Carrier
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COOLtec

The Ultimate CO_2 Refrigeration System for every Food Retail Store Format
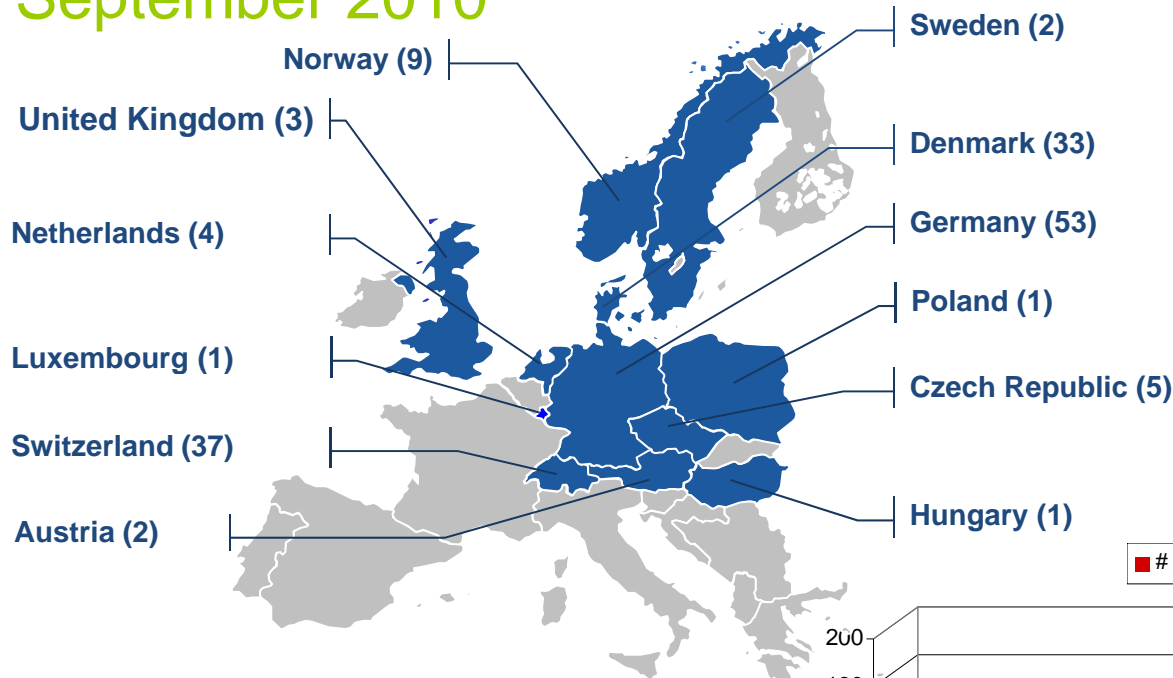
Atmosphere 2010, Brussels
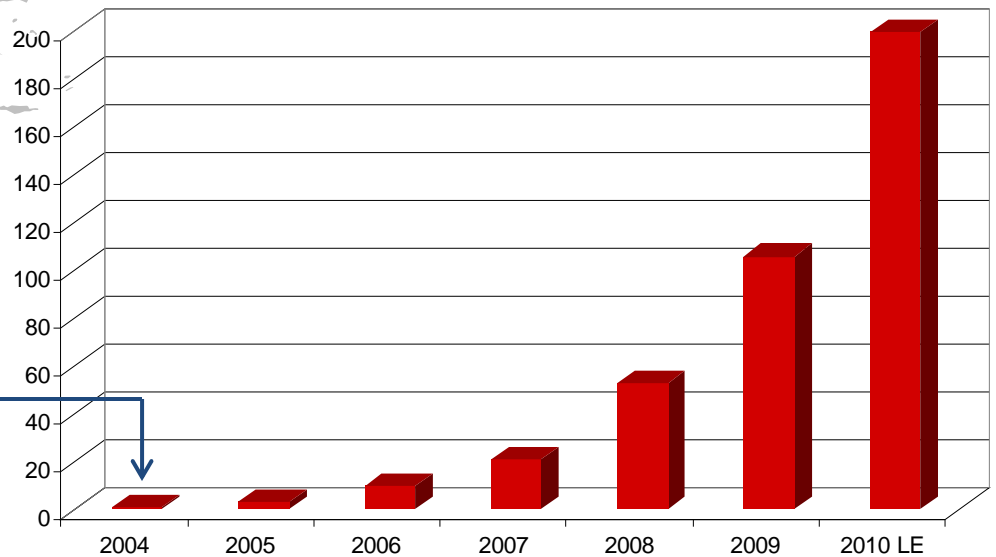
Speaker: Christoph Brouwers   27.09.2010

CO2OLtec SYSTEMS IN OPERATION

September 2010

Norway (9)

United Kingdom (3)

Netherlands (4)

Luxembourg (1)

Switzerland (37)

Austria (2)

Sweden (2)

Denmark (33)

Germany (53)

Poland (1)

Czech Republic (5)

Hungary (1)

YTD September 2010

> 150 stores in operation

> 18,5 MW MT refrigeration capacity

> 2 million operating hours (> 230 years)

First CO2OLtec system installation in Switzerland in year 2004

■ # CO2OLtec Stores in operation

	2004	2005	2006	2007	2008	2009	2010 LE

COOL$_2$tec SYSTEMS IN OPERATION

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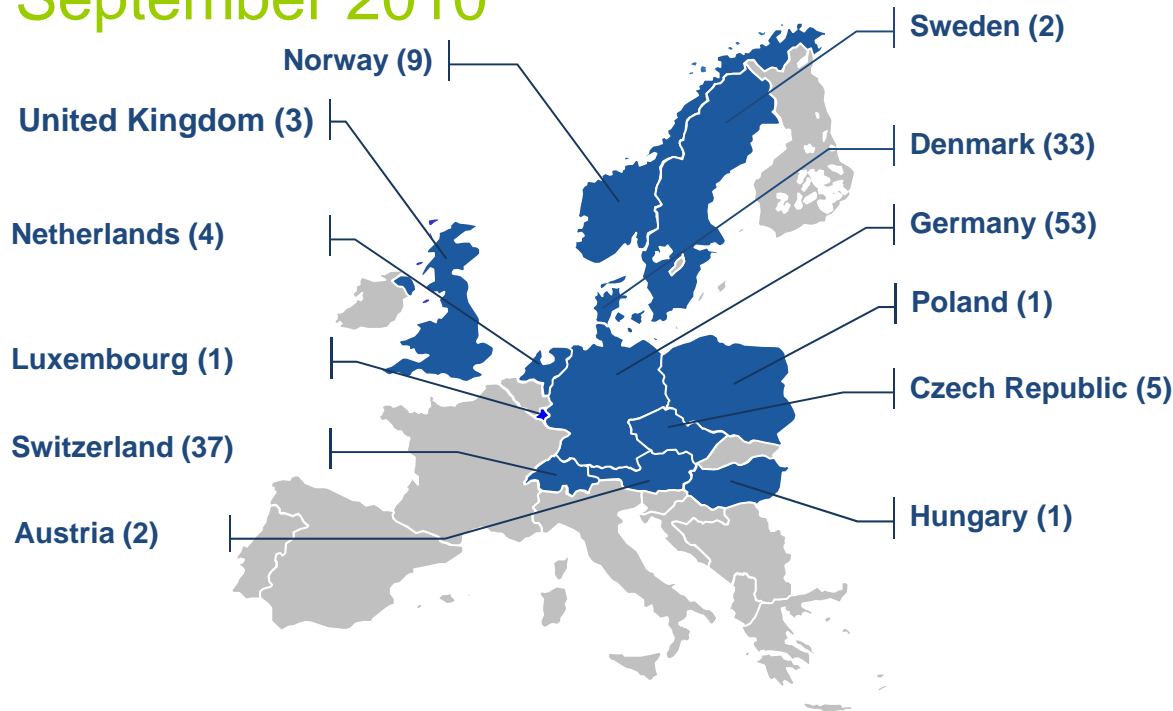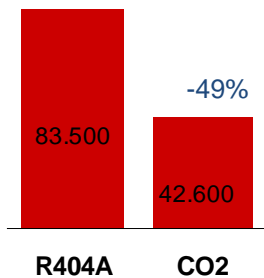
> 2 million operating hours (> 230 years)

Environmental Impact

CO$_2$ equivalent(tons)

-49%

83.500

42.600

R404A   **CO2**

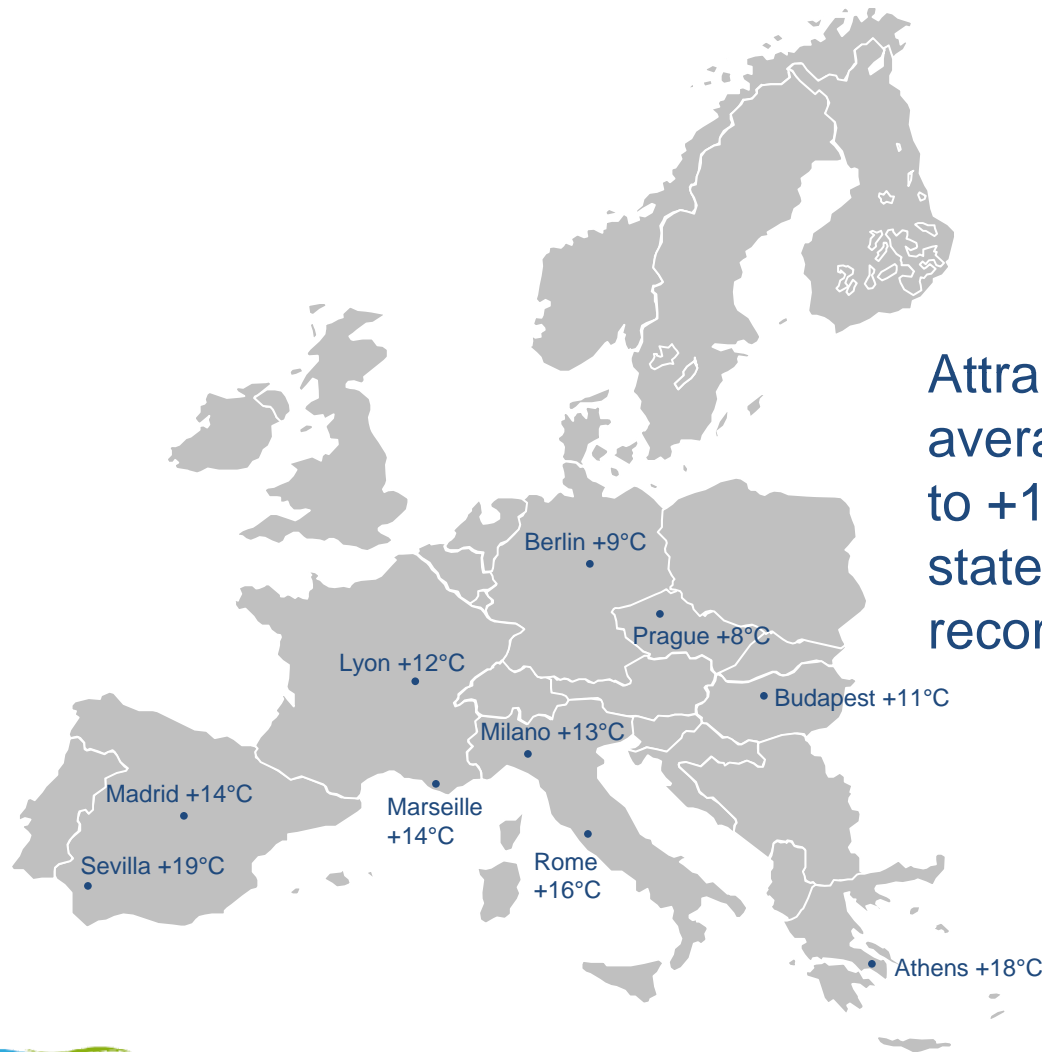### Cumulated reduction of CO$_2$ emissions

40.900 tons or*

12.900 X

• Average car using 0,12Kg CO2/km;
• run time 15.000 km per year

3

CO$_2$ DX REFRIGERATION SYSTEMS
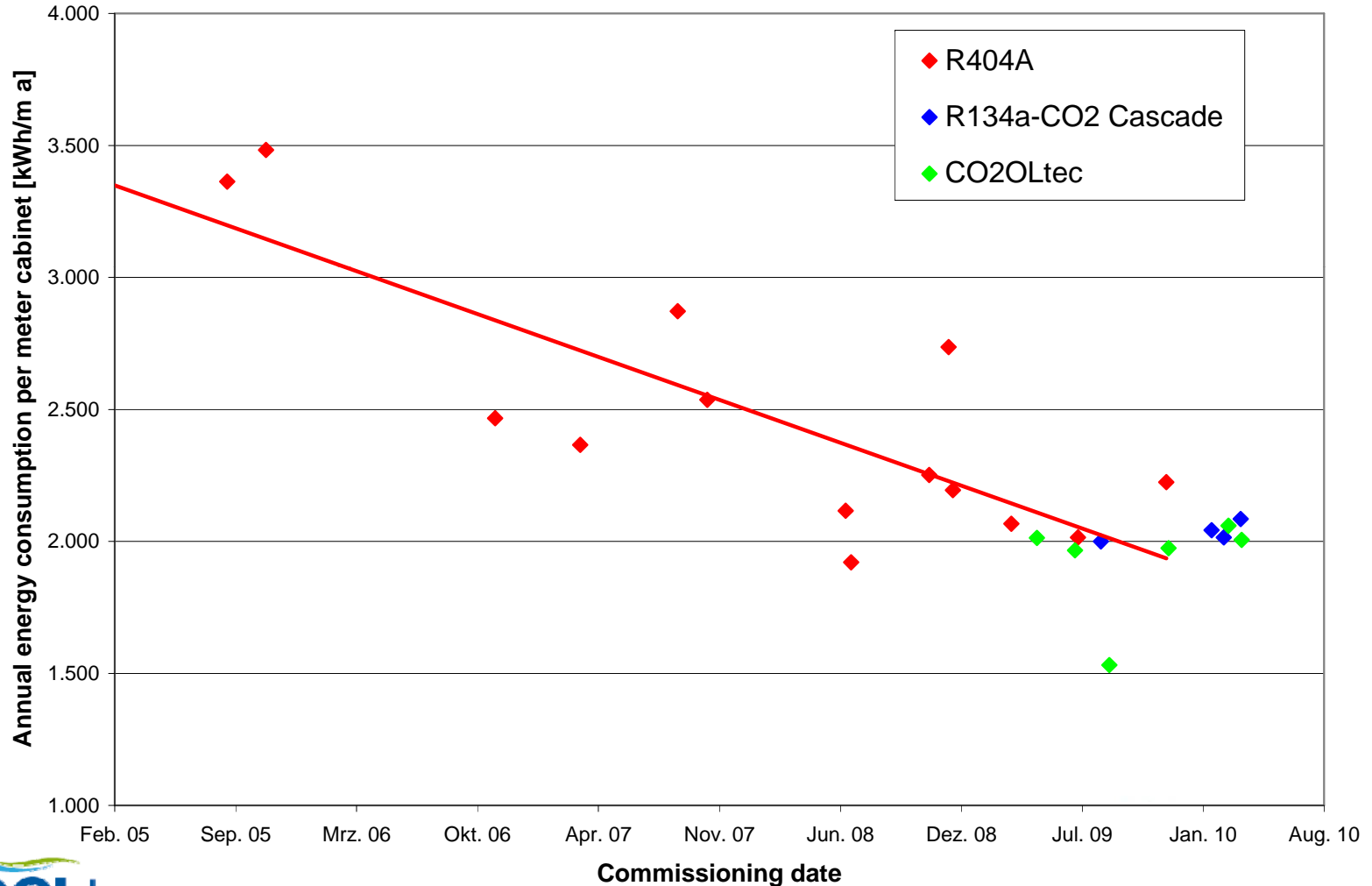

Attractive energy performance at average annual temperatures up to +15 °C in line with EPEE statement and energy data recording

Berlin +9°C

Prague +8°C

Lyon +12°C

Budapest +11°C

Milano +13°C

Madrid +14°C

Marseille +14°C

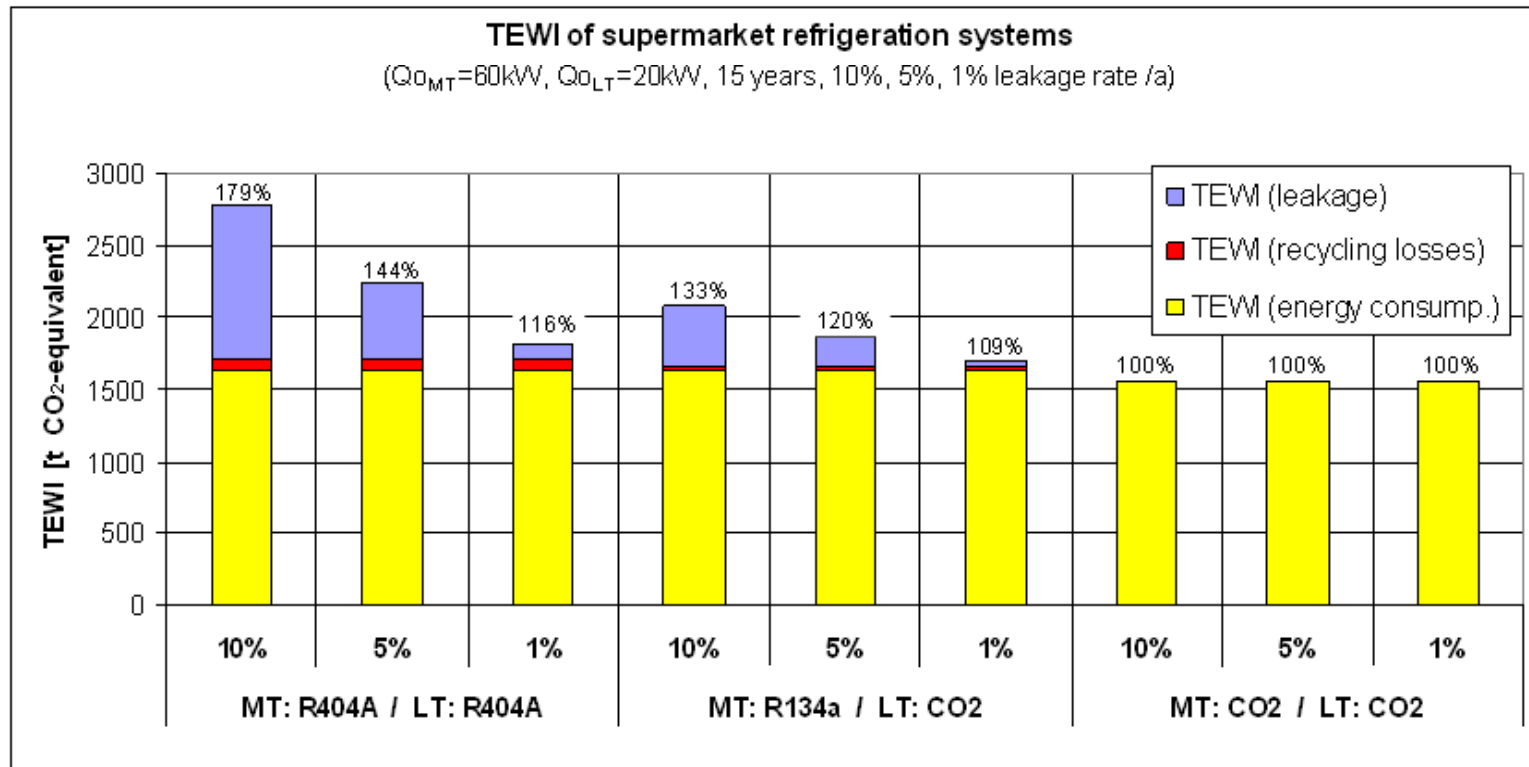Sevilla +19°C

Rome +16°C

Athens +18°C

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REFRIGERATION SYSTEMS COMPARISON
Energy consumption benchmark (measured)

WHY NATURAL REFRIGERANTS?
TEWI comparison for a supermarket format

TEWI of supermarket refrigeration systems
(Qo_{MT}=60kW, Qo_{LT}=20kW, 15 years, 10%, 5%, 1% leakage rate /a)

Legend:
- TEWI (leakage)
- TEWI (recycling losses)
- TEWI (energy consump.)

Y-axis: TEWI [t CO_2-equivalent]

Bar labels (left group MT: R404A / LT: R404A): 10% → 179%, 5% → 144%, 1% → 116%
Middle group (MT: R134a / LT: CO2): 10% → 133%, 5% → 120%, 1% → 109%
Right group (MT: CO2 / LT: CO2): 10% → 100%, 5% → 100%, 1% → 100%

Filling charge: R404A: 220kg   R134a: 210kg CO_2: 130kg
CO_2: 25kg

Data according German climate conditions

ENVIRONMENT IS PRECIOUS

Avoidance of direct emissions by:

Use of the natural refrigerant CO_2
with GWP=1

Reduction of indirect emissions by:

Proven energy efficiency of
CO_2 DX refrigeration systems

Carrier has the right refrigerant solution for every application, but not every application will have the same refrigerant solution.

TEWI

Indirect Emissions

Direct Emissions

think system,
master energy

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CO$_2$OLtec

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