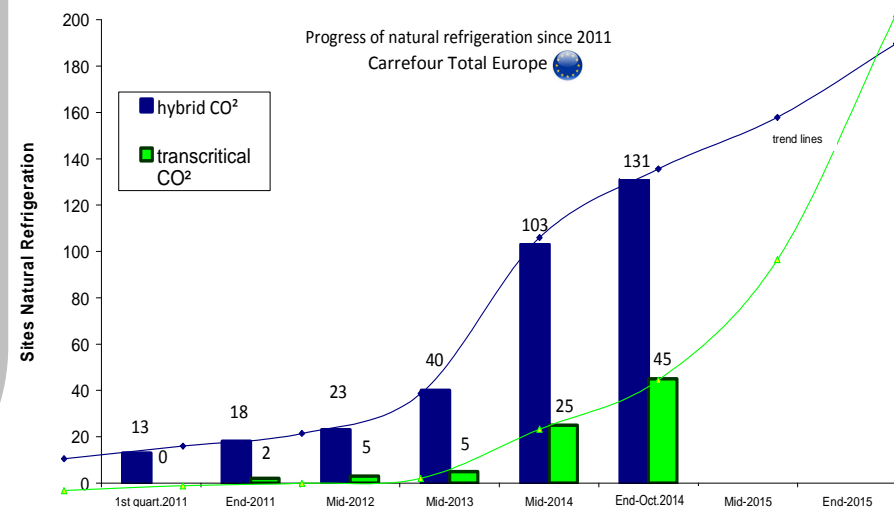
- Persist in tracking and reducing refrigerant leaks.

Gradually we deploy 100% CO<sup>2</sup> in transcritical mode, new projects and replace end life of equipment

- In the short term for special cases, we set hybrid cascade CO<sup>2</sup>/R134a to replace end of life equipment, glycol as a secondary refrigerant is an option.

### Beyond refrigeration

- In HVAC, in R&D mode with industry partners we evaluating natural refrigerants in the quest for a complete HFC-free solution.



## Full CO<sup>2</sup> solutions for warm regions are now possible



### Spain forefront in innovation CO<sup>2</sup>

• Through Spain 2 pilot stores in Valencia region we are confident that CO<sup>2</sup>TR solution with some technical adaptations runs efficiently in warm regions, we expect several projects in south of France, Italy, Brazil,...in parallel compression.

1 pilot hypermarket Alzira-Valencia running since november 2013-

#### Parallel Compression CO<sup>2</sup>

> significant savings are expecting

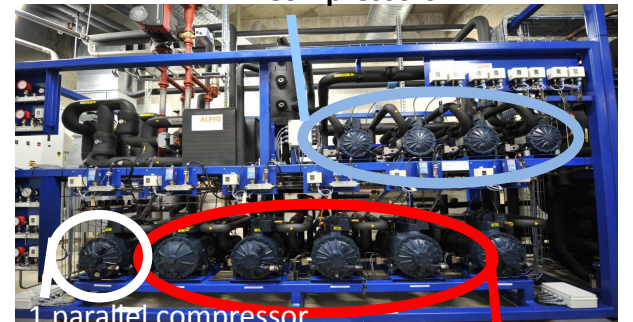
• 1 more pilot hypermarket Castellon-Valencia had been launched in 2014

#### Parallel Compression CO<sup>2</sup> + Ejector

> additional savings are expecting vs Alzira

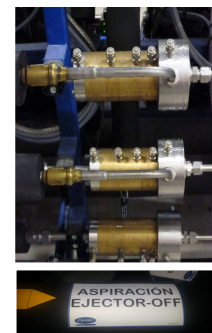


4 LT Compressors



1 parallel compressor

5 MT compressors





## 13% Electricity saving vs. former installation\*

\* (« LFL » figures, like-for-like comparison)

### Hypermarket Alzira-Valencia

#### What remained the same:

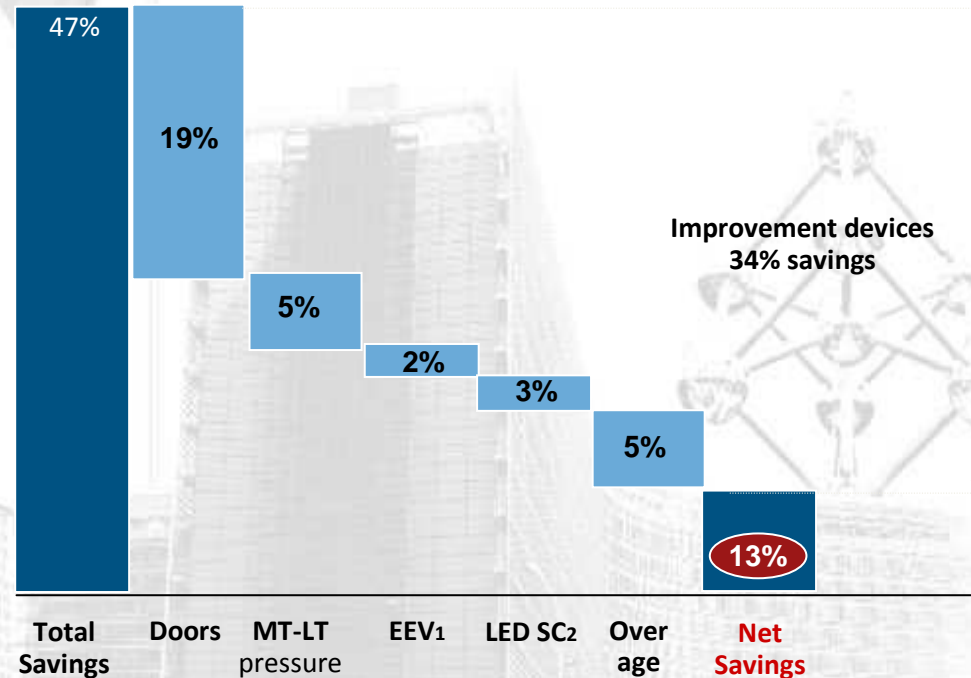
- Store layout and refrigeration displays
- Installation power
- Opening hours
- Climatic conditions

#### What has changed:

- Electricity consumption
- Maintenance cost
- Impact weather
- Report of improvement devices

#### Outcome:

- OPEX > 10 year accumulated savings 792 K€
- CAPEX > extra-cost 94 K€
- ROI > 1,2 year (10 years basis)



\* Dx R22 1. EEV > Electronic expansion valve 2. SC > showcases  
Source Carrefour Spain IDG-JMF 21012014 Madrid



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Thank you very much!